

# 2019 Integrated *resource plan*

VOLUME II – APPENDICES A-L  
OCTOBER 18, 2019



**PACIFICORP**  
A BERKSHIRE HATHAWAY ENERGY COMPANY

*This 2019 Integrated Resource Plan Report is based upon the best available information at the time of preparation. The IRP action plan will be implemented as described herein, but is subject to change as new information becomes available or as circumstances change. It is PacifiCorp's intention to revisit and refresh the IRP action plan no less frequently than annually. Any refreshed IRP action plan will be submitted to the State Commissions for their information.*

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**Cover Photos (Top to Bottom):**

*Marengo Wind Project  
Transmission Line  
Electric Meter  
Pavant III Solar Plant*



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## APPENDIX A – LOAD FORECAST DETAILS

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### Introduction

This appendix reviews the load forecast used in the modeling and analysis of the 2019 Integrated Resource Plan (IRP), including scenario development for case sensitivities. The load forecast used in the IRP is an estimate of the energy sales, and peak demand over a 20-year period. The 20-year horizon is important to anticipate electricity demand in order to develop a timely response of resources.

In the development of its load forecast PacifiCorp employs econometric models that use historical data and inputs such as regional and national economic growth, weather, seasonality, and other customer usage and behavior changes. The forecast is divided into classes that use energy for similar purposes and at comparable retail rates. These separate customer classes include residential, commercial, industrial, irrigation, and lighting customer classes. The classes are modeled separately using variables specific to their usage patterns. For residential customers, typical energy uses include space heating, air conditioning, water heating, lighting, cooking, refrigeration, dish washing, laundry washing, televisions and various other end use appliances. Commercial and industrial customers use energy for production and manufacturing processes, space heating, air conditioning, lighting, computers and other office equipment.

Jurisdictional peak load forecasts are developed using econometric equations that relate observed monthly peak loads, peak producing weather and the weather-sensitive loads for all classes. The system coincident peak forecast, which is used in portfolio development, is the maximum load required on the system in any hourly period and is extracted from the hourly forecast model.

### Summary Load Forecast

PacifiCorp updated its load forecast in September 2018. The compound annual energy growth rate for the 10-year period (2019 through 2028) is 0.87 percent. Relative to the load forecast prepared for the 2017 IRP Update, PacifiCorp 2028 energy forecasted energy requirement increased in all jurisdictions other than Wyoming and Idaho, while PacifiCorp system energy requirement increased approximately 3.15 percent. Figure A.1 has a comparison of energy forecasts from the 2019 IRP to the 2017 IRP Update.

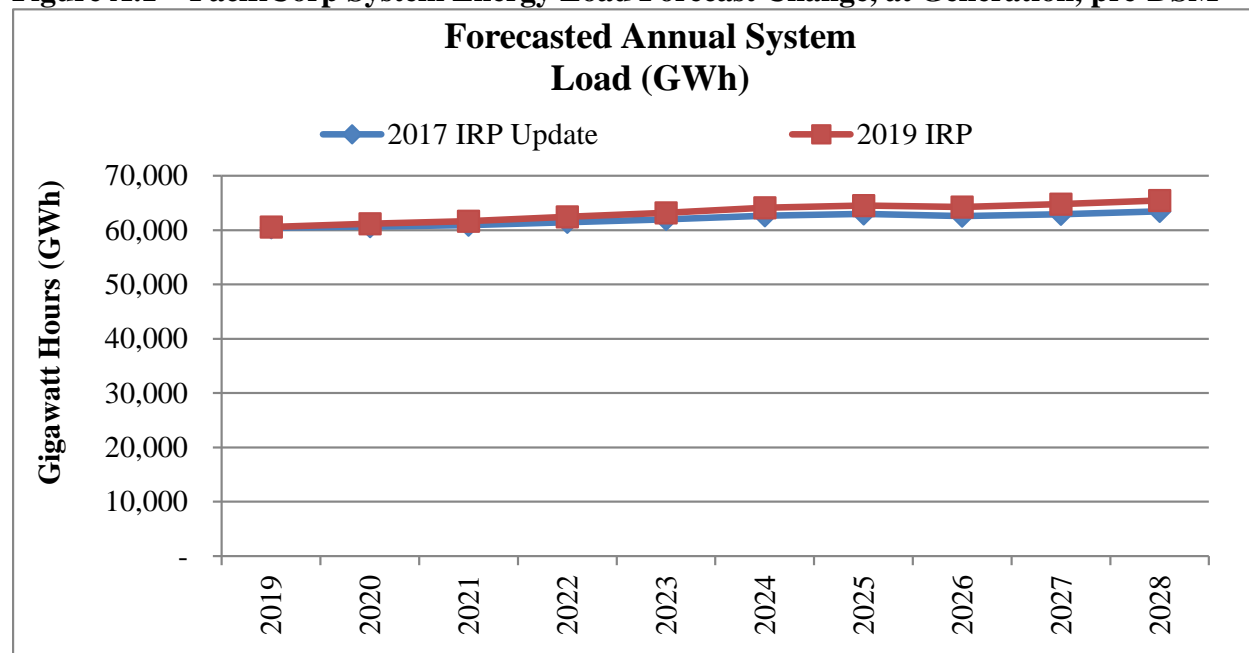
**Figure A.1 – PacifiCorp System Energy Load Forecast Change, at Generation, pre-DSM**

Table A.1 and Table A.2 show the annual load and coincident peak load forecast when not reducing load projections to account for new energy efficiency measures (Class 2 DSM).<sup>1</sup> Table A.3 and Table A.4 show the forecast changes relative to the 2017 IRP Update load forecast for loads and coincident system peak, respectively.

**Table A.1 Forecasted Annual Load, 2019 through 2028 (Megawatt-hours), at Generation, pre-DSM**

| Year                               | Total      | OR         | WA        | CA      | UT         | WY         | ID        |
|------------------------------------|------------|------------|-----------|---------|------------|------------|-----------|
| 2019                               | 60,555,090 | 15,116,420 | 4,648,980 | 888,050 | 25,905,480 | 10,034,340 | 3,961,820 |
| 2020                               | 61,200,990 | 15,458,460 | 4,683,290 | 894,090 | 26,240,960 | 9,947,800  | 3,976,390 |
| 2021                               | 61,668,220 | 15,762,730 | 4,696,950 | 886,220 | 26,490,100 | 9,844,530  | 3,987,690 |
| 2022                               | 62,430,120 | 16,073,620 | 4,724,840 | 883,300 | 26,889,210 | 9,851,110  | 4,008,040 |
| 2023                               | 63,189,850 | 16,226,410 | 4,756,440 | 881,850 | 27,359,260 | 9,935,110  | 4,030,780 |
| 2024                               | 64,099,060 | 16,422,560 | 4,802,810 | 882,180 | 27,876,700 | 10,058,210 | 4,056,600 |
| 2025                               | 64,561,310 | 16,522,910 | 4,821,500 | 877,420 | 28,220,370 | 10,052,750 | 4,066,360 |
| 2026                               | 64,235,860 | 16,669,290 | 4,855,450 | 873,460 | 27,647,290 | 10,110,510 | 4,079,860 |
| 2027                               | 64,827,020 | 16,821,000 | 4,892,190 | 867,600 | 27,944,390 | 10,210,990 | 4,090,850 |
| 2028                               | 65,443,430 | 17,016,870 | 4,944,450 | 863,690 | 28,255,530 | 10,260,170 | 4,102,720 |
| <b>Compound Annual Growth Rate</b> |            |            |           |         |            |            |           |
| 2019 - 2028                        | 0.87%      | 1.32%      | 0.69%     | -0.31%  | 0.97%      | 0.25%      | 0.39%     |

<sup>1</sup> Class 2 demand-side management (DSM) load reductions are included as resources in the System Optimizer model.

**Table A.2 – Forecasted Annual Coincident Peak Load (Megawatts) at Generation, pre-DSM**

| Year                        | Total  | OR    | WA    | CA     | UT    | WY    | ID    |
|-----------------------------|--------|-------|-------|--------|-------|-------|-------|
| 2019                        | 10,197 | 2,406 | 767   | 147    | 4,786 | 1,307 | 784   |
| 2020                        | 10,279 | 2,447 | 774   | 146    | 4,827 | 1,301 | 785   |
| 2021                        | 10,357 | 2,491 | 779   | 145    | 4,862 | 1,291 | 788   |
| 2022                        | 10,468 | 2,526 | 786   | 144    | 4,928 | 1,293 | 791   |
| 2023                        | 10,581 | 2,543 | 792   | 146    | 5,005 | 1,301 | 794   |
| 2024                        | 10,687 | 2,555 | 788   | 141    | 5,088 | 1,324 | 791   |
| 2025                        | 10,786 | 2,579 | 808   | 143    | 5,155 | 1,316 | 784   |
| 2026                        | 10,818 | 2,596 | 815   | 142    | 5,144 | 1,322 | 799   |
| 2027                        | 10,895 | 2,613 | 822   | 141    | 5,186 | 1,332 | 800   |
| 2028                        | 10,985 | 2,629 | 830   | 141    | 5,250 | 1,337 | 799   |
| Compound Annual Growth Rate |        |       |       |        |       |       |       |
| 2019 - 2028                 | 0.83%  | 0.99% | 0.88% | -0.49% | 1.03% | 0.25% | 0.21% |

**Table A.3 – Annual Load Change: September 2018 Forecast less November 2017 Forecast (Megawatt-hours) at Generation, pre-DSM**

| Year | Total     | OR        | WA      | CA       | UT        | WY        | ID       |
|------|-----------|-----------|---------|----------|-----------|-----------|----------|
| 2019 | 106,560   | (31,660)  | 46,810  | (11,290) | 33,630    | 28,140    | 40,930   |
| 2020 | 516,600   | 286,760   | 60,670  | 2,420    | 211,460   | (81,630)  | 36,920   |
| 2021 | 715,580   | 544,030   | 76,140  | 2,350    | 279,490   | (219,250) | 32,820   |
| 2022 | 978,340   | 757,450   | 90,500  | 3,300    | 389,520   | (288,990) | 26,560   |
| 2023 | 1,206,810 | 803,410   | 103,860 | 5,170    | 556,490   | (281,790) | 19,670   |
| 2024 | 1,437,060 | 851,760   | 113,690 | 6,560    | 712,080   | (257,650) | 10,620   |
| 2025 | 1,556,540 | 893,570   | 120,030 | 8,490    | 842,170   | (307,270) | (450)    |
| 2026 | 1,657,600 | 947,910   | 127,000 | 8,850    | 905,310   | (318,900) | (12,570) |
| 2027 | 1,904,560 | 1,004,000 | 137,810 | 6,900    | 1,069,810 | (287,310) | (26,650) |
| 2028 | 1,998,380 | 1,062,760 | 152,300 | 3,490    | 1,157,930 | (332,600) | (45,500) |

**Table A.4 – Annual Coincident Peak Change: September 2018 Forecast less November 2017 Forecast (Megawatts) at Generation, pre-DSM**

| Year | Total | OR  | WA | CA  | UT  | WY   | ID   |
|------|-------|-----|----|-----|-----|------|------|
| 2019 | 192   | 50  | 10 | (0) | 101 | 27   | 4    |
| 2020 | 241   | 88  | 10 | 0   | 123 | 18   | 2    |
| 2021 | 248   | 123 | 12 | (0) | 111 | 3    | (1)  |
| 2022 | 278   | 149 | 13 | (0) | 125 | (5)  | (4)  |
| 2023 | 314   | 157 | 15 | (0) | 155 | (5)  | (7)  |
| 2024 | 344   | 164 | 5  | (3) | 185 | 7    | (15) |
| 2025 | 366   | 173 | 17 | (0) | 194 | (8)  | (10) |
| 2026 | 396   | 182 | 19 | (0) | 222 | (10) | (16) |
| 2027 | 433   | 192 | 20 | (1) | 253 | (8)  | (23) |
| 2028 | 449   | 201 | 22 | (3) | 272 | (14) | (29) |

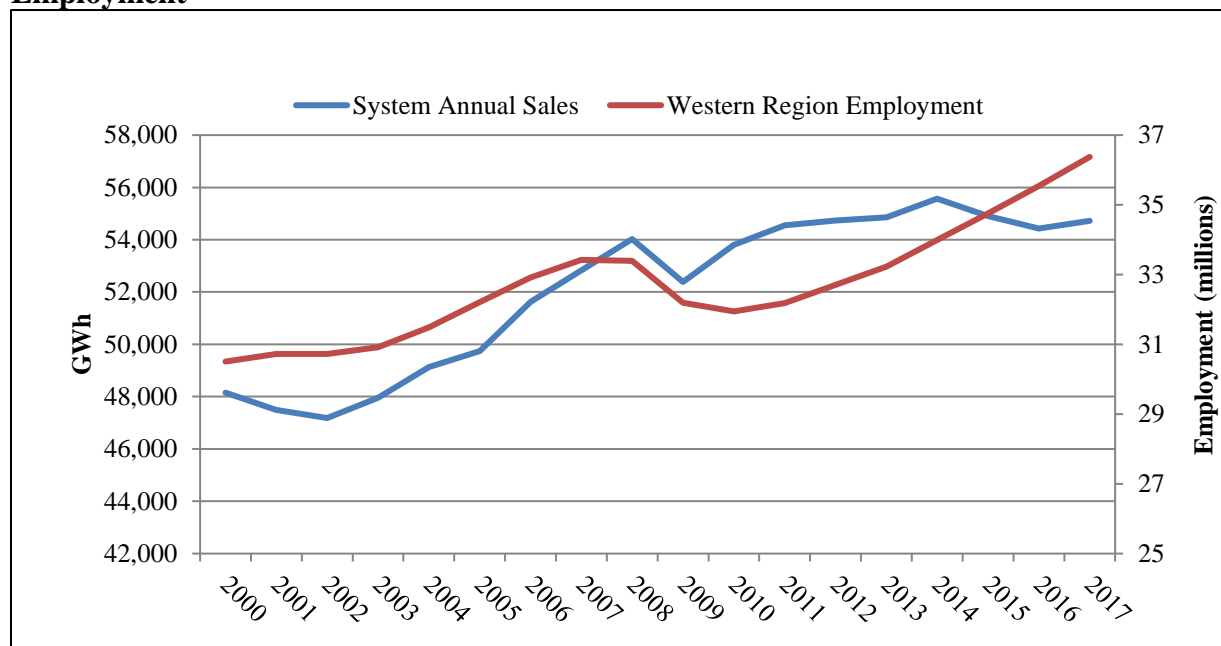
## Load Forecast Assumptions

### Regional Economy by Jurisdiction

The PacifiCorp electric service territory is comprised of six states and within these states the company serves customers in a total of 90 counties. The level of retail sales for each state and county is correlated with economic conditions and population statistics in each state. PacifiCorp

uses both economic data, such as employment, and population data, to forecast its retail sales. Looking at historical sales and employment data for PacifiCorp's service territory, 2000 through 2017, in Figure A.2, it is apparent that the company's retail sales are correlated to economic conditions in its service territory, and most recently the 2008-2009 recession.

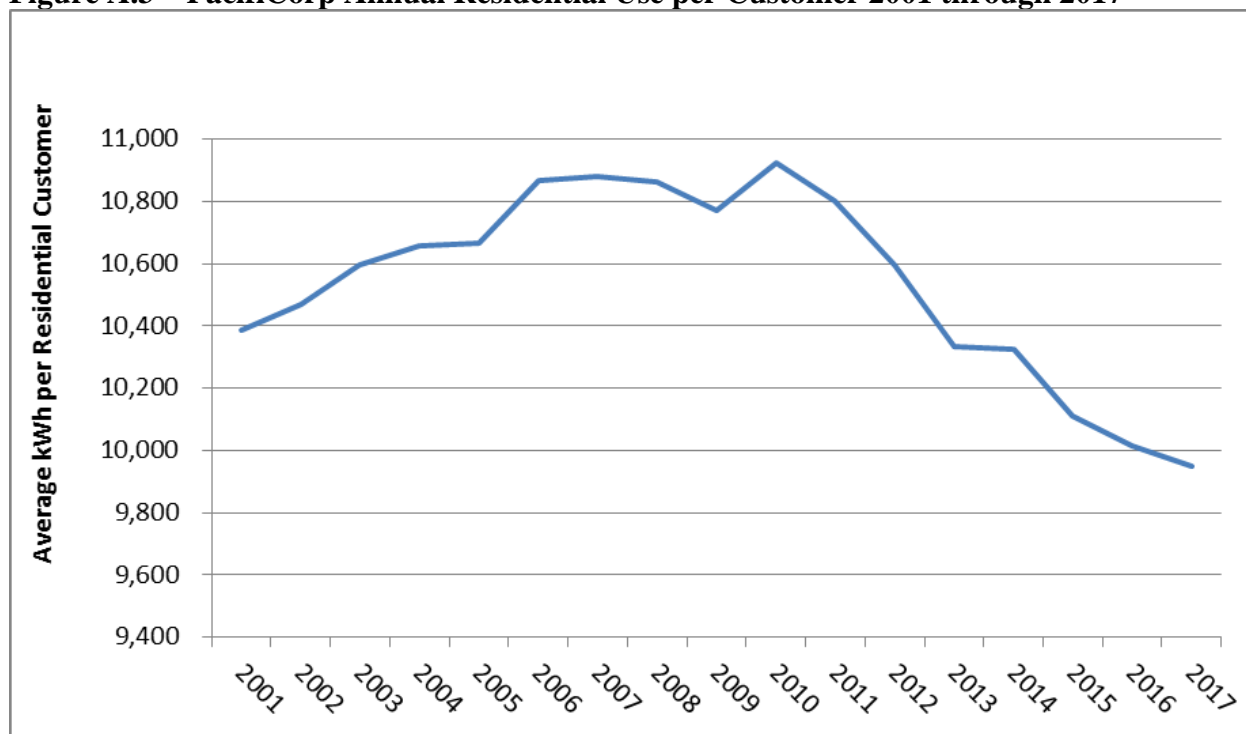
**Figure A.2 – PacifiCorp Annual Retail Sales 2000 through 2017 and Western Region Employment**



Sources: PacifiCorp and United States Department of Labor, Bureau of Labor Statistics

The 2019 IRP forecast utilizes the February 2018 release of IHS Markit economic driver forecast; whereas the 2017 IRP Update relies on the February 2017 release from IHS Markit. As discussed below, although both the economic and demographic forecast is relatively unchanged from the 2017 IRP Update, the load forecast has increased. There are two changes which are driving the 2019 IRP load and peak forecast higher. First, higher projected demand from data centers are driving up the commercial forecast; whereas, a higher residential customer forecast is driving a higher residential forecast.

Figure A.3 shows the weather normalized average system residential use per customer. As illustrated, residential use per customer has been decreasing since 2010.

**Figure A.3 – PacifiCorp Annual Residential Use per Customer 2001 through 2017**

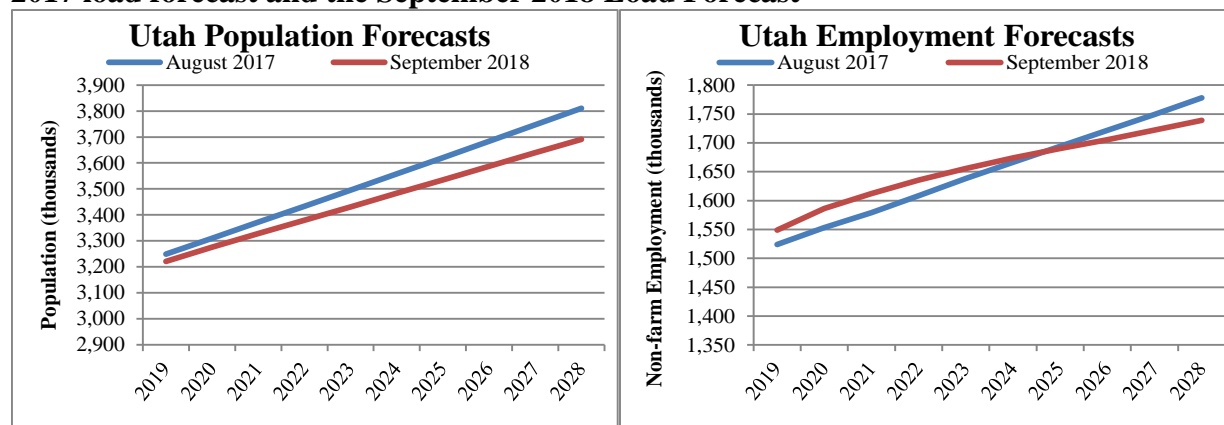
Residential use per customer across all six of PacifiCorp's states is changing due to increased energy efficiency driven primarily by lighting efficiency standards resulting from the 2007 Federal Energy legislation. In addition, there has been a shift from single-family and manufactured housing to multi-dwelling units and a trend of replacing older electric appliances with more energy efficient appliances.

## Utah

PacifiCorp serves 26 of the 29 counties in the state of Utah, with Salt Lake City being the largest metropolitan area served by the company within the state. Utah is expected to experience an annual increase of 1.30 percent in non-farm employment over the next 10 years. Figure A.4 shows the change in population and employment forecasts between the 2017 IRP Update relative to the 2019 IRP forecast. This figure illustrates that the population forecast is slightly lower. The employment forecast is slightly higher over the 2019 through 2024 timeframe, while it is lower over the 2025 through 2028 timeframe. Relative to the load forecast prepared for the 2017 IRP Update, the Utah 2028 retail load forecast increased approximately 4.95 percent. This increase is attributable to higher projected demand from data centers driving up the commercial forecast and higher residential demand due to higher projected residential customers.



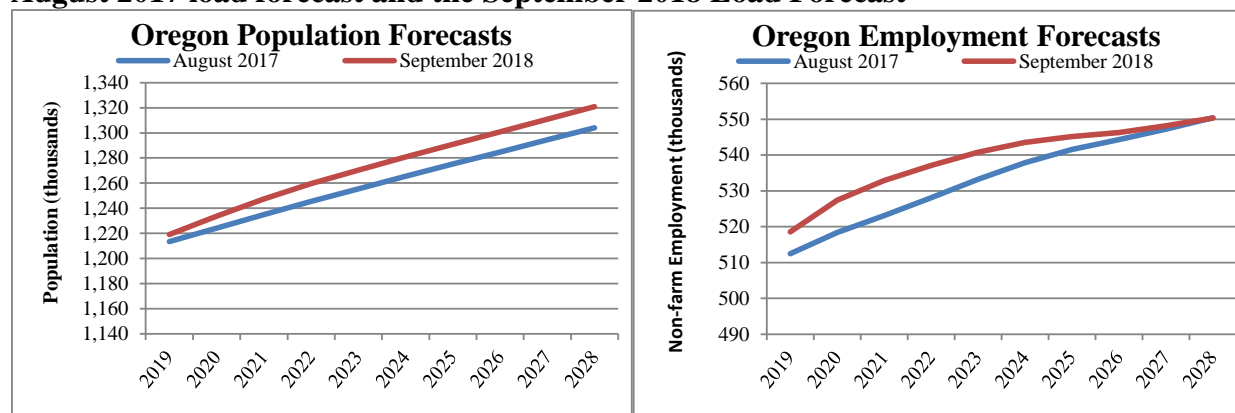
**Figure A.4 – IHS Global Insight Utah Household and Employment forecasts from the August 2017 load forecast and the September 2018 Load Forecast**



## Oregon

PacifiCorp serves 25 of the 36 counties in Oregon, but provided only 26.6 percent of ultimate electric retail sales in the state of Oregon in 2017.<sup>2</sup> Figure A.5 shows the change in population and employment forecasts for the 2017 IRP Update relative to the 2019 IRP forecast. This figure illustrates that the Oregon forecast of population and employment have both increased slightly. Relative to the load forecast prepared for the 2017 IRP Update, the Oregon 2028 retail load forecast has increased approximately 5.73 percent.

**Figure A.5 – IHS Global Insight Oregon Household and Employment forecasts from the August 2017 load forecast and the September 2018 Load Forecast**



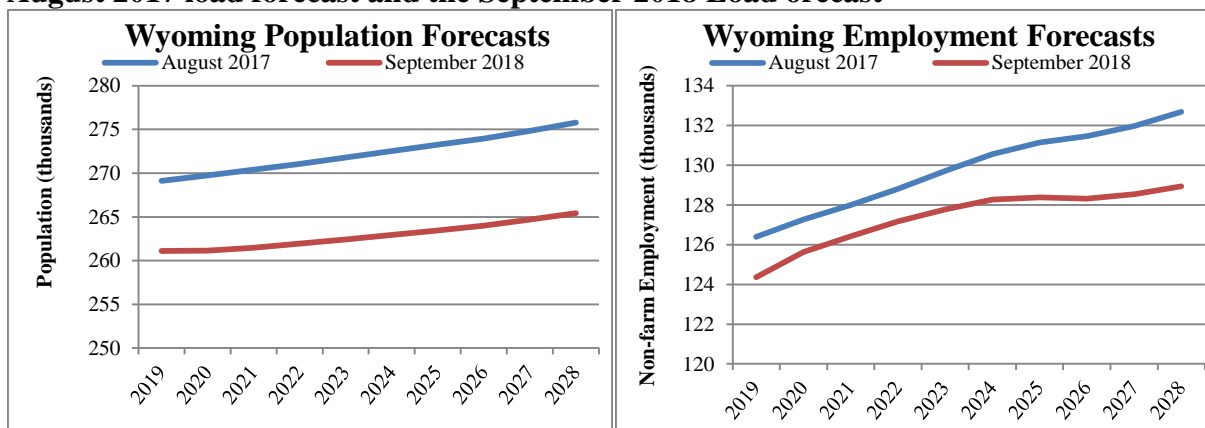
## Wyoming

PacifiCorp serves 15 of the 23 counties in Wyoming, with Casper being the largest metropolitan area served by the company in the state. Industrial sales make up approximately 74 percent of PacifiCorp's Wyoming sales. Figure A.6 shows the change in population and employment forecasts for the 2017 IRP Update relative to the 2019 IRP forecast. This figure illustrates that the Wyoming population forecast used in the 2019 IRP forecast has decreased relative to the 2017 IRP Update. Similarly, the employment forecast has also decreased. Relative to the load forecast

<sup>2</sup> Source: Oregon Public Utility Commission, 2017 Oregon Utility Statistics.

prepared for the 2017 IRP Update, the Wyoming 2028 retail load forecast decreased approximately 4.27 percent.

**Figure A.6 – IHS Global Insight Wyoming Household and Employment forecasts from the August 2017 load forecast and the September 2018 Load forecast**

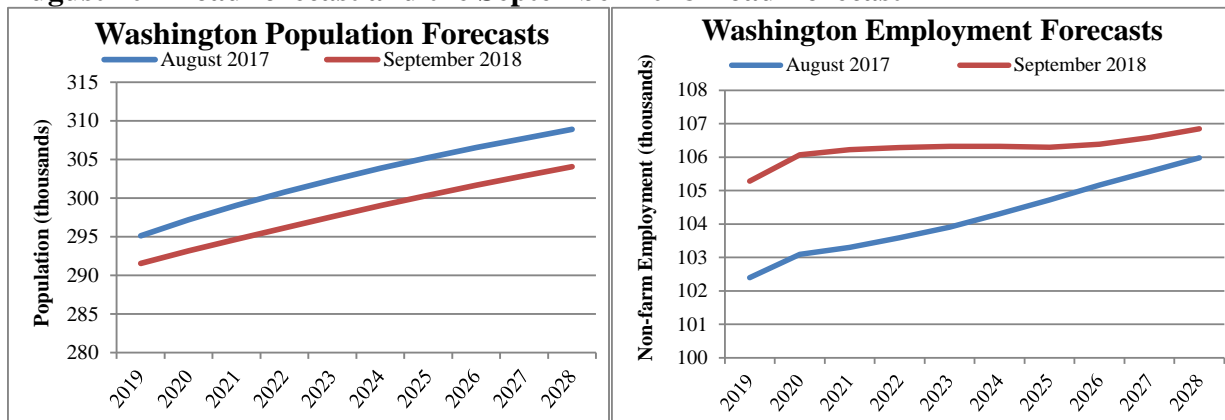


A risk to the Wyoming forecast is commodity prices, such as oil and natural gas, where volatility in prices and profitability can lead to swings in production and employment which translates to potential swings in the retail sales forecast.

## Washington

PacifiCorp serves the following counties in Washington State: Benton, Columbia, Cowlitz, Garfield, Walla Walla, and Yakima. Yakima is the most populated county that the company serves in Washington State and has a large concentration of agriculture and food processing businesses. Residential and commercial sales are roughly equal in size each making up approximately 39 percent of PacifiCorp's Washington sales. Figure A.7 shows the change in population and employment forecasts for the 2017 IRP Update relative to the 2019 IRP forecast. This figure illustrates that the population forecast is lower, while the employment forecast has increased. Relative to the load forecast prepared for the 2017 IRP Update, the Washington 2028 retail load forecast increased approximately 1.78 percent.

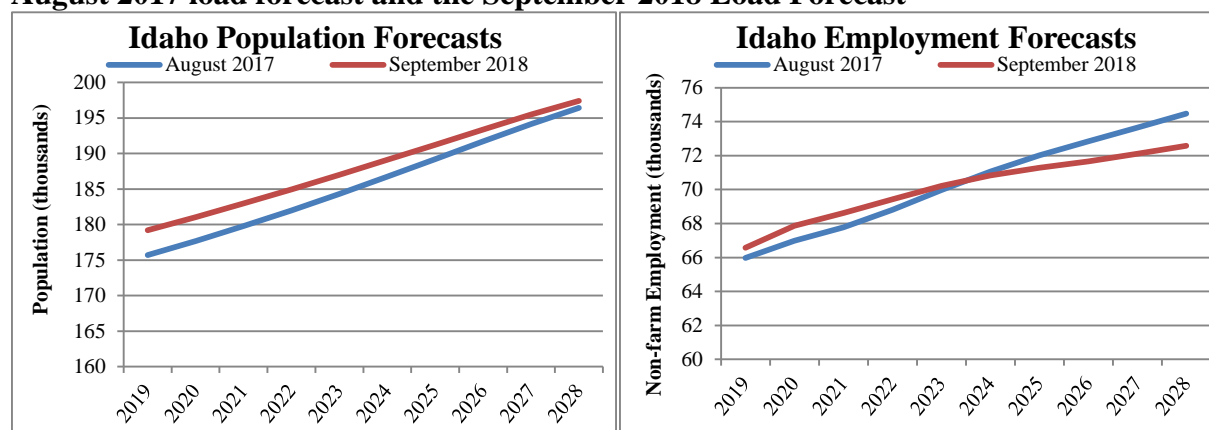
**Figure A.7 – IHS Global Insight Washington Household and Employment forecasts from the August 2017 load forecast and the September 2018 Load Forecast**



## Idaho

PacifiCorp serves 14 of the 44 counties in the state of Idaho, with the majority of the company's service territory in rural Idaho. Industrial sales make up approximately 50 percent of the company's Idaho sales. Figure A.8 shows the change in population and employment forecasts for the 2017 IRP Update relative to the 2019 IRP forecast. This figure illustrates that the forecast for population has increased, while the employment forecast has increased over the 2019 to 2023 timeframe and declined over the 2024 to 2028 timeframe. Relative to the load forecast prepared for the 2017 IRP Update, the Idaho 2028 retail load forecast decreased approximately 1.32 percent.

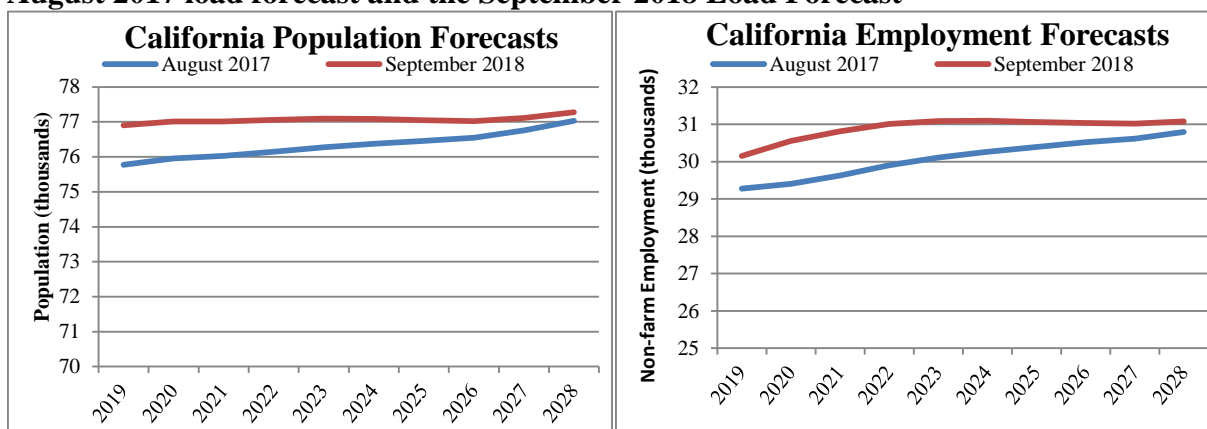
**Figure A.8 – IHS Global Insight Washington Household and Employment forecasts from the August 2017 load forecast and the September 2018 Load Forecast**



## California

The four northern California counties served by PacifiCorp are largely rural, which include Del Norte, Modoc, Shasta and Siskiyou Counties. Crescent City is the largest metropolitan area served by the company in California. Residential sales make up approximately 50 percent of the company's California sales. Figure A.9 shows the change in population and employment forecasts for the 2017 IRP Update relative to the 2019 IRP forecast. This figure illustrates that the population and employment forecasts have increased. Relative to the load forecast prepared for the 2017 IRP Update, the California 2028 retail load forecast increased 0.40 percent before energy efficiency (and decreased 0.85% after accounting for energy efficiency savings).

**Figure A.9 – IHS Global Insight California Household and Employment forecasts from the August 2017 load forecast and the September 2018 Load Forecast**

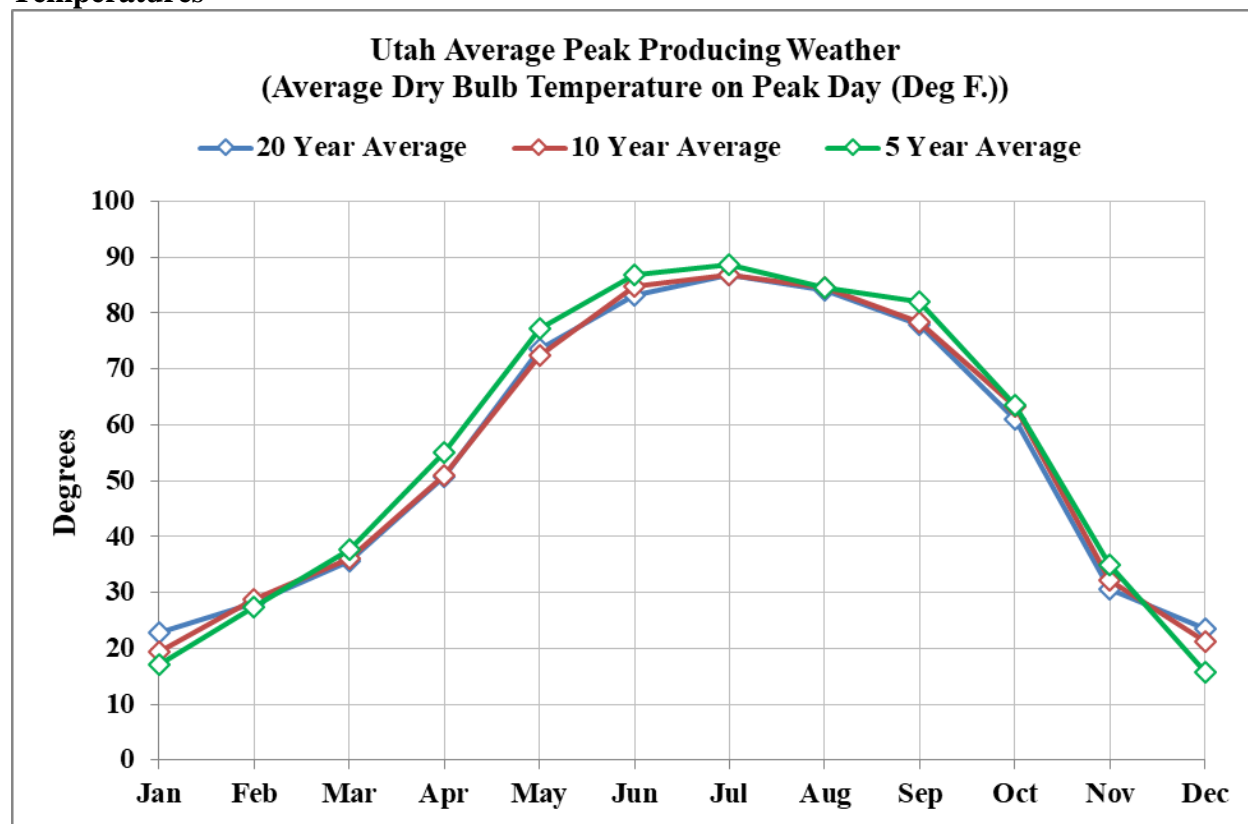


## Weather

PacifiCorp’s load forecast is based on normal weather defined by the 20-year time period of 1998-2017. The company updated its temperature spline models to the five-year time period of 2013-2017. PacifiCorp’s spline models are used to model the commercial and residential class temperature sensitivity at varying temperatures.

PacifiCorp has reviewed the appropriateness of using the average weather from a shorter time period as its “normal” peak weather. Figure A.10 indicates that peak producing weather does not change significantly when comparing five, 10, or 20 year average weather.

**Figure A.10 - Comparison of Utah 5, 10, and 20 Year Average Peak Producing Temperatures**



### Statistically Adjusted End-Use (“SAE”)

PacifiCorp models sales per customer for the residential class using the SAE model, which combines the end-use modeling concepts with traditional regression analysis techniques. Major drivers of the SAE-based residential model are heating and cooling related variables, equipment shares, saturation levels and efficiency trends, and economic drivers such as household size, income and energy price. PacifiCorp uses ITRON for its load forecasting software and services, as well as SAE. To predict future changes in the efficiency of the various end uses for the residential class, an excel spreadsheet model obtained from ITRON was utilized; the model includes appliance efficiency trends based on appliance life as well as past and future efficiency standards. The model embeds all currently applicable laws and regulations regarding appliance efficiency, along with life cycle models of each appliance. The life cycle models, based on the decay and replacement rate are necessary to estimate how fast the existing stock of any given appliance turns over, i.e. newer more efficient equipment replacing older less efficient equipment. The underlying efficiency data is based on estimates of energy efficiency from the US Department of Energy’s Energy Information Administration (EIA). The EIA estimates the efficiency of appliance stocks and the saturation of appliances at the national level and for individual Census Regions.

### Individual Customer Forecast

PacifiCorp updated its load forecast for a select group of large industrial customers, self-generation facilities of large industrial customers, and data center forecasts within the respective jurisdictions.

Customer forecasts are provided by the customer to PacifiCorp through a regional business manager (RBM).

## Actual Load Data

With the exception of the industrial class, PacifiCorp uses actual load data from January 2000 through February 2018. The historical data period used to develop the industrial monthly sales is from January 2000 through February 2018 in Utah, Wyoming, and Washington, January 2002 through February 2018 in Idaho, and January 2003 through February 2018 in California and January 2008 through February 2018 in Oregon.

The following tables are the annual actual retail sales, non-coincident peak, and coincident peak by state used in calculating the 2019 IRP retail sales forecast.

**Table A.5 - Weather Normalized Jurisdictional Retail Sales 2000 through 2017**

| <b>System Retail Sales - Megawatt-hours (MWh)*</b> |                   |              |               |              |                   |                |                   |
|--|-------------------|--------------|---------------|--------------|-------------------|----------------|-------------------|
| <b>Year</b>  | <b>California</b> | <b>Idaho</b> | <b>Oregon</b> | <b>Utah</b>  | <b>Washington</b> | <b>Wyoming</b> | <b>System</b>     |
| <b>2000</b>  | 776,330           | 3,094,742    | 14,047,381    | 18,765,857   | 4,099,269         | 7,373,138      | <b>48,156,718</b> |
| <b>2001</b>  | 778,256           | 2,987,391    | 13,529,960    | 18,490,759   | 4,020,032         | 7,680,903      | <b>47,487,300</b> |
| <b>2002</b>  | 800,256           | 3,218,294    | 13,097,842    | 18,642,679   | 4,017,549         | 7,405,485      | <b>47,182,104</b> |
| <b>2003</b>  | 819,413           | 3,243,349    | 13,071,848    | 19,279,071   | 4,067,427         | 7,471,935      | <b>47,953,042</b> |
| <b>2004</b>  | 845,263           | 3,300,658    | 13,188,745    | 19,880,615   | 4,101,526         | 7,808,927      | <b>49,125,734</b> |
| <b>2005</b>  | 835,878           | 3,232,797    | 13,199,197    | 20,253,628   | 4,211,933         | 8,011,258      | <b>49,744,691</b> |
| <b>2006</b>  | 859,459           | 3,348,273    | 13,911,150    | 21,117,901   | 4,130,862         | 8,252,936      | <b>51,620,581</b> |
| <b>2007</b>  | 874,813           | 3,384,194    | 14,023,385    | 21,983,724   | 4,076,966         | 8,481,524      | <b>52,824,605</b> |
| <b>2008</b>  | 866,625           | 3,413,508    | 13,771,921    | 22,691,490   | 4,073,872         | 9,209,482      | <b>54,026,899</b> |
| <b>2009</b>  | 828,967           | 2,965,022    | 13,128,912    | 22,157,832   | 4,048,793         | 9,258,055      | <b>52,387,581</b> |
| <b>2010</b>  | 841,471           | 3,426,215    | 13,158,282    | 22,661,371   | 4,052,934         | 9,664,860      | <b>53,805,133</b> |
| <b>2011</b>  | 803,462           | 3,472,522    | 13,029,055    | 23,457,892   | 4,018,089         | 9,765,559      | <b>54,546,579</b> |
| <b>2012</b>  | 785,674           | 3,518,810    | 13,044,180    | 23,859,599   | 4,045,878         | 9,475,326      | <b>54,729,467</b> |
| <b>2013</b>  | 775,001           | 3,549,834    | 13,081,879    | 23,839,238   | 4,059,599         | 9,551,554      | <b>54,857,105</b> |
| <b>2014</b>  | 775,699           | 3,544,391    | 13,136,140    | 24,418,898   | 4,105,424         | 9,587,978      | <b>55,568,531</b> |
| <b>2015</b>  | 747,798           | 3,468,932    | 13,093,004    | 24,117,031   | 4,102,238         | 9,377,276      | <b>54,906,279</b> |
| <b>2016</b>  | 757,112           | 3,491,849    | 13,185,654    | 23,796,978   | 4,041,996         | 9,153,908      | <b>54,427,497</b> |
| <b>2017</b>  | 760,943           | 3,574,912    | 13,164,078    | 23,707,035   | 4,080,132         | 9,433,527      | <b>54,720,628</b> |
| <b>Compound Annual Growth Rate</b>                 |                   |              |               |              |                   |                |                   |
| <b>2000-17</b>                                     | <b>-0.12%</b>     | <b>0.85%</b> | <b>-0.38%</b> | <b>1.38%</b> | <b>-0.03%</b>     | <b>1.46%</b>   | <b>0.75%</b>      |

\*System retail sales do not include sales for resale

**Table A.6 - Non-Coincident Jurisdictional Peak 2000 through 2017**

| <b>Non-Coincident Peak - Megawatts (MW)*</b> |                   |              |               |              |                   |                |               |
|--|-------------------|--------------|---------------|--------------|-------------------|----------------|---------------|
| <b>Year</b>                                  | <b>California</b> | <b>Idaho</b> | <b>Oregon</b> | <b>Utah</b>  | <b>Washington</b> | <b>Wyoming</b> | <b>System</b> |
| <b>2000</b>                                  | 176               | 686          | 2,603         | 3,684        | 785               | 1,062          | <b>8,995</b>  |
| <b>2001</b>                                  | 162               | 616          | 2,739         | 3,480        | 755               | 1,124          | <b>8,876</b>  |
| <b>2002</b>                                  | 174               | 713          | 2,639         | 3,773        | 771               | 1,113          | <b>9,184</b>  |
| <b>2003</b>                                  | 169               | 722          | 2,451         | 4,004        | 788               | 1,126          | <b>9,260</b>  |
| <b>2004</b>                                  | 193               | 708          | 2,524         | 3,862        | 920               | 1,111          | <b>9,318</b>  |
| <b>2005</b>                                  | 189               | 753          | 2,721         | 4,081        | 844               | 1,224          | <b>9,811</b>  |
| <b>2006</b>                                  | 180               | 723          | 2,724         | 4,314        | 822               | 1,208          | <b>9,970</b>  |
| <b>2007</b>                                  | 187               | 789          | 2,856         | 4,571        | 834               | 1,230          | <b>10,466</b> |
| <b>2008</b>                                  | 187               | 759          | 2,921         | 4,479        | 923               | 1,339          | <b>10,609</b> |
| <b>2009</b>                                  | 193               | 688          | 3,121         | 4,404        | 917               | 1,383          | <b>10,705</b> |
| <b>2010</b>                                  | 176               | 777          | 2,552         | 4,448        | 893               | 1,366          | <b>10,213</b> |
| <b>2011</b>                                  | 177               | 770          | 2,686         | 4,596        | 854               | 1,404          | <b>10,486</b> |
| <b>2012</b>                                  | 159               | 800          | 2,550         | 4,732        | 797               | 1,338          | <b>10,376</b> |
| <b>2013</b>                                  | 182               | 814          | 2,980         | 5,091        | 886               | 1,398          | <b>11,351</b> |
| <b>2014</b>                                  | 161               | 818          | 2,598         | 5,024        | 871               | 1,360          | <b>10,831</b> |
| <b>2015</b>                                  | 157               | 843          | 2,598         | 5,226        | 837               | 1,326          | <b>10,986</b> |
| <b>2016</b>                                  | 155               | 848          | 2,584         | 5,018        | 819               | 1,300          | <b>10,724</b> |
| <b>2017</b>                                  | 177               | 830          | 2,920         | 4,932        | 943               | 1,354          | <b>11,156</b> |
| <b>Compound Annual Growth Rate</b>           |                   |              |               |              |                   |                |               |
| <b>2000-17</b>                               | <b>0.06%</b>      | <b>1.13%</b> | <b>0.68%</b>  | <b>1.73%</b> | <b>1.09%</b>      | <b>1.44%</b>   | <b>1.27%</b>  |

\*Non-coincident peaks do not include sales for resale

**Table A.7- Jurisdictional Contribution to Coincident Peak 2000 through 2017**

| <b>Coincident Peak - Megawatts (MW)*</b> |                   |              |               |              |                   |                |               |
|--|-------------------|--------------|---------------|--------------|-------------------|----------------|---------------|
| <b>Year</b>                              | <b>California</b> | <b>Idaho</b> | <b>Oregon</b> | <b>Utah</b>  | <b>Washington</b> | <b>Wyoming</b> | <b>System</b> |
| <b>2000</b>                              | 154               | 523          | 2,347         | 3,684        | 756               | 979            | <b>8,443</b>  |
| <b>2001</b>                              | 124               | 421          | 2,121         | 3,479        | 627               | 1,091          | <b>7,863</b>  |
| <b>2002</b>                              | 162               | 689          | 2,138         | 3,721        | 758               | 1,043          | <b>8,511</b>  |
| <b>2003</b>                              | 155               | 573          | 2,359         | 4,004        | 774               | 1,022          | <b>8,887</b>  |
| <b>2004</b>                              | 120               | 603          | 2,200         | 3,831        | 740               | 1,094          | <b>8,588</b>  |
| <b>2005</b>                              | 171               | 681          | 2,238         | 4,015        | 708               | 1,081          | <b>8,895</b>  |
| <b>2006</b>                              | 156               | 561          | 2,684         | 3,972        | 816               | 1,094          | <b>9,283</b>  |
| <b>2007</b>                              | 160               | 701          | 2,604         | 4,381        | 754               | 1,129          | <b>9,730</b>  |
| <b>2008</b>                              | 171               | 682          | 2,521         | 4,145        | 728               | 1,208          | <b>9,456</b>  |
| <b>2009</b>                              | 153               | 517          | 2,573         | 4,351        | 795               | 987            | <b>9,375</b>  |
| <b>2010</b>                              | 144               | 527          | 2,442         | 4,294        | 757               | 1,208          | <b>9,373</b>  |
| <b>2011</b>                              | 143               | 549          | 2,187         | 4,596        | 707               | 1,204          | <b>9,387</b>  |
| <b>2012</b>                              | 156               | 782          | 2,163         | 4,731        | 749               | 1,225          | <b>9,806</b>  |
| <b>2013</b>                              | 156               | 674          | 2,407         | 5,091        | 797               | 1,349          | <b>10,474</b> |
| <b>2014</b>                              | 150               | 630          | 2,345         | 5,024        | 819               | 1,294          | <b>10,263</b> |
| <b>2015</b>                              | 152               | 805          | 2,472         | 5,081        | 833               | 1,259          | <b>10,601</b> |
| <b>2016</b>                              | 139               | 575          | 2,462         | 4,940        | 817               | 1,201          | <b>10,135</b> |
| <b>2017</b>                              | 152               | 593          | 2,547         | 4,911        | 787               | 1,306          | <b>10,296</b> |
| <b>Compound Annual Growth Rate</b>       |                   |              |               |              |                   |                |               |
| <b>2000-17</b>                           | <b>-0.08%</b>     | <b>0.74%</b> | <b>0.48%</b>  | <b>1.70%</b> | <b>0.24%</b>      | <b>1.71%</b>   | <b>1.17%</b>  |

\*Coincident peaks do not include sales for resale



## System Losses

Line loss factors are derived using the five-year average of the percent difference between the annual system load by jurisdiction and the retail sales by jurisdiction. System line losses were updated to reflect actual losses for the five-year period ending December 31, 2017.

## Forecast Methodology Overview

### Class 2 Demand-side Management Resources in the Load Forecast

PacifiCorp modeled Class 2 DSM as a resource option to be selected as part of a cost-effective portfolio resource mix using the company's capacity expansion optimization model, System Optimizer. The load forecast used for IRP portfolio development excluded forecasted load reductions from Class 2 DSM; System Optimizer then determines the amount of Class 2 DSM—expressed as supply curves that relate incremental DSM quantities with their costs—given the other resource options and inputs included in the model. The use of Class 2 DSM supply curves, along with the economic screening provided by System Optimizer, determines the cost-effective mix of Class 2 DSM for a given scenario.

### Modeling overview

The load forecast is developed by forecasting the monthly sales by customer class for each jurisdiction. The residential sales forecast is developed as a use-per-customer forecast multiplied by the forecast number of customers.

The customer forecasts are based on a combination of regression analysis and exponential smoothing techniques using historical data from January 2000 to February 2018. For the residential class, PacifiCorp forecasts the number of customers using IHS Global Insight's forecast of each state's number of population as the major driver.

For the 2019 IRP, PacifiCorp improved its residential customer forecasting methodology by adopting a differenced model approach in the development of the residential customer forecast. Rather than directly forecasting the number of customers as has been done in previous years, the differenced model predicts the monthly change in number of customers. The changes are accumulated and added to the initial number of customers to generate the final customer forecast. PacifiCorp had observed that directly forecasted customers, as done in previous years, consistently produced an under forecast of residential customers. PacifiCorp performed a historical comparison of the forecasted results using both methods against actual customer counts and determined the differenced model produced a more accurate customer forecast. As such the model was used to forecast load for the 2019 IRP, and resulted in an increase in the overall residential customer projections.

PacifiCorp models sales per customer for the residential class using the SAE model discussed above, which combines the end-use modeling concepts with traditional regression analysis techniques.

For the commercial class, the company forecasts sales using regression analysis techniques with non-manufacturing employment and non-farm employment designated as the major economic

drivers, in addition to weather-related variables. Monthly sales for the commercial class are forecast directly from historical sales volumes, not as a product of the use per customer and number of customers. The development of the forecast of monthly commercial sales involves an additional step; to reflect the addition of a large “lumpy” change in sales such as a new data center, monthly commercial sales are increased based on input from PacificCorp’s RBM’s. The treatment of large commercial additions is similar to the methodology for large industrial customer sales, which is discussed below.

Monthly sales for irrigation and street lighting are forecast directly from historical sales volumes, not as a product of the use per customer and number of customers.

The majority of industrial sales are modeled using regression analysis with trend and economic variables. Manufacturing employment is used as the major economic driver in all states with exception of Utah, in which an Industrial Production Index is used. For a small number of the very largest industrial customers, PacificCorp prepares individual forecasts based on input from the customer and information provided by the RBM’s.

After PacificCorp develops the forecasts of monthly energy sales by customer class, a forecast of hourly loads is developed in two steps. First, monthly peak forecasts are developed for each state. The monthly peak model uses historical peak-producing weather for each state, and incorporates the impact of weather on peak loads through several weather variables that drive heating and cooling usage. The weather variables include the average temperature on the peak day and lagged average temperatures from up to two days before the day of the forecast. The peak forecast is based on average monthly historical peak-producing weather for the 20-year period, 1998 through 2017. Second, PacificCorp develops hourly load forecasts for each state using hourly load models that include state-specific hourly load data, daily weather variables, the 20-year average temperatures as identified above, a typical annual weather pattern, and day-type variables such as weekends and holidays as inputs to the model. The hourly loads are adjusted to match the monthly peaks from the first step above. Hourly loads are then adjusted so the monthly sum of hourly loads equals monthly sales plus line losses.

After the hourly load forecasts are developed for each state, hourly loads are aggregated to the total system level. The system coincident peaks can then be identified, as well as the contribution of each jurisdiction to those monthly peaks.

## **Sales Forecast at the Customer Meter**

This section provides total system and state-level forecasted retail sales summaries measured at the customer meter by customer class including load reduction projections from new energy efficiency measures from the Preferred Portfolio.

**Table A.8 – System Annual Retail Sales Forecast 2019 through 2028, post-DSM**

| <b>System Retail Sales – Megawatt-hours (MWh)</b> |                    |                   |                   |                   |                 |                   |
|---|--------------------|-------------------|-------------------|-------------------|-----------------|-------------------|
| <b>Year</b>                                       | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Irrigation</b> | <b>Lighting</b> | <b>Total</b>      |
| <b>2019</b>                                       | 16,212,700         | 18,034,090        | 18,920,232        | 1,466,024         | 133,696         | <b>54,766,743</b> |
| <b>2020</b>                                       | 15,854,942         | 18,459,331        | 18,954,765        | 1,462,213         | 133,807         | <b>54,865,059</b> |
| <b>2021</b>                                       | 15,638,202         | 18,734,789        | 18,834,645        | 1,458,187         | 132,854         | <b>54,798,677</b> |
| <b>2022</b>                                       | 15,616,831         | 18,954,503        | 18,818,871        | 1,454,137         | 132,066         | <b>54,976,408</b> |
| <b>2023</b>                                       | 15,631,036         | 19,074,719        | 18,859,396        | 1,449,880         | 131,097         | <b>55,146,128</b> |
| <b>2024</b>                                       | 15,713,571         | 19,209,491        | 18,950,500        | 1,444,465         | 130,381         | <b>55,448,408</b> |
| <b>2025</b>                                       | 15,659,140         | 19,230,120        | 18,896,281        | 1,437,742         | 128,815         | <b>55,352,098</b> |
| <b>2026</b>                                       | 15,674,375         | 19,326,384        | 17,955,352        | 1,430,140         | 127,588         | <b>54,513,839</b> |
| <b>2027</b>                                       | 15,702,419         | 19,410,838        | 18,013,973        | 1,421,958         | 126,313         | <b>54,675,500</b> |
| <b>2028</b>                                       | 15,792,344         | 19,488,236        | 18,053,413        | 1,413,928         | 125,383         | <b>54,873,304</b> |
| <b>Compound Annual Growth Rate</b>                |                    |                   |                   |                   |                 |                   |
| <b>2019-28</b>                                    | <b>-0.29%</b>      | <b>0.87%</b>      | <b>-0.52%</b>     | <b>-0.40%</b>     | <b>-0.71%</b>   | <b>0.02%</b>      |

## Residential

Over the 2019-2028 timeframe, the average annual growth of the residential class sales forecast decreased from -0.28 percent in the 2017 IRP Update to -0.29 percent in the 2019 IRP. The number of residential customers across PacifiCorp's system is expected to grow at an annual average rate of 1.33 percent, reaching approximately 1.9 million customers in 2028, with Rocky Mountain Power states adding 1.64 percent per year and Pacific Power states adding 0.84 percent per year.

## Commercial

Average annual growth of the commercial class sales forecast increased from 0.18 percent annual average growth in the 2017 IRP Update to 0.87 percent expected average annual growth. The number of commercial customers across PacifiCorp's system is expected to grow at an annual average rate of 0.95 percent, reaching approximately 233,000 customers in 2028, with Rocky Mountain Power states adding 1.20 percent per year and Pacific Power states adding 0.61 percent per year.

## Industrial

Average annual growth of the industrial class sales forecast decreased from -0.23 percent annual average growth in the 2017 IRP Update to -0.52 percent expected annual growth. A portion of the company's industrial load is in the extractive industry in Utah and Wyoming; therefore, changes in commodity prices can impact the company's load forecast.

## State Summaries

### Oregon

Table A.9 summarizes Oregon state forecasted retail sales growth by customer class.

**Table A.9 – Forecasted Retail Sales Growth in Oregon, post-DSM**

| <b>Oregon Retail Sales – Megawatt-hours (MWh)</b> |                    |                   |                   |                   |                 |                   |
|---|--------------------|-------------------|-------------------|-------------------|-----------------|-------------------|
| <b>Year</b>                                       | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Irrigation</b> | <b>Lighting</b> | <b>Total</b>      |
| <b>2019</b>                                       | 5,633,553          | 5,434,085         | 1,793,918         | 327,801           | 39,963          | <b>13,229,320</b> |
| <b>2020</b>                                       | 5,585,633          | 5,629,864         | 1,801,507         | 327,928           | 40,220          | <b>13,385,151</b> |
| <b>2021</b>                                       | 5,556,225          | 5,790,809         | 1,794,568         | 327,934           | 40,180          | <b>13,509,716</b> |
| <b>2022</b>                                       | 5,556,664          | 5,918,154         | 1,786,929         | 327,933           | 40,220          | <b>13,629,900</b> |
| <b>2023</b>                                       | 5,560,848          | 5,902,220         | 1,782,399         | 327,944           | 40,250          | <b>13,613,661</b> |
| <b>2024</b>                                       | 5,585,036          | 5,896,025         | 1,782,806         | 327,778           | 40,386          | <b>13,632,030</b> |
| <b>2025</b>                                       | 5,562,845          | 5,865,984         | 1,778,446         | 327,419           | 40,289          | <b>13,574,983</b> |
| <b>2026</b>                                       | 5,564,157          | 5,851,239         | 1,781,633         | 327,076           | 40,308          | <b>13,564,414</b> |
| <b>2027</b>                                       | 5,571,868          | 5,840,305         | 1,784,666         | 326,715           | 40,326          | <b>13,563,879</b> |
| <b>2028</b>                                       | 5,605,191          | 5,846,409         | 1,791,562         | 326,393           | 40,460          | <b>13,610,015</b> |
| <b>Compound Annual Growth Rate</b>                |                    |                   |                   |                   |                 |                   |
| <b>2019-28</b>                                    | <b>-0.06%</b>      | <b>0.82%</b>      | <b>-0.01%</b>     | <b>-0.05%</b>     | <b>0.14%</b>    | <b>0.32%</b>      |

### Washington

Table A.10 summarizes Washington state forecasted retail sales growth by customer class.

**Table A.10 – Forecasted Retail Sales Growth in Washington, post-DSM**

| <b>Washington Retail Sales – Megawatt-hours (MWh)</b> |                    |                   |                   |                   |                 |                  |
|---|--------------------|-------------------|-------------------|-------------------|-----------------|------------------|
| <b>Year</b>   | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Irrigation</b> | <b>Lighting</b> | <b>Total</b>     |
| <b>2019</b>   | 1,592,714          | 1,578,131         | 784,573           | 158,742           | 9,629           | <b>4,123,789</b> |
| <b>2020</b>   | 1,570,960          | 1,592,676         | 786,855           | 158,600           | 9,645           | <b>4,118,735</b> |
| <b>2021</b>   | 1,554,764          | 1,588,547         | 783,146           | 158,437           | 9,592           | <b>4,094,486</b> |
| <b>2022</b>   | 1,548,303          | 1,585,273         | 778,282           | 158,162           | 9,546           | <b>4,079,565</b> |
| <b>2023</b>   | 1,545,173          | 1,580,260         | 773,376           | 157,836           | 9,484           | <b>4,066,130</b> |
| <b>2024</b>   | 1,548,861          | 1,578,084         | 772,198           | 157,483           | 9,442           | <b>4,066,068</b> |
| <b>2025</b>   | 1,540,807          | 1,566,204         | 768,629           | 157,091           | 9,342           | <b>4,042,072</b> |
| <b>2026</b>   | 1,538,798          | 1,560,228         | 768,325           | 156,638           | 9,270           | <b>4,033,259</b> |
| <b>2027</b>   | 1,537,675          | 1,556,561         | 768,111           | 156,191           | 9,197           | <b>4,027,735</b> |
| <b>2028</b>   | 1,543,009          | 1,559,989         | 769,585           | 155,719           | 9,154           | <b>4,037,455</b> |
| <b>Compound Annual Growth Rate</b>                    |                    |                   |                   |                   |                 |                  |
| <b>2019-28</b>  | <b>-0.35%</b>      | <b>-0.13%</b>     | <b>-0.21%</b>     | <b>-0.21%</b>     | <b>-0.56%</b>   | <b>-0.23%</b>    |

## California

Table A.11 summarizes California state forecasted sales growth by customer class.

**Table A.11 – Forecasted Retail Sales Growth in California, post-DSM**

| <b>California Retail Sales – Megawatt-hours (MWh)</b> |                    |                   |                   |                   |                 |                |
|---|--------------------|-------------------|-------------------|-------------------|-----------------|----------------|
| <b>Year</b>   | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Irrigation</b> | <b>Lighting</b> | <b>Total</b>   |
| <b>2019</b>   | 367,897            | 235,353           | 58,162            | 85,073            | 1,862           | <b>748,349</b> |
| <b>2020</b>   | 361,826            | 233,214           | 67,127            | 84,597            | 1,862           | <b>748,625</b> |
| <b>2021</b>   | 355,511            | 229,650           | 66,226            | 84,195            | 1,848           | <b>737,430</b> |
| <b>2022</b>   | 352,031            | 226,864           | 65,636            | 83,848            | 1,836           | <b>730,214</b> |
| <b>2023</b>   | 349,717            | 223,699           | 64,992            | 83,434            | 1,820           | <b>723,662</b> |
| <b>2024</b>   | 348,835            | 220,828           | 64,281            | 82,916            | 1,808           | <b>718,667</b> |
| <b>2025</b>   | 345,089            | 216,362           | 63,212            | 82,405            | 1,782           | <b>708,850</b> |
| <b>2026</b>   | 341,104            | 212,623           | 62,272            | 81,891            | 1,760           | <b>699,651</b> |
| <b>2027</b>   | 335,738            | 208,827           | 61,282            | 81,350            | 1,738           | <b>688,935</b> |
| <b>2028</b>   | 331,144            | 205,609           | 60,463            | 80,790            | 1,718           | <b>679,724</b> |
| <b>Compound Annual Growth Rate</b>                    |                    |                   |                   |                   |                 |                |
| <b>2019-28</b>  | <b>-1.16%</b>      | <b>-1.49%</b>     | <b>0.43%</b>      | <b>-0.57%</b>     | <b>-0.90%</b>   | <b>-1.06%</b>  |

## Utah

Table A.12 summarizes Utah state forecasted sales growth by customer class.

**Table A.12 – Forecasted Retail Sales Growth in Utah, post-DSM**

| <b>Utah Retail Sales – Megawatt-hours (MWh)</b> |                    |                   |                   |                   |                 |                   |
|---|--------------------|-------------------|-------------------|-------------------|-----------------|-------------------|
| <b>Year</b>                                     | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Irrigation</b> | <b>Lighting</b> | <b>Total</b>      |
| <b>2019</b>                                     | 6,958,632          | 8,924,202         | 7,530,762         | 227,083           | 68,050          | <b>23,708,729</b> |
| <b>2020</b>                                     | 6,722,640          | 9,127,823         | 7,641,629         | 226,518           | 67,972          | <b>23,786,583</b> |
| <b>2021</b>                                     | 6,585,633          | 9,255,377         | 7,650,500         | 225,843           | 67,339          | <b>23,784,691</b> |
| <b>2022</b>                                     | 6,586,282          | 9,355,618         | 7,689,331         | 225,172           | 66,786          | <b>23,923,189</b> |
| <b>2023</b>                                     | 6,610,009          | 9,503,731         | 7,719,130         | 224,471           | 66,122          | <b>24,123,463</b> |
| <b>2024</b>                                     | 6,664,829          | 9,652,768         | 7,763,907         | 223,747           | 65,575          | <b>24,370,827</b> |
| <b>2025</b>                                     | 6,659,418          | 9,744,139         | 7,768,559         | 222,910           | 64,592          | <b>24,459,618</b> |
| <b>2026</b>                                     | 6,686,629          | 9,887,868         | 6,828,384         | 222,092           | 63,782          | <b>23,688,755</b> |
| <b>2027</b>                                     | 6,722,653          | 10,010,002        | 6,850,869         | 221,261           | 62,940          | <b>23,867,725</b> |
| <b>2028</b>                                     | 6,788,210          | 10,091,495        | 6,900,904         | 220,444           | 62,269          | <b>24,063,321</b> |
| <b>Compound Annual Growth Rate</b>              |                    |                   |                   |                   |                 |                   |
| <b>2019-28</b>                                  | <b>-0.28%</b>      | <b>1.38%</b>      | <b>-0.97%</b>     | <b>-0.33%</b>     | <b>-0.98%</b>   | <b>0.17%</b>      |

## Idaho

Table A.13 summarizes Idaho state forecasted sales growth by customer class.

**Table A.13 – Forecasted Retail Sales Growth in Idaho, post-DSM**

| <b>Idaho Retail Sales – Megawatt-hours (MWh)</b> |                    |                   |                   |                   |                 |                  |
|--|--------------------|-------------------|-------------------|-------------------|-----------------|------------------|
| <b>Year</b>                                      | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Irrigation</b> | <b>Lighting</b> | <b>Total</b>     |
| <b>2019</b>                                      | 708,653            | 507,405           | 1,784,522         | 642,926           | 2,590           | <b>3,646,095</b> |
| <b>2020</b>                                      | 699,473            | 517,175           | 1,784,139         | 640,292           | 2,580           | <b>3,643,660</b> |
| <b>2021</b>                                      | 695,588            | 520,131           | 1,781,940         | 637,612           | 2,548           | <b>3,637,819</b> |
| <b>2022</b>                                      | 697,223            | 524,387           | 1,780,536         | 634,963           | 2,518           | <b>3,639,627</b> |
| <b>2023</b>                                      | 699,948            | 527,991           | 1,778,654         | 632,234           | 2,481           | <b>3,641,308</b> |
| <b>2024</b>                                      | 706,271            | 531,511           | 1,777,222         | 628,727           | 2,446           | <b>3,646,179</b> |
| <b>2025</b>                                      | 706,162            | 529,386           | 1,773,991         | 624,315           | 2,393           | <b>3,636,249</b> |
| <b>2026</b>                                      | 709,090            | 527,395           | 1,771,600         | 619,091           | 2,345           | <b>3,629,521</b> |
| <b>2027</b>                                      | 710,493            | 525,432           | 1,769,234         | 613,336           | 2,294           | <b>3,620,789</b> |
| <b>2028</b>                                      | 710,115            | 525,478           | 1,767,661         | 607,711           | 2,249           | <b>3,613,214</b> |
| <b>Compound Annual Growth Rate</b>               |                    |                   |                   |                   |                 |                  |
| <b>2019-28</b>                                   | <b>0.02%</b>       | <b>0.39%</b>      | <b>-0.11%</b>     | <b>-0.62%</b>     | <b>-1.55%</b>   | <b>-0.10%</b>    |

## Wyoming

Table A.14 summarizes Wyoming state forecasted sales growth by customer class.

**Table A.14 – Forecasted Retail Sales Growth in Wyoming, post-DSM**

| <b>Wyoming Retail Sales – Megawatt-hours (MWh)</b> |                    |                   |                   |                   |                 |                  |
|--|--------------------|-------------------|-------------------|-------------------|-----------------|------------------|
| <b>Year</b>  | <b>Residential</b> | <b>Commercial</b> | <b>Industrial</b> | <b>Irrigation</b> | <b>Lighting</b> | <b>Total</b>     |
| <b>2019</b>  | 951,251            | 1,354,914         | 6,968,294         | 24,398            | 11,603          | <b>9,310,460</b> |
| <b>2020</b>  | 914,411            | 1,358,579         | 6,873,509         | 24,277            | 11,528          | <b>9,182,304</b> |
| <b>2021</b>  | 890,481            | 1,350,275         | 6,758,266         | 24,167            | 11,347          | <b>9,034,535</b> |
| <b>2022</b>  | 876,329            | 1,344,207         | 6,718,156         | 24,060            | 11,161          | <b>8,973,913</b> |
| <b>2023</b>  | 865,341            | 1,336,818         | 6,740,843         | 23,962            | 10,940          | <b>8,977,905</b> |
| <b>2024</b>  | 859,738            | 1,330,275         | 6,790,086         | 23,814            | 10,724          | <b>9,014,636</b> |
| <b>2025</b>  | 844,820            | 1,308,045         | 6,743,444         | 23,601            | 10,416          | <b>8,930,325</b> |
| <b>2026</b>  | 834,596            | 1,287,030         | 6,743,137         | 23,352            | 10,123          | <b>8,898,239</b> |
| <b>2027</b>  | 823,992            | 1,269,711         | 6,779,811         | 23,106            | 9,818           | <b>8,906,437</b> |
| <b>2028</b>  | 814,676            | 1,259,257         | 6,763,239         | 22,872            | 9,532           | <b>8,869,576</b> |
| <b>Compound Annual Growth Rate</b>                 |                    |                   |                   |                   |                 |                  |
| <b>2019-28</b>                                     | <b>-1.71%</b>      | <b>-0.81%</b>     | <b>-0.33%</b>     | <b>-0.72%</b>     | <b>-2.16%</b>   | <b>-0.54%</b>    |

## Alternative Load Forecast Scenarios

The purpose of providing alternative load forecast cases is to determine the resource type and timing impacts resulting from a change in the economy or system peaks as a result of higher than normal temperatures.

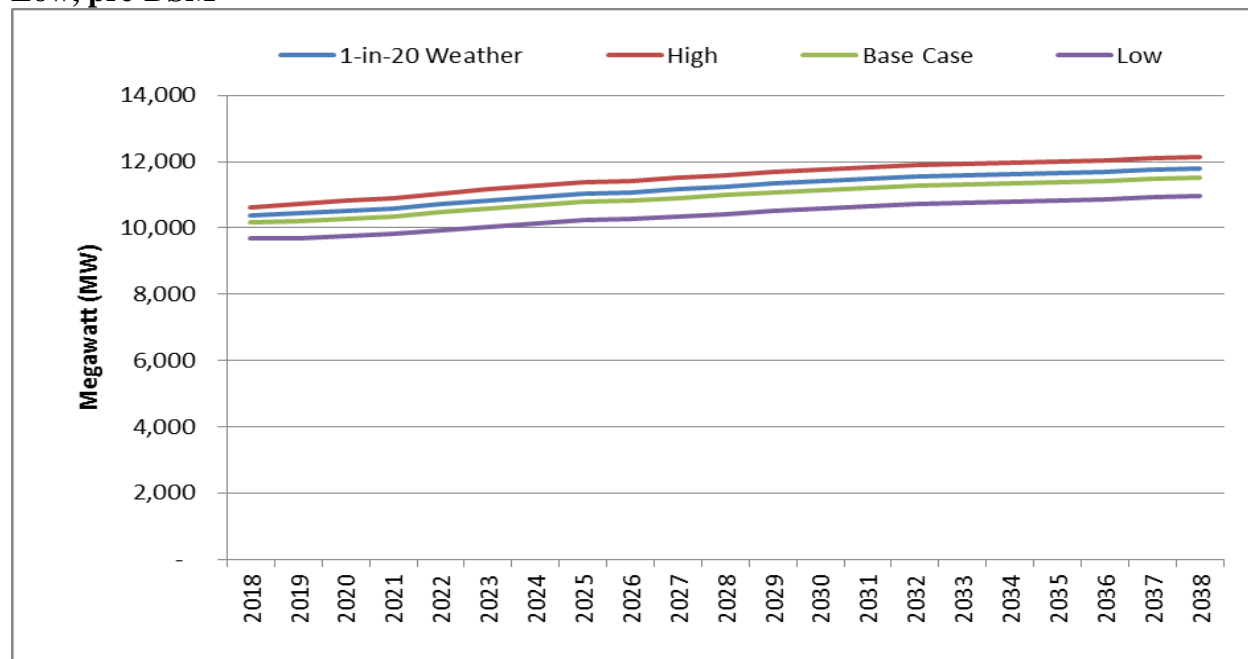
The September 2018 forecast is the baseline scenario. For the high and low load growth scenarios, optimistic and pessimistic economic driver assumptions from IHS Markit were applied to the economic drivers in PacifiCorp's load forecasting models. These growth assumptions were extended for the entire forecast horizon. Further, the high and low load growth scenarios also incorporate the standard error bands for the energy and the peak forecast to determine a 95 percent prediction interval around the base IRP forecast.

The 95 percent prediction interval is calculated at the system level and then allocated to each state and class based on their contribution to the variability of the system level forecast. The standard error bands for the jurisdictional peak forecasts were calculated in a similar manner. The final high load growth scenario includes the optimistic economic forecast plus the monthly energy adder and the monthly peak forecast with the peak adder. The final low load growth scenario includes the pessimistic economic forecast minus the monthly energy adder and monthly peak forecast minus the peak adder.

For the 1-in-20 year (5 percent probability) extreme weather scenario, PacifiCorp used 1-in-20 year peak weather for summer (July) months for each state. The 1-in-20 year peak weather is defined as the year for which the peak has the chance of occurring once in 20 years.

Figure A.11 shows the comparison of the above scenarios relative to the base case scenario.

**Figure A.11 – Load Forecast Scenarios for 1-in-20 Weather, High, Base Case and Low, pre-DSM**







## APPENDIX B - IRP REGULATORY COMPLIANCE

### Introduction

This appendix describes how PacifiCorp’s 2019 Integrated Resource Plan (IRP) complies with (1) the various state commission IRP standards and guidelines, (2) specific analytical requirements stemming from acknowledgment orders for the company’s 2017 Integrated Resource Plan (2017 IRP) and other ongoing IRP acknowledgement order requirements as applicable, and (3) state commission IRP requirements stemming from other regulatory proceedings.

Included in this appendix are the following tables:

- Table B.1 - Provides an overview and comparison of the rules in each state for which IRP submission is required.<sup>1</sup>
- Table B.2 - Provides a description of how PacifiCorp addressed the 2017 IRP acknowledgement order requirements and other commission directives.
- Table B.3 - Provides an explanation of how this plan addresses each of the items contained in the Oregon IRP guidelines.
- Table B.4 - Provides an explanation of how this plan addresses each of the items contained in the Public Service Commission of Utah IRP Standard and Guidelines issued in June 1992.
- Table B.5 - Provides an explanation of how this plan addresses each of the items contained in the Washington Utilities and Transportation Commission IRP guidelines issued in January 2006.
- Table B.6 - Provides an explanation of how this plan addresses each of the items contained in the Wyoming Public Service Commission IRP guidelines updated in March 2016.

### General Compliance

PacifiCorp prepares the IRP on a biennial basis and files the IRP with state commissions. The preparation of the IRP is done in an open public process with consultation from all interested parties, including commissioners and commission staff, customers, and other stakeholders. This open process provides parties with a substantial opportunity to contribute information and ideas in the planning process, and also serves to inform all parties on the planning issues and approach. The public input process for this IRP, described in Volume I, Chapter 2 (Introduction), as well as Volume II, Appendix C (Public Input Process) fully complies with IRP standards and guidelines.

The IRP provides a framework and plan for future actions to ensure PacifiCorp continues to provide reliable and least-cost electric service to its customers. The IRP evaluates, over a twenty-year planning period, the future load of PacifiCorp customers and the resources required to meet this load.

To fill any gap between changes in loads and existing resources, while taking into consideration potential early retirement of existing coal units as an alternative to investments that achieve

<sup>1</sup> California Public Utilities Code Section 454.5 allows utility with less than 500,000 customers in the state to request an exemption from filing an IRP. However, PacifiCorp files its IRP and IRP supplements with the California Public Utilities Commission to address the company plan for compliance with the California RPS requirements.

compliance with environmental regulations, the IRP evaluates a broad range of available resource options, as required by state commission rules. These resource options include supply-side, demand-side, and transmission alternatives. The evaluation of the alternatives in the IRP, as detailed in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and Chapter 8 (Modeling and Portfolio Selection Results) meets this requirement and includes the impact to system costs, system operations, supply and transmission reliability, and the impacts of various risks, uncertainties and externality costs that could occur. To perform the analysis and evaluation, PacifiCorp employs a suite of models that simulate the complex operation of the PacifiCorp system and its integration within the Western interconnection. The models allow for a rigorous testing of a reasonably broad range of commercially feasible resource alternatives available to PacifiCorp on a consistent and comparable basis. The analytical process, including the risk and uncertainty analysis, fully complies with IRP standards and guidelines, and is described in detail in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach).

The IRP analysis is designed to define a resource plan that is least-cost, after consideration of risks and uncertainties. To test resource alternatives and identify a least-cost, risk adjusted plan, portfolio resource options were developed and tested against each other. This testing included examination of various tradeoffs among the portfolios, such as average cost versus risk, reliability, customer rate impacts, and average annual carbon dioxide (CO<sub>2</sub>) emissions. This portfolio analysis and the results and conclusions drawn from the analysis are described in Volume I, Chapter 8 (Modeling and Portfolio Selection Results).

Consistent with the IRP standards and guidelines of Oregon, Utah, and Washington, this IRP includes an Action Plan in Volume I, Chapter 9 (Action Plan). The Action Plan details near-term actions that are necessary to ensure PacifiCorp continues to provide reliable and least-cost electric service after considering risk and uncertainty. The Action Plan also provides a progress report on action items contained in the 2017 IRP and 2017 IRP Update.

The 2019 IRP and related Action Plan are filed with each commission with a request for acknowledgment or acceptance, as applicable. Acknowledgment or acceptance means that a commission recognizes the IRP as meeting all regulatory requirements at the time of acknowledgment. In a case where a commission acknowledges the IRP in part or not at all, PacifiCorp may modify and seek to re-file an IRP that meets their acknowledgment standards or address any deficiencies in the next plan.

State commission acknowledgment orders or letters typically stress that an acknowledgment does not indicate approval or endorsement of IRP conclusions or analysis results. Similarly, an acknowledgment does not imply that favorable ratemaking treatment for resources proposed in the IRP will be given.

## California

Public Utilities Code Section 454.52, mandates that the California Public Utilities Commission (CPUC) adopt a process for load serving entities to file an IRP beginning in 2017. In February 2016, the CPUC opened a rulemaking to adopt an IRP process and address the scope of the IRP to be filed with the CPUC (Docket R.16.02.007).

Decision (D.) 18-02-018 instructed PacifiCorp to file an alternative IRP consisting of any IRP submitted to another public regulatory entity within the previous calendar year (Alternative Type

2 Load Serving Entity Plan). D. 18-02-018 also instructed PacifiCorp to provide an adequate description of treatment of disadvantaged communities, as well as a description of how planned future procurement is consistent with the 2030 Greenhouse Gas Benchmark.

On August 1, 2018, PacifiCorp resubmitted its 2017 IRP in compliance with D.18-02-018, and the CPUC approved PacifiCorp's resubmission in D.19-04-040 and deemed it to be in compliance.

On September 20, 2019 the CPUC issued a ruling in Docket R.16.02.007 setting forth proposed IRP filing requirements; CPUC Staff continues to recommend a nonstandard IRP filing plan for multi-jurisdictional utilities, including PacifiCorp. The company submitted comments in support of these filing requirements on October 14, 2019.

## Idaho

The Idaho Public Utilities Commission's (Idaho PUC) Order No. 22299, issued in January 1989, specifies integrated resource planning requirements. This order mandates that PacifiCorp submit a Resource Management Report (RMR) on a biennial basis. The intent of the RMR is to describe the status of IRP efforts in a concise format, and cover the following areas:

*Each utility's RMR should discuss any flexibilities and analyses considered during comprehensive resource planning, such as: (1) examination of load forecast uncertainties; (2) effects of known or potential changes to existing resources; (3) consideration of demand and supply side resource options; and (4) contingencies for upgrading, optioning and acquiring resources at optimum times (considering cost, availability, lead time, reliability, risk, etc.) as future events unfold.*

This IRP is submitted to the Idaho PUC as the Resource Management Report for 2019, and fully addresses the above report components.

## Oregon

This IRP is submitted to the Oregon Public Utility Commission (OPUC) in compliance with its planning guidelines issued in January 2007 (Order No. 07-002). The Oregon PUC's IRP guidelines consist of substantive requirements (Guideline 1), procedural requirements (Guideline 2), plan filing, review, and updates (Guideline 3), plan components (Guideline 4), transmission (Guideline 5), conservation (Guideline 6), demand response (Guideline 7), environmental costs (Guideline 8, Order No. 08-339), direct access loads (Guideline 9), multi-state utilities (Guideline 10), reliability (Guideline 11), distributed generation (Guideline 12), resource acquisition (Guideline 13), and flexible resource capacity (Order No. 12-013<sup>2</sup>). Consistent with the earlier guidelines (Order 89-507), the Oregon PUC notes that acknowledgment does not guarantee favorable ratemaking treatment, only that the plan seems reasonable at the time acknowledgment is given. Table B.3 provides detail on how this plan addresses each of the requirements.

## Utah

This IRP is submitted to the Public Service Commission of Utah in compliance with its 1992 Order on Standards and Guidelines for Integrated Resource Planning (Docket No. 90-2035-01, "Report

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<sup>2</sup> Public Utility Commission of Oregon, Order No. 12-013, Docket No. 1461, January 19, 2012.

and Order on Standards and Guidelines”). Table B.4 documents how PacifiCorp complies with each of these standards.

## Washington

This IRP is submitted to the Washington Utilities and Transportation Commission (WUTC) in compliance with its rule requiring least cost planning (Washington Administrative Code 480-100-238) (as amended, January 2006). In addition to a least cost plan, the rule requires provision of a two-year action plan and a progress report that “relates the new plan to the previously filed plan.”

The rule requires PacifiCorp to submit a work plan for informal commission review not later than 12 months prior to the due date of the plan. The work plan is required to lay out the contents of the IRP, the resource assessment method, and timing and extent of public participation. PacifiCorp filed a work plan with the WUTC on March 28, 2018, in Docket UE-180259. Table B.5 provides detail on how this IRP addresses each of the rule requirements.

## Wyoming

Wyoming Public Service Commission issued new rules that replaced the previous set of rules on March 21, 2016. Chapter 3, Section 33 outlines the requirements on filing IRPs for any utility serving Wyoming customers. The rule, shown below, went into effect in March 2016. Table B.6 provides detail on how this plan addresses the rule requirements.

***Section 33. Integrated Resource Plan (IRP).***

*Each utility serving in Wyoming that files an IRP in another jurisdiction shall file that IRP with the Commission. The Commission may require any utility to file an IRP.*

**Table B.1 – Integrated Resource Planning Standards and Guidelines Summary by State**

| <b>Topic</b>               | <b>Oregon</b>  | <b>Utah</b>   | <b>Washington</b>   | <b>Idaho</b>   | <b>Wyoming</b>  |
|----------------------------|--|---|---|--|---|
| <b>Source</b>              | <p>Order No. 07-002, <i>Investigation Into Integrated Resource Planning</i>, January 8, 2007, as amended by Order No. 07-047.</p> <p>Order No. 08-339, <i>Investigation into the Treatment of CO2 Risk in the Integrated Resource Planning Process</i>, June 30, 2008.</p> <p>Order No. 09-041, New Rule OAR 860-027-0400, implementing Guideline 3, “Plan Filing, Review, and Updates”.</p> <p>Order No. 12-013, “Investigation of Matters related to Electric Vehicle Charging”, January 19, 2012.</p> | Docket 90-2035-01 <i>Standards and Guidelines for Integrated Resource Planning</i> June 18, 1992. | WAC 480-100-251 Least cost planning, May 19, 1987, and as amended from WAC 480-100-238 <i>Least Cost Planning Rulemaking</i> , January 9, 2006 (Docket # UE-030311) | Order 22299 <i>Electric Utility Conservation Standards and Practices</i> January, 1989.  | Wyoming Electric, Gas and Water Utilities, Chapter 3, Section 33, March 21, 2016.                                   |
| <b>Filing Requirements</b> | Least-cost plans must be filed with the Oregon PUC.  | An IRP is to be submitted to commission.  | Submit a least cost plan to the WUTC. Plan to be developed with consultation of WUTC staff, and with public involvement.  | Submit Resource Management Report on planning status. Also file progress reports on conservation, low-income programs, lost opportunities and capability building. | Each utility serving in Wyoming that files and IRP in another jurisdiction, shall file the IRP with the commission. |

|                            |   |   |   |  |  |
|----------------------------|---|---|---|--|--|
| <b>Frequency</b>           | Plans filed biennially, within two years of its previous IRP acknowledgment order. An annual update to the most recently acknowledged IRP is required to be filed on or before the one-year anniversary of the acknowledgment order date. While informational only, utilities may request acknowledgment of proposed changes to the action plan.  | File biennially.  | File biennially.  | RMR to be filed at least biennially. Conservation reports to be filed annually. Low income reports to be filed at least annually. Lost Opportunities reports to be filed at least annually. Capability building reports to be filed at least annually. | The commission may require any utility to file an IRP.   |
| <b>Commission Response</b> | Least-cost plan (LCP) <i>acknowledged</i> if found to comply with standards and guidelines. A decision made in the LCP process does not guarantee favorable rate-making treatment. The OPUC may direct the utility to revise the IRP or conduct additional analysis before an acknowledgment order is issued.<br><br>Note, however, that Rate Plan legislation allows pre-approval of near-term resource investments. | IRP acknowledged if found to comply with standards and guidelines. Prudence reviews of new resource acquisitions will occur during rate making proceedings. | The plan will be considered, with other available information, when evaluating the performance of the utility in rate proceedings.<br><br>WUTC sends a letter discussing the report, making suggestions and requirements and acknowledges the report. | Report does not constitute pre-approval of proposed resource acquisitions.<br><br>Idaho sends a short letter stating that they accept the filing and acknowledge the report as satisfying commission requirements.                                     | Commission advisory staff reviews the IRP as directed by the Commission and drafts a memo to report its findings to the commission in an open meeting or technical conference. |



|                |  |  |  |   |  |
|----------------|--|--|--|---|--|
| <b>Process</b> | <p>The public and other utilities are allowed significant involvement in the preparation of the plan, with opportunities to contribute and receive information. Order 07-002 requires that the utility present IRP results to the Oregon PUC at a public meeting prior to the deadline for written public comments. Commission staff and parties should complete their comments and recommendations within six months after IRP filing. Competitive secrets must be protected.</p> | <p>Planning process open to the public at all stages. IRP developed in consultation with the commission, its staff, with ample opportunity for public input.</p>   | <p>In consultation with WUTC staff, develop and implement a public involvement plan. Involvement by the public in development of the plan is required. PacifiCorp is required to submit a work plan for informal commission review not later than 12 months prior to the due date of the plan. The work plan is to lay out the contents of the IRP, resource assessment method, and timing and extent of public participation.</p> | <p>Utilities to work with commission staff when reviewing and updating RMRs. Regular public workshops should be part of process.</p>  | <p>The review may be conducted in accordance with guidelines set from time to time as conditions warrant.</p> <p>The Public Service Commission of Wyoming, in its Letter Order on PacifiCorp's 2008 IRP (Docket No. 2000-346-EA-09) adopted commission Staff's recommendation to expand the review process to include a technical conference, an expanded public comment period, and filing of reply comments.</p> |
| <b>Focus</b>   | <p>20-year plan, with end-effects, and a short-term (two-year) action plan. The IRP process should result in the selection of that mix of options which yields, for society over the long run, the best combination of expected costs and variance of costs.</p>   | <p>20-year plan, with short-term (four-year) action plan. Specific actions for the first two years and anticipated actions in the second two years to be detailed. The IRP process should result in the selection of the optimal set of resources given the expected combination of costs, risk and uncertainty.</p> | <p>20-year plan, with short-term (two-year) action plan. The plan describes mix of resources sufficient to meet current and future loads at "lowest reasonable" cost to utility and ratepayers. Resource cost, market volatility risks, demand-side resource uncertainty, resource dispatchability, ratepayer risks, policy impacts, and environmental risks, must be considered.</p>  | <p>20-year plan to meet load obligations at least-cost, with equal consideration to demand side resources. Plan to address risks and uncertainties. Emphasis on clarity, understandability, resource capabilities and planning flexibility.</p> | <p>Identification of least-cost/least-risk resources and discussion of deviations from least-cost resources or resource combinations.</p>  |

| Elements | <p>Basic elements include:</p> <ul style="list-style-type: none"> <li>• All resources evaluated on a consistent and comparable basis.</li> <li>• Risk and uncertainty must be considered.</li> <li>• The primary goal must be least cost, consistent with the long-run public interest.</li> <li>• The plan must be consistent with Oregon and federal energy policy.</li> <li>• External costs must be considered, and quantified where possible. OPUC specifies environmental adders (Order No. 93-695, Docket UM 424).</li> <li>• Multi-state utilities should plan their generation and transmission systems on an integrated-system basis.</li> <li>• Construction of resource portfolios over the range of identified risks and uncertainties.</li> <li>• Portfolio analysis shall include fuel transportation and</li> </ul> | <p>IRP will include:</p> <ul style="list-style-type: none"> <li>• Range of forecasts of future load growth</li> <li>• Evaluation of all present and future resources, including demand side, supply side and market, on a consistent and comparable basis.</li> <li>• Analysis of the role of competitive bidding</li> <li>• A plan for adapting to different paths as the future unfolds.</li> <li>• A cost effectiveness methodology.</li> <li>• An evaluation of the financial, competitive, reliability and operational risks associated with resource options, and how the action plan addresses these risks.</li> <li>• Definition of how risks are allocated between ratepayers and shareholders</li> </ul> | <p>The plan shall include:</p> <ul style="list-style-type: none"> <li>• A range of forecasts of future demand using methods that examine the effect of economic forces on the consumption of electricity and that address changes in the number, type and efficiency of electrical end-uses.</li> <li>• An assessment of commercially available conservation, including load management, as well as an assessment of currently employed and new policies and programs needed to obtain the conservation improvements.</li> <li>• Assessment of a wide range of conventional and commercially available nonconventional generating technologies</li> <li>• An assessment of transmission system capability and reliability.</li> <li>• A comparative evaluation of energy supply resources (including transmission and distribution) and improvements in conservation using</li> </ul> | <p>Discuss analyses considered including:</p> <ul style="list-style-type: none"> <li>• Load forecast uncertainties;</li> <li>• Known or potential changes to existing resources;</li> <li>• Equal consideration of demand and supply side resource options;</li> <li>• Contingencies for upgrading, optioning and acquiring resources at optimum times;</li> <li>• Report on existing resource stack, load forecast and additional resource menu.</li> </ul> | <p>Proposed Commission Staff guidelines issued July 2016 cover:</p> <ul style="list-style-type: none"> <li>• Sufficiency of the public comment process</li> <li>• Utility strategic goals, resource planning goals and preferred resource portfolio</li> <li>• Resource need over the near-term and long-term planning horizons</li> <li>• Types of resources considered</li> <li>• Changes in expected resource acquisitions and load growth from the previous IRP</li> <li>• Environmental impacts considered</li> <li>• Market purchase evaluation</li> <li>• Reserve margin analysis</li> <li>• Demand-side management and conservation options</li> </ul> |
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|  | <p>transmission requirements.</p> <ul style="list-style-type: none"><li>• Plan includes conservation potential study, demand response resources, environmental costs, and distributed generation technologies.</li><li>• Avoided cost filing required within 30 days of acknowledgment.</li></ul> |  | <p>“lowest reasonable cost” criteria.</p> <ul style="list-style-type: none"><li>• Integration of the demand forecasts and resource evaluations into a long-range (at least 10 years) plan.</li><li>• All plans shall also include a progress report that relates the new plan to the previously filed plan.</li></ul> |  |  |
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**Table B.2 – Handling of 2017 IRP Acknowledgment and Other IRP Requirements**

| Reference                                    | IRP Requirement or Recommendation   | How the Requirement or Recommendation is Addressed in the 2019 IRP   |
|--|---|--|
| <b>Idaho</b>                                 |   |  |
| Case No. PAC-E-17-03, Order No. 34018, p. 14 | Expect the company to consider public input meeting process concerns raised in the 2017 IRP as related to the Energy Vision 2020 projects and continue to evaluate all resource options and the best interest of customers when developing the 2019 IRP.  | For the 2019 IRP, PacifiCorp expanded the public-input meeting process from seven to 18 public-input meetings and presented its preferred portfolio and draft action plan at the October 3-4, 2019 public-input meeting. See Volume II, Appendix C (Public Input Process).   |
| Case No. PAC-E-17-03, Order No. 34018, p. 14 | The company should let its modeling fully assess when a coal plant should be retired, and provide resource portfolios that are least-cost based on modeling, and not assumed coal plan retirement.  | Recognizing limitations in modeling regarding endogenous transmission retirements, PacifiCorp conducted comprehensive coal studies as part of its 2019 IRP. See Volume I, Chapter 8 (Modeling and Portfolio Selection Results) and Volume II, Appendix R (Coal Studies) in particular for more information.  |
| Case No. PAC-E-17-03, Order No. 34018, p. 14 | Expect the company to continue improving its forecasting methodologies by analyzing a broad and diverse range of measures to avoid disadvantageous or unfair forecasting treatment of certain resources over others, including coal and wind.   | See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach).  |
| <b>Oregon</b>                                |   |  |
| Order No. 14-252, p. 3                       | Beginning in the third quarter of 2014, PacifiCorp will appear before the Commission to provide quarterly updates on coal plant compliance requirements, legal proceedings, pollution control investments, and other major capital expenditures on its coal plants or transmission projects. PacifiCorp may provide a written report and need not appear if there are no significant changes between the quarterly updates. | <p>Order No. 14-288 modified the requirements, moving the date of the first meeting from the third quarter of 2014 to the fourth quarter of 2014.</p> <p>Order No. 16-071 further streamlined this requirement by requiring the company to continue to provide twice yearly updates on the status of demand-side management (DSM) IRP acquisition goals at public meetings and include in these updates information on future coal plant and transmission investment decisions. Also include information on 111(d) rule compliance analysis;</p> <p>Environmental/coal and transmission expenditures quarterly presentations were made at Commission special public meetings on October 28, 2014 and March 16, 2015. Quarterly presentations via written reports were provided on June 30, 2015 and October 1, 2015. The 2015 fourth quarter presentation was made at the Commission special public meeting on December 17, 2015.</p> <p>A biannual DSM update was provided at the Commission public meetings on March 10, 2015 and December 15, 2015</p> <p>Biannual presentations for both Environmental/coal and transmission</p> |

| Reference  | IRP Requirement or Recommendation  | How the Requirement or Recommendation is Addressed in the 2019 IRP  |
|--|--|---|
|  |  | <p>expenditures/111(d) and DSM were provided on August 30, 2016 and December 20, 2016.</p> <p>Please see Commission website for public meeting history and Docket RE 163 for presentations and written reports provided.</p>  |
| Order No. 14-252, p. 3                             | <p>In future IRPs, PacifiCorp will provide:</p> <ul style="list-style-type: none"> <li>• Timelines and key decision points for expected pollution control options and transmission investments; and</li> <li>• Tables detailing major planned expenditures with estimated costs in each year for each plant or transmission project, under different modeled scenarios.</li> </ul> | <p>PacifiCorp has included two Regional Haze scenarios in the 2019 IRP. See Volume II, Appendix M (Case Study Fact Sheets) for discussion on specific Regional Haze assumptions. For modeling purposes PacifiCorp has included incremental transmission costs associated with specific resources. See Volume I, Chapter 6 (Resource Options) for discussion of these potential costs.</p> <p>Additional detail is provided on the data discs included with the 2019 IRP filing.</p> |
| Order No. 14-252, p. 13                            | <p>In the acknowledgement order the Commission provided the following recommendation:<br/>As part of the 2015, 2017, and 2019 IRPs, PacifiCorp will provide an updated version of the screening tool spreadsheet model that was provided to participants in the 2011 (docket LC 52) IRP Update.</p>  | <p>The screening tool is no longer used to model competing retirement scenarios. In the 2019 IRP, PacifiCorp conducted comprehensive coal studies. See Volume I, Chapter 8 (Modeling and Portfolio Selection Results) and Volume II, Appendix R (Coal Studies) in particular for more information.</p>  |
| Order No. 14-252, p. 16                            | <p>In future IRPs, PacifiCorp will provide yearly Demand Response (Class 1) and Energy Efficiency (Class 2) DSM acquisition targets in both GWh and MW for each year in the planning period, by state.</p>   | <p>See Volume II, Appendix D (Demand-Side Management Resources) for the breakdown by state and year for both energy and capacity selected for the preferred portfolio.</p>  |
| Order No. 16-071, p. 4                             | <p>The Commission expects the company to update its Clean Power Plan modeling in its 2015 IRP update or its next IRP (depending on when Oregon's compliance plan is known) to correctly reflect the final rule and Oregon's implementation plan.</p>   | <p>PacifiCorp's 2019 IRP notes that the Clean Power Plan rule is stayed and that no implementation plans or compliance measures impacted the 2019 IRP.</p>  |
| Order No. 16-071, p. 5                             | <p>In addition to the action item 3a irrigation pilot program, the Oregon PUC directs PacifiCorp to design and present additional pilots.</p>  | <p>PacifiCorp presented information on potential demand response pilot opportunities at the Oregon PUC's August 16, 2016 public input meeting and explained that the 2017 IRP would inform whether the company would propose additional pilot programs.</p>   |
| Order No. 16-071, Appendix A, p.1 (action item 3b) | <p>Continue to provide twice yearly updates on the status of DSM IRP acquisition goals at public meetings. Include in these updates information on future coal plant and transmission investment decisions, as a streamlined continuation of Order No. 14-288.</p>   | <p>PacifiCorp provided updates on the status of DSM acquisition goals to the Oregon PUC on October 5, 2018 and August 5, 2019.</p> <p>PacifiCorp did not conduct a sensitivity on accelerated DSM in the 2019 IRP.</p>  |

| Reference   | IRP Requirement or Recommendation   | How the Requirement or Recommendation is Addressed in the 2019 IRP  |
|---|---|---|
|   | <p>Also include information on 111 (d) rule compliance analysis;</p> <p>Provide more risk analysis on portfolios that include accelerated energy efficiency as a resource;</p> <p>Include annual incremental summer and winter peak demand capacity (MW) corresponding to 2015 through 2018 Energy Efficiency (Class 2) DSM annual energy savings targets;</p> <p>For the 2015 IRP Update, provide model run results of the preferred portfolio with base case DSM and with accelerated DSM for comparison purposes;</p> <p>Perform stochastic modeling on all portfolios with accelerated DSM.</p>           | <p>See Volume I, Chapter 8 (Modeling Portfolio Selection Results) for the annual summer and winter peak demand capacity (MW) for Energy Efficiency DSM.</p>   |
| <p>Order No. 16-071, Appendix A, p.2 (action item 5a) and Order No. 16-071, p. 9.</p> | <p>Continue permitting Energy Gateway Segments D, E, F, and H until PacifiCorp files its 2017 IRP.</p> <p>The Oregon PUC acknowledges this action item only to the extent of PacifiCorp's permitting actions. The Oregon PUC expects to see updated analysis in the next IRP or before the company makes significant commitments to these transmission lines.</p>   | <p>See Chapter 4 (Transmission), Chapter 7 (Modeling and Portfolio Evaluation Approach), Chapter 8 (Modeling and Portfolio Selection Results), and Chapter 9 (Action Plan) for updated analysis on the company's Energy Gateway transmission segments. See also Volume II, Appendix M (Case Fact Sheets Overview) for additional detail regarding the Energy Gateway transmission segments studied in the 2019 IRP.</p>   |
| <p>Order No. 16-071, Appendix A, p.2 (additional actions - modeling)</p>              | <ol style="list-style-type: none"> <li>1. Include more robust analysis regarding the west BAA winter peak load/resource balance and portfolios to meet this peak load;</li> <li>2. Provide quantitative justification for the planning reserve margin of 13 percent;</li> <li>3. Utilize the Balancing Authority's Area Control Error (ACE) Limit (BAAL) NERC standard in forthcoming wind integration studies, and confirm and demonstrate that the study is based on implementation of the BAAL standard;</li> <li>4. Use the same regional haze assumptions when directly comparing portfolios.</li> </ol> | <ol style="list-style-type: none"> <li>1. See Volume I, Chapter 8 (Modeling and Portfolio Selection Results) including winter and summer peak load and resource tables.</li> <li>2. See Volume II, Appendix I (Planning Reserve Margin Study). The study concludes with a planning criteria that meets one day in 10 year planning targets at the lowest reasonable cost.</li> <li>3. The company's Flexible Reserve Study (Appendix H) incorporates the specific requirements of the BAAL standard (BAL-001-2).</li> <li>4. Regional haze compliance is embedded in the portfolio-development process. Top performing portfolios reflected in PacifiCorp's 2019 IRP reflect consistent regional haze compliance requirements.</li> </ol> |

| Reference  | IRP Requirement or Recommendation   | How the Requirement or Recommendation is Addressed in the 2019 IRP  |
|--|---|---|
| Order No. 18-138, Appendix A p. 19                                 | <p>PacifiCorp must:</p> <ol style="list-style-type: none"> <li>1. Provide an updated economic analysis with the request for acknowledgement of the final shortlist from the 2017R RFP</li> <li>2. Update its analysis of the Energy Vision 2020 projects as part of its 2017 IRP Update, including any changes resulting from the 2017R RFP or changes to critical assumptions, such as availability of tax credits corporate tax rate, then-current cost-and-performance data for repowered wind resources, cost-and-performance data from the 2017R RFP final shortlist, and cost assumptions for the transmission projects; and</li> <li>3. Provide quarterly updates to the Oregon PUC and Staff as development of the projects chosen in the 2017R RFP and the transmission projects proceed (through the date the projects go into service).</li> </ol> | <ol style="list-style-type: none"> <li>1. RFP information was provided in the 2017 IRP Update, Chapter 7 (Energy Vision 2020 Update).</li> <li>2. An update on Energy Vision 2020 was provided in the 2017 IRP Update, Chapter 7 (Energy Vision 2020 Update).</li> <li>3. PacifiCorp has provided quarterly updates in Docket No. LC-70 starting July 11, 2018. Subsequent updates were provided on October 30, 2018, January 7, 2019, May 7, 2019 and August 2, 2019.</li> </ol> |
| Order No. 18-138, Appendix A p. 20                                 | PacifiCorp must provide the Dave Johnston early retirement transmission analysis to the Oregon PUC and parties in LC 67 once the third-party review and validation has been finalized.  | See 2017 IRP Update Filing, Chapter 6 (Portfolio Development).  |
| Order No. 18-138, Appendix A p. 20                                 | <ol style="list-style-type: none"> <li>1. PacifiCorp is to report back in its 2017 IRP Update as to the current and forecasted use of front office transactions through 2036 and any changes in assumptions impacting front office transaction use from the initial filing of LC 67 in April 2017.</li> <li>2. PacifiCorp should repeat its study of trading hub liquidity and also the market reliance risk analysis of front office transactions prior to the 2019 IRP.</li> <li>3. For the 2019 IRP, if a generating resource is included in the preferred portfolio with an associated action item, then PacifiCorp will report on the cost and risk tradeoffs between the preferred portfolio and alternatives that do not include a generating resource.</li> </ol>   | <ol style="list-style-type: none"> <li>1. See 2017 IRP Update Filing, Chapter 5 (Modeling and Assumptions Update).</li> <li>2. See 2019 IRP, Volume II, Appendix J (Western Resource Adequacy Evaluation) for an updated study.</li> <li>3. See Volume I, Chapter 8 (Modeling and Portfolio Selection Results).</li> </ol>  |
| Order No. 18-138, Appendix A p. 21 as modified by Order No. 18-420 | 1. PacifiCorp, in coordination with staff and the Energy Trust of Oregon (ETO) will conduct an analysis before the 2019 IRP that identifies and   | 1. PacifiCorp conducted an analysis in cooperation with Navigant and the Energy Trust of Oregon as part of the 2019 IRP analysis. The report with recommendations was presented at public-input   |

| Reference                          | IRP Requirement or Recommendation  | How the Requirement or Recommendation is Addressed in the 2019 IRP   |
|------------------------------------|--|--|
|                                    | <p>compares the ongoing differences between ETO and PacifiCorp’s near to long-term energy efficiency forecast with ETO’s actual achieved savings. PacifiCorp will report on this analysis, including any recommendations to both organizations regarding forecast improvements, in the 2019 IRP. PacifiCorp will present the analysis as a public input IRP meeting.</p> <p>2. Early in the public input process for the 2019 IRP, prior to finalizing energy efficiency supply curves, PacifiCorp will hold a DSM technical workshop to review and receive input regarding how the company models energy efficiency potential in the IRP and supporting studies such as the Conservation Potential Assessment.</p>  | <p>meetings (see below) and is available on PacifiCorp’s website.</p> <p>2. PacifiCorp provided demand-side management workshops as part of its 2019 IRP public-input meetings on June 28-29, 2018 and July 12, 2019.</p>  |
| Order No. 18-138, Appendix A p. 21 | <p>PacifiCorp will perform 25 system optimizer (SO) runs, one for each coal unit and a base case. PacifiCorp will summarize the results providing a table of the difference in the PVRR resulting from the early retirement of each unit, an itemized list of coal unit retirement cost assumptions used in each SO run, and a list of coal units that would free up transmission along the path from the proposed Wyoming wind projects if retired. PacifiCorp is to provide this information by June 30, 2018. If there is a dispute about modeling in the meantime, PacifiCorp, staff and parties should first attempt to resolve it informally, but if that fails, staff may report back to the Oregon PUC at a public meeting before the 2019 IRP is filed. An Oregon PUC commissioner workshop will likely be scheduled to review this analysis once it is complete.</p> | <p>PacifiCorp provided the requested information in a public-input meeting presentation on June 28-29, 2018, and the presentation is available on the company’s website. PacifiCorp presented an update on its coal studies at a special meeting at the Oregon PUC on December 18, 2018.</p> |
| Order No. 18-138, Appendix A p. 21 | <p>PacifiCorp will continue to model the assumption that EPA regional haze litigation against the company is successful and that PacifiCorp will be required to comply with the current requirements of the State Implementation Plan (SIP) and Federal Implementation Plan (FIP).</p>   | <p>PacifiCorp has included two Regional Haze scenarios in the 2019 IRP. See Volume II, Appendix M (Case Study Fact Sheets) for discussion on specific Regional Haze assumptions.</p>   |
| Order No. 18-138, Appendix A p. 21 | <p>In the IRP Update PacifiCorp will explain the reasons for the (sometimes) low correlation in the short-term forecast.</p>   | <p>See 2017 IRP Update Filing, Chapter 5 (Modeling and Assumptions Update).</p>  |



| Reference                          | IRP Requirement or Recommendation  | How the Requirement or Recommendation is Addressed in the 2019 IRP   |
|------------------------------------|--|--|
| Order No. 18-138, Appendix A p. 22 | In the IRP Update PacifiCorp will model natural gas and storage for meeting flexible reserve study needs.  | See 2017 IRP Update Filing, Chapter 5 (Modeling and Assumptions Update).   |
| Order No. 18-138, Appendix A p. 22 | PacifiCorp will work with staff and parties to advance distributed energy resource forecasting and representation in the IRP, and define a proposal for opening a distribution system planning investigation.  | In the 2019 IRP, PacifiCorp discussed distributed energy resources at its July 26-27, 2019 public-input meeting along with a workshop specific to energy storage.  |
| Order No. 18-138, Appendix A p. 22 | PacifiCorp will work with staff and parties to explore the use of AMI data in future IRPs.   | AMI data will further enhance the granularity of load forecasting and PacifiCorp will continue to evolve in its IRP process as more AMI data becomes available.  |
| Order No. 18-138, Appendix A p. 22 | PacifiCorp, staff and parties should discuss a potential study of the capacity value of renewing QFs, and staff shall bring this issue to a public meeting before the 2017 IRP Update.   | PacifiCorp discussed with Staff and parties over conference call and agreed to evaluate its 2019 IRP preferred portfolio load and resource balance with the assumption of QF renewal and provide that information subsequent to the filing of the 2019 IRP.  |
| <b>Utah</b>                        |  |  |
| Order, Docket No. 15-035-04, p.18  | If PacifiCorp plans to use the System Benefit Tool type of transmission analytical tool in future IRPs, PacifiCorp should introduce and vet the tool in an IRP workshop setting prior to utilizing the tool.   | The System Benefit Tool is not used in the 2019 IRP.   |
| Order, Docket No. 15-035-04, p.19  | Encourage PacifiCorp in future IRP processes, to provide a stronger demonstration of the reasonableness of the range of renewable resource costs analyzed.   | PacifiCorp discussed its 2019 IRP supply-side resource table and inputs at the October 9, 2018 public-input meeting. The supply-side resource table was updated based on stakeholder feedback.   |
| Order, Docket No. 15-035-04, p.20  | Direct PacifiCorp to identify the amount of distributed generation in the baseload forecast in its load and resource table, as it does for existing DSM and curtailment.   | See Volume I, Chapter 5 (Load and Resource Balance), which breaks out private generation in the same manner as DSM and interruptible load curtailment.   |
| Order, Docket No. 15-035-04, p.21  | Direct PacifiCorp to continue to evaluate the depth of the western wholesale market, and to use sensitivity cases and acquisition path analysis, including development of a contingency plan, to monitor the feasibility of long-term reliance on Front Office Transactions to meet near-term load growth. | See Volume II, Appendix J (Western Resource Adequacy Evaluation) for an evaluation of market depth, and also cases studied to assess impacts of higher market prices provided in Volume I, Chapter 8 (Modeling and Portfolio Selection Results). Also refer to acquisition path analysis for contingencies in Volume I, Chapter 9 (Action Plan). |
| Order, Docket No. 15-035-04, p.21  | Recommend continued analysis of the planning reserve margin in future IRPs using results from both loss of load probability studies and analysis of the tradeoffs between reliability and cost.  | See Volume II, Appendix I (Planning Reserve Margin Study). The study concludes with a planning criteria that meets one day in 10 year planning targets at the lowest reasonable cost.  |

| Reference                         | IRP Requirement or Recommendation   | How the Requirement or Recommendation is Addressed in the 2019 IRP   |
|-----------------------------------|---|--|
| Order, Docket No. 15-035-04, p.25 | Analysis behind Near-Term and Long-Term Resource Acquisition Paths (Table 9.3 in the 2015 IRP) could be improved in terms of identifying potential exogenous changes that would cause a significant change in acquisition path. Encourage PacifiCorp in future IRPs to further define the critical contingencies it is monitoring and identify the magnitude of changes that would be required to potentially trigger movement to any of the different paths listed in the table. | See acquisition path analysis for contingencies in Volume I, Chapter 9 (Action Plan).  |
| Order, Docket No. 15-035-04, p.31 | Remind PacifiCorp of the requirement to future IRPs to present the Business Plan as a sensitivity case. If PacifiCorp has substantive objections to this requirement, PacifiCorp should file a motion for Commission action within 90 days of this order explaining the objection and requesting relief.  | Please refer to the Sensitivity S-06- presented in Volume I, Chapter 8 (Modeling and Portfolio Selection Results) consistent with the Order in Docket No. 15-035-04.   |
| Order, Docket No. 17-035-16, p.22 | Encourage PacifiCorp and stakeholders to review recommendations of the DPU on process at the start of the 2019 IRP process.   | PacifiCorp met with Utah stakeholders on August 9, 2018 and discussed recommendations of the Division of Public Utilities (DPU). PacifiCorp made best efforts to implement recommendations for timely materials and also shortened the lunch break and started earlier on the second day of public-input meetings. |
| Order, Docket No. 17-035-16, p.31 | Encourage all parties to communicate in advance of the 2019 IRP about whether a training session on IRP capacity expansion and stochastic models would be appropriate and helpful. There is a distinction between requiring PacifiCorp to create opportunity for public involvement as required by the Guidelines, and requiring PacifiCorp to conduct analyses on behalf of parties.   | PacifiCorp held a modeling workshop as part of its June 28-29, 2018 public-input meeting and provided information on its System Optimizer model and Planning and Risk model. PacifiCorp provided details on its models, functionality and planning assumptions throughout the public-input meeting process.        |
| Order, Docket No. 17-035-16, p.35 | To satisfy Guideline 3, any changes to the DSM modeling assumptions must be circulated during the IRP development process.  | PacifiCorp provided a demand-side management workshop as part of a public-input meeting June 28-29, 2018. An additional workshop was held July 12, 2019. PacifiCorp discussed updates related to demand-side management modeling throughout its 2019 IRP process.  |
| Order, Docket No. 17-035-16, p.37 | PacifiCorp commits to conduct a workshop specific to energy storage as part of the 2019 IRP public input process prior to finalizing the supply-side resource table inputs for battery and energy storage.  | PacifiCorp held an energy storage workshop August 30, 2018, and the presentation is available on the company's website.  |
| Order, Docket No. 17-035-16, p.43 | Expect PacifiCorp and stakeholders to review the DPU's recommendations on transmission modeling at the start of the 2019 IRP process.   | PacifiCorp met with Utah stakeholders on August 9, 2018 and discussed recommendations of the Division of Public Utilities (DPU). PacifiCorp provided a transmission overview and update as   |

| Reference   | IRP Requirement or Recommendation   | How the Requirement or Recommendation is Addressed in the 2019 IRP  |
|---|---|---|
|   |   | part of a public-input meeting September 27-28, 2018.   |
| <b>Washington</b>                                   |   |   |
| UE-140546, Acknowledgement Letter, p.1              | Encourage the company to continue the practice of including data discs with the filing in future IRP filings.   | Data discs have provided as part of the 2019 IRP filing.  |
| UE-140546, Acknowledgement Letter, p.2              | Encourage the company to continue to evaluate how its method of developing capacity value of renewable resources compares to the effective load carrying capability method on which it was based, to ensure that the company's model is yielding accurate results.  | See Volume II, Appendix N (Capacity Contribution Study), analyzing updated hourly profiles and transmission availability impacts to determine effectiveness in meeting system load. The 2019 IRP includes winter peak (in addition to summer peak) in its assumptions, allowing enhanced insight into solar penetration concerns. |
| UE-140546, Acknowledgement Letter, p.4              | The cost impacts in S-10 in the 2015 IRP were on a system basis and the commission would like to see them on a balancing authority area basis. Requests the analysis be redone in the 2017 IRP and that the company use inputs consistent with the staff MSP power flow data or explain why different inputs are more appropriate. Request that the company incorporate the balancing area analysis in all future IRPs. | PacifiCorp plans to incorporate this sensitivity as part of its 2019 IRP Update.  |
| UE-140546, Acknowledgement Letter, p.8              | Encourage the company to continue to integrate the EIM into its IRP model, in particular to develop modeling capability to capture how different resources with different generation profiles would interact with the EIM, based on the company's experience with the market.   | PacifiCorp incorporated flexible ramping procurement diversity savings from the EIM in its Flexible Reserve Study. See Volume II, Appendix F (Flexible Reserve Study).  |
| UE-160353, Acknowledgement Letter Attachment, p.4-6 | Expect examination of Jim Bridger and Colstrip Units 3 & 4 pursuant to specific questions to be addressed in the 2019 IRP.  | PacifiCorp plans to incorporate responses to these questions as part of its 2019 IRP Update pursuant to the Washington Utilities and Transportation Commission's July 3, 2019 letter.   |
| UE-160353, Acknowledgement Letter Attachment, p.6-7 | Balancing Area analysis in all future IRPs that includes a west control area and an east control area analysis with a robust description of the modeling interaction between the two discrete systems.  | See Volume II, Appendix J (Western Resource Adequacy Evaluation).   |
| UE-160353, Acknowledgement Letter Attachment, p.8   | Expect the company to incorporate principles in the commission's policy statement on energy storage in the 2019 IRP.  | See Volume II, Appendix Q (Energy Storage Potential Evaluation).  |
| UE-160353, Acknowledgement Letter Attachment, p.8-9 | Expect the company to provide a market reliance risk assessment in the 2019 IRP and expect the analysis will result in a quantified representation of risk that can be folded into the IRP analytical framework.  | See Volume II, Appendix J (Western Resource Adequacy Evaluation). PacifiCorp's 2019 IRP also included analysis of the impact of higher market prices on select cases (FOT cases). See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and Chapter 8 (Modeling and Portfolio Selection Results).                  |

| Reference  | IRP Requirement or Recommendation  | How the Requirement or Recommendation is Addressed in the 2019 IRP  |
|--|--|---|
| UE-160353, Acknowledgement Letter Attachment, p.9-10   | In future IRPs, the company should more prominently display the Quick Reference Guides included in Appendix M of its 2017 IRP.   | PacifiCorp expanded Volume II, Appendix M (Case Fact Sheets Overview) to include more portfolio specific materials that were included in public-input meeting presentations throughout the course of the 2019 IRP process. Discussion in Volume I of the 2019 IRP draws more direct references to Volume II, Appendix M (Case Fact Sheets Overview) for simplified navigation.  |
| UE-160353, Acknowledgement Letter Attachment, p.10-11  | In future IRPs, the company should incorporate the cost of risk of future greenhouse gas regulation in addition to known regulations in its preferred portfolio. The cost estimate should come from a comprehensive, peer-reviewed estimate of the monetary cost of climate change damages, produced by a reputable organization. WUTC suggests using the Interagency Working Group on Social Cost of Greenhouse Gases estimate with a three percent discount rate. The company should also continue to model other higher and lower cost estimates to understand how the resource portfolio changes based on these costs. | In the 2019 IRP, PacifiCorp assumed a CO <sub>2</sub> price starting in 2025 in its base case analysis. It also performed assessments of certain top performing portfolios under a low gas/no CO <sub>2</sub> , a high gas/high CO <sub>2</sub> , and a social cost of carbon price-policy scenario that was developed using estimates by the Interagency Working Group on Social Cost of Greenhouse Gases. See Volume I, Chapter 8 (Modeling and Portfolio Selection Results). |
| UE-160353, Acknowledgement Letter Attachment, p.11   | The company should develop a supply curve of emissions abatement and include this cost curve in the 2019 IRP. The analysis should identify all programs and technologies reasonably available in the company's service area, then use best available information to estimate the amount of emissions reductions each option might achieve, and at what cost.   | PacifiCorp will use information from this analysis as part of its 2019 IRP Update.  |
| <b>Wyoming</b>   |  |   |
| The Wyoming Public Service Commission accepted Rocky Mountain Power's 2017 Integrated Resource Plan (Docket No. 20000-512-EA-17) without further action on the matter pursuant to action taken at its open meeting on November 20, 2017 and by Letter Order issued January 29, 2019. |  |   |

**Table B.3 – Oregon Public Utility Commission IRP Standard and Guidelines**

| No.  | Requirement  | How the Guideline is Addressed in the 2019 IRP  |
|--|--|---|
| <b>Guideline 1. Substantive Requirements</b> |  |   |
| 1.a.1  | All resources must be evaluated on a consistent and comparable basis: All known resources for meeting the utility's load should be considered, including supply-side options which focus on the generation, purchase and transmission of power – or gas purchases, transportation, and storage – and | PacifiCorp considered a wide range of resources including renewables, demand-side management, energy storage, power purchases, thermal resources, and transmission. Volume I, Chapter 4 (Transmission Planning), Chapter 6 (Resource Options), and Chapter 7 (Modeling and Portfolio Evaluation Approach) document how PacifiCorp developed these resources |

| No.   | Requirement  | How the Guideline is Addressed in the 2019 IRP   |
|-------|--|--|
|       | demand-side options which focus on conservation and demand response.   | and modeled them in its portfolio analysis. All these resources were established as resource options in the company's capacity expansion optimization model, System Optimizer, and selected by the model based on load requirements, relative economics, resource size, availability dates, and other factors.   |
| 1.a.2 | All resources must be evaluated on a consistent and comparable basis:<br>Utilities should compare different resource fuel types, technologies, lead times, in-service dates, durations and locations in portfolio risk modeling.   | All portfolios developed with System Optimizer were subjected to Monte Carlo production cost simulation. These portfolios contained a variety of resource types with different fuel types (coal, gas, biomass, nuclear fuel, "no fuel" renewables), lead-times (ranging from front office transactions to nuclear plants), in-service dates, operational lives, and locations. See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach), Chapter 8 (Modeling and Portfolio Selection Results), and Volume II, Appendix K (Capacity Expansion Results Detail) and Appendix L (Stochastic Simulation Results).   |
| 1.a.3 | All resources must be evaluated on a consistent and comparable basis:<br>Consistent assumptions and methods should be used for evaluation of all resources.  | PacifiCorp fully complies with this requirement. The company developed generic supply-side resource attributes based on a consistent characterization methodology. For demand-side resources, the company used the Applied Energy Group's supply curve data developed for this IRP for representation of DSM resources. The study was based on a consistently applied methodology for determining technical, market, and achievable DSM potentials. All portfolio resources were evaluated using the same sets of price and load forecast inputs. These inputs are documented in Volume I, Chapter 5 (Load and Resource Balance), Chapter 6 (Resource Alternatives), and Chapter 7 (Modeling and Portfolio Evaluation Approach) as well as Volume II, Appendix D (Demand-Side Management Resources). |
| 1.a.4 | All resources must be evaluated on a consistent and comparable basis: The after-tax marginal weighted-average cost of capital (WACC) should be used to discount all future resource costs.   | PacifiCorp applied its nominal after-tax WACC of 6.92 percent to discount all cost streams.  |
| 1.b.1 | Risk and uncertainty must be considered:<br>At a minimum, utilities should address the following sources of risk and uncertainty:<br>1. Electric utilities: load requirements, hydroelectric generation, plant forced outages, fuel prices, electricity prices, and costs to comply with any regulation of greenhouse gas emissions. | Each of the sources of risk identified in this guideline is treated as a stochastic variable in Monte Carlo production cost simulation with the exception of CO <sub>2</sub> emission compliance costs, which are treated as a scenario risk and evaluated as part of a CO <sub>2</sub> price assumption and a no CO <sub>2</sub> , a high CO <sub>2</sub> , and a social cost of carbon price-policy scenario for specific studies. See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and Volume I, Chapter 8 (Modeling and Portfolio Selection Results).  |
| 1.b.2 | Risk and uncertainty must be considered:<br>Utilities should identify in their plans any additional sources of risk and uncertainty.   | Resource risk mitigation is discussed in Volume I, Chapter 9 (Action Plan). Regulatory and financial risks associated with resource and transmission investments are highlighted in several areas in the IRP document, including Volume I, Chapter 3 (The  |

| No.     | Requirement   | How the Guideline is Addressed in the 2019 IRP  |
|---------|---|---|
|         |   | Planning Environment), Chapter 4 (Transmission), Chapter 7 (Modeling and Portfolio Evaluation Approach), and Chapter 8 (Modeling and Portfolio Selection Results).  |
| 1.c     | The primary goal must be the selection of a portfolio of resources with the best combination of expected costs and associated risks and uncertainties for the utility and its customers (“best cost/risk portfolio”).   | PacifiCorp evaluated cost/risk tradeoffs for each of the portfolios considered. See Volume I, Chapter 8 (Modeling and Portfolio Selection Results), Chapter 9 (Action Plan), and Volume II, Appendix K (Capacity Expansion Results Detail) and Appendix H (Stochastic Parameters) for the company’s portfolio cost/risk analysis and determination of the preferred portfolio.  |
| 1.c.1   | The planning horizon for analyzing resource choices should be at least 20 years and account for end effects. Utilities should consider all costs with a reasonable likelihood of being included in rates over the long term, which extends beyond the planning horizon and the life of the resource.  | PacifiCorp used a 20-year study period (2019-2038) for portfolio modeling, and a real levelized revenue requirement methodology for treatment of end effects.   |
| 1.c.2   | Utilities should use present value of revenue requirement (PVRR) as the key cost metric. The plan should include analysis of current and estimated future costs for all long-lived resources such as power plants, gas storage facilities, and pipelines, as well as all short-lived resources such as gas supply and short-term power purchases. | Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) provides a description of the PVRR methodology.  |
| 1.c.3.1 | To address risk, the plan should include, at a minimum:<br>1. Two measures of PVRR risk: one that measures the variability of costs and one that measures the severity of bad outcomes.   | PacifiCorp uses the standard deviation of stochastic production costs as the measure of cost variability. For the severity of bad outcomes, the company calculates several measures, including stochastic upper-tail mean PVRR (mean of highest three Monte Carlo iterations) and the 95 <sup>th</sup> percentile stochastic production cost PVRR.  |
| 1.c.3.2 | To address risk, the plan should include, at a minimum:<br>2. Discussion of the proposed use and impact on costs and risks of physical and financial hedging.   | A discussion on hedging is provided in Volume I, Chapter 9 (Action Plan).   |
| 1.c.4   | The utility should explain in its plan how its resource choices appropriately balance cost and risk.  | Volume I, Chapter 8 (Modeling and Portfolio Selection Results) summarizes the results of PacifiCorp’s cost/risk tradeoff analysis, and describes what criteria the company used to determine the best cost/risk portfolios and the preferred portfolio.   |
| 1.d     | The plan must be consistent with the long-run public interest as expressed in Oregon and federal energy policies.   | PacifiCorp considered both current and potential state and federal energy/pollutant emission policies in portfolio modeling. Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) describes the decision process used to derive portfolios, which includes consideration of state and federal resource policies and regulations that are summarized in Volume I, Chapter 3 (The Planning Environment). Volume I, Chapter 8 (Modeling and Portfolio Selection Results) provides the results. Volume I, |



| No.  | Requirement   | How the Guideline is Addressed in the 2019 IRP   |
|--|---|--|
|  |   | Chapter 9 (Action Plan) presents an acquisition path analysis that describes resource strategies based on regulatory trigger events.   |
| <b>Guideline 2: Procedural Requirements</b>          |   |  |
| 2.a  | The public, which includes other utilities, should be allowed significant involvement in the preparation of the IRP. Involvement includes opportunities to contribute information and ideas, as well as to receive information. Parties must have an opportunity to make relevant inquiries of the utility formulating the plan. Disputes about whether information requests are relevant or unreasonably burdensome, or whether a utility is being properly responsive, may be submitted to the Oregon PUC for resolution. | PacifiCorp fully complies with this requirement. Volume I, Chapter 2 (Introduction) provides an overview of the public process, all public-input meetings held for the 2019 IRP, which are documented in Volume II, Appendix C (Public Input Process). PacifiCorp also made use of a Stakeholder Feedback Form for stakeholders to provide comments and offer suggestions. Stakeholder Feedback Forms along with the public-input meeting presentations are available on PacifiCorp's webpage at: <a href="http://www.pacificorp.com/energy/integrated-resource-plan.html">www.pacificorp.com/energy/integrated-resource-plan.html</a> |
| 2.b  | While confidential information must be protected, the utility should make public, in its plan, any non-confidential information that is relevant to its resource evaluation and action plan. Confidential information may be protected through use of a protective order, through aggregation or shielding of data, or through any other mechanism approved by the Oregon PUC.  | 2019 IRP Volumes I and II provide non-confidential information used for portfolio evaluation, as well as other data requested by stakeholders. PacifiCorp also provided stakeholders with non-confidential information to support public meeting discussions via email and in response to Stakeholder Feedback Forms. Data discs will be available with public data. Additionally, data discs with confidential data will be provided to appropriate parties through use of protective order 18-216.   |
| 2.c  | The utility must provide a draft IRP for public review and comment prior to filing a final plan with the Oregon PUC.  | PacifiCorp distributed draft IRP materials for external review throughout the process prior to each of the public input meetings and solicited/and received feedback at various times when developing the 2019 IRP. The materials shared with stakeholders at these meetings, outlined in Volume I Chapter 2 (Introduction), is consistent with materials presented in Volumes I and II of the 2019 IRP report.<br><br>PacifiCorp requested and responded to comments from stakeholders when establishing modeling assumptions and throughout its portfolio-development process and sensitivity definitions.                           |
| <b>Guideline 3: Plan Filing, Review, and Updates</b> |   |  |
| 3.a  | A utility must file an IRP within two years of its previous IRP acknowledgment order. If the utility does not intend to take any significant resource action for at least two years after its next IRP is due, the utility may request an extension of its filing date from the Oregon PUC.   | The 2019 IRP complies with this requirement.   |
| 3.b  | The utility must present the results of its filed plan to the Oregon PUC at a public meeting prior to the deadline for written public comment.  | This activity will be conducted subsequent to filing this IRP.   |

| No.   | Requirement  | How the Guideline is Addressed in the 2019 IRP  |
|---|--|---|
| 3.c   | Commission staff and parties should complete their comments and recommendations within six months of IRP filing.   | This activity will be conducted subsequent to filing this IRP.  |
| 3.d   | The Commission will consider comments and recommendations on a utility's plan at a public meeting before issuing an order on acknowledgment. The Commission may provide the utility an opportunity to revise the IRP before issuing an acknowledgment order.   | This activity will be conducted subsequent to filing this IRP.  |
| 3.e   | The Commission may provide direction to a utility regarding any additional analyses or actions that the utility should undertake in its next IRP.  | Not applicable.   |
| 3.f   | (a) Each energy utility must submit an annual update on its most recently acknowledged IRP. The update is due on or before the acknowledgment order anniversary date. Once a utility anticipates a significant deviation from its acknowledged IRP, it must file an update with the Oregon PUC, unless the utility is within six months of filing its next IRP. The utility must summarize the update at an Oregon PUC public meeting. The utility may request acknowledgment of changes in proposed actions identified in an update.  | Not applicable to this filing; this activity will be conducted subsequent to filing this IRP.   |
| 3.g   | Unless the utility requests acknowledgment of changes in proposed actions, the annual update is an informational filing that: <ul style="list-style-type: none"> <li>• Describes what actions the utility has taken to implement the plan;</li> <li>• Provides an assessment of what has changed since the acknowledgment order that affects the action plan to select best portfolio of resources, including changes in such factors as load, expiration of resource contracts, supply-side and demand-side resource acquisitions, resource costs, and transmission availability; and</li> <li>• Justifies any deviations from the acknowledged action plan.</li> </ul> | Not applicable to this filing; this activity will be conducted subsequent to filing this IRP.   |
| <b>Guideline 4. Plan Components:</b> At a minimum, the plan must include the following elements |  |   |
| 4.a   | An explanation of how the utility met each of the substantive and procedural requirements.   | The purpose of this table is to comply with this guideline.   |
| 4.b   | Analysis of high and low load growth scenarios in addition to stochastic load risk analysis with an explanation of major assumptions.  | PacifiCorp developed low, high, and extreme peak temperature (one-in-twenty probability) load growth forecasts for scenario analysis using the System Optimizer model. Stochastic variability of loads was also captured in the risk analysis. See Volume I, Chapters 5 (Load and Resource Balance) and Chapter 7 (Modeling and Portfolio Evaluation Approach), and Volume II, Appendix A (Load Forecast Detail) for load forecast information. |



| No. | Requirement   | How the Guideline is Addressed in the 2019 IRP   |
|-----|---|--|
| 4.c | For electric utilities, a determination of the levels of peaking capacity and energy capability expected for each year of the plan, given existing resources; identification of capacity and energy needed to bridge the gap between expected loads and resources; modeling of all existing transmission rights, as well as future transmission additions associated with the resource portfolios tested. | See Chapter 5 (Resource Needs Assessment) for details on annual capacity and energy balances. Existing transmission rights are reflected in the IRP model topologies. Future transmission additions used in analyzing portfolios are summarized in Volume I, Chapter 4 (Transmission) and Chapter 7 (Modeling and Portfolio Evaluation Approach).  |
| 4.d | For gas utilities only.   | Not applicable.  |
| 4.e | Identification and estimated costs of all supply-side and demand side resource options, taking into account anticipated advances in technology.   | Volume I, Chapter 6 (Resource Options) identifies the resources included in this IRP, and provides their detailed cost and performance attributes. Additional information on energy efficiency resource characteristics is available in Volume II, Appendix D (Demand-Side Management Resources) referencing additional information on PacifiCorp's IRP website see footnote 3 of this Appendix B.   |
| 4.f | Analysis of measures the utility intends to take to provide reliable service, including cost-risk tradeoffs.  | In addition to incorporating a 13 percent planning reserve margin for all portfolios evaluated, as supported by an updated Stochastic Loss of Load Study in Volume II, Appendix L (Stochastic Simulation Results), the company used several measures to evaluate relative portfolio supply reliability. These measures (Energy Not Served and Loss of Load Probability) are described in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach). |
| 4.g | Identification of key assumptions about the future (e.g., fuel prices and environmental compliance costs) and alternative scenarios considered.   | Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) describes the key assumptions and alternative scenarios used in this IRP. Volume II, Appendix M (Case Study Fact Sheets) includes summaries of assumptions used for each case definition analyzed in the 2019 IRP.  |
| 4.h | Construction of a representative set of resource portfolios to test various operating characteristics, resource types, fuels and sources, technologies, lead times, in-service dates, durations and general locations – system-wide or delivered to a specific portion of the system.   | This IRP documents the development and results of portfolios designed to determine resource selection under a variety of input assumptions in Volume I, Chapters 7 (Modeling and Portfolio Evaluation Approach) and Chapter 8 (Modeling and Portfolio Selection Results).  |
| 4.i | Evaluation of the performance of the candidate portfolios over the range of identified risks and uncertainties.   | Volume I, Chapter 8 (Modeling and Portfolio Selection Results) presents the stochastic portfolio modeling results, and describes portfolio attributes that explain relative differences in cost and risk performance.  |
| 4.j | Results of testing and rank ordering of the portfolios by cost and risk metric, and interpretation of those results.  | Volume I, Chapter 8 (Modeling and Portfolio Selection Results) provides tables and charts with performance measure results, including rank ordering.   |
| 4.k | Analysis of the uncertainties associated with each portfolio evaluated.   | See responses to 1.b.1 and 1.b.2 above.  |

| No.                              | Requirement  | How the Guideline is Addressed in the 2019 IRP   |
|----------------------------------|--|--|
| 4.l                              | Selection of a portfolio that represents the best combination of cost and risk for the utility and its customers.  | See 1.c above.   |
| 4.m                              | Identification and explanation of any inconsistencies of the selected portfolio with any state and federal energy policies that may affect a utility's plan and any barriers to implementation.  | This IRP is designed to avoid inconsistencies with state and federal energy policies therefore none are currently identified.  |
| 4.n                              | An action plan with resource activities the utility intends to undertake over the next two to four years to acquire the identified resources, regardless of whether the activity was acknowledged in a previous IRP, with the key attributes of each resource specified as in portfolio testing.   | Volume I Chapter 9 (Action Plan) presents the 2019 IRP action plan.  |
| <b>Guideline 5: Transmission</b> |  |  |
| 5                                | Portfolio analysis should include costs to the utility for the fuel transportation and electric transmission required for each resource being considered. In addition, utilities should consider fuel transportation and electric transmission facilities as resource options, taking into account their value for making additional purchases and sales, accessing less costly resources in remote locations, acquiring alternative fuel supplies, and improving reliability.       | PacifiCorp evaluated four sensitivities on Energy Gateway transmission project configurations on a consistent and comparable basis with respect to other resources. Where new resources would require additional transmission facilities the associated costs were factored into the analysis. Fuel transportation costs were factored into resource costs.  |
| <b>Guideline 6: Conservation</b> |  |  |
| 6.a                              | Each utility should ensure that a conservation potential study is conducted periodically for its entire service territory.   | A multi-state demand-side management potential study was completed in 2018, and those results were incorporated into this plan.  |
| 6.b                              | To the extent that a utility controls the level of funding for conservation programs in its service territory, the utility should include in its action plan all best cost/risk portfolio conservation resources for meeting projected resource needs, specifying annual savings targets.  | PacifiCorp's energy efficiency supply curves incorporate Oregon resource potential. Oregon potential estimates were provided by the Energy Trust of Oregon. See the demand-side resource section in Volume I, Chapter 6 (Resource Options), the results in Volume I, Chapter 8 (Modeling and Portfolio Selection Results), the targeted amounts in Volume I, Chapter 9 (Action Plan) and the implementation steps outlined in Volume II, Appendix D (DSM Resources). |
| 6.c                              | To the extent that an outside party administers conservation programs in a utility's service territory at a level of funding that is beyond the utility's control, the utility should:<br>1. Determine the amount of conservation resources in the best cost/risk portfolio without regard to any limits on funding of conservation programs; and<br>2. Identify the preferred portfolio and action plan consistent with the outside party's projection of conservation acquisition. | See the response for 6.b above.  |

| No.                                     | Requirement   | How the Guideline is Addressed in the 2019 IRP   |
|---|---|--|
| <b>Guideline 7: Demand Response</b>     |   |  |
| 7                                       | Plans should evaluate demand response resources, including voluntary rate programs, on par with other options for meeting energy, capacity, and transmission needs (for electric utilities) or gas supply and transportation needs (for natural gas utilities).   | PacifiCorp evaluated demand response resources (Class 1 DSM) on a consistent basis with other resources.   |
| <b>Guideline 8: Environmental Costs</b> |   |  |
| 8.a                                     | Base case and other compliance scenarios: The utility should construct a base-case scenario to reflect what it considers to be the most likely regulatory compliance future for carbon dioxide (CO <sub>2</sub> ), nitrogen oxides, sulfur oxides, and mercury emissions. The utility should develop several compliance scenarios ranging from the present CO <sub>2</sub> regulatory level to the upper reaches of credible proposals by governing entities. Each compliance scenario should include a time profile of CO <sub>2</sub> compliance requirements. The utility should identify whether the basis of those requirements, or “costs,” would be CO <sub>2</sub> taxes, a ban on certain types of resources, or CO <sub>2</sub> caps (with or without flexibility mechanisms such as an allowance for credit trading as a safety valve). The analysis should recognize significant and important upstream emissions that would likely have a significant impact on resource decisions. Each compliance scenario should maintain logical consistency, to the extent practicable, between the CO <sub>2</sub> regulatory requirements and other key inputs. | <p>See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach).</p> <p>In the 2019 IRP, PacifiCorp modeled a price on CO<sub>2</sub> starting in 2025.</p>  |
| 8.b                                     | Testing alternative portfolios against the compliance scenarios: The utility should estimate, under each of the compliance scenarios, the present value revenue requirement (PVRR) costs and risk measures, over at least 20 years, for a set of reasonable alternative portfolios from which the preferred portfolio is selected. The utility should incorporate end-effect considerations in the analyses to allow for comparisons of portfolios containing resources with economic or physical lives that extend beyond the planning period. The utility should also modify projected lifetimes as necessary to be consistent with the compliance scenario under analysis. In addition, the utility should include, if material, sensitivity analyses on a range of reasonably possible regulatory futures for nitrogen oxides, sulfur oxides, and mercury to further inform the preferred portfolio selection.  | <p>Volume II, Appendix L (Stochastic Simulation Results) provides the stochastic mean PVRR versus upper tail mean less stochastic mean PVRR scatter plot diagrams that for a broad range of portfolios developed with a range of compliance scenarios as summarized in 8.a above.</p> <p>The company considers end-effects in its use of Real Levelized Revenue Requirement Analysis, as summarized in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and uses a 20-year planning horizon.</p> <p>Early retirement and gas conversion alternatives to coal unit environmental investments were considered in the development of all resource portfolios.</p> |
| 8.c                                     | Trigger point analysis: The utility should identify at least one CO <sub>2</sub> compliance “turning  | See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) for a description of initial  |

| No.  | Requirement   | How the Guideline is Addressed in the 2019 IRP   |
|--|---|--|
|  | point” scenario, which, if anticipated now, would lead to, or “trigger” the selection of a portfolio of resources that is substantially different from the preferred portfolio. The utility should develop a substitute portfolio appropriate for this trigger-point scenario and compare the substitute portfolio’s expected cost and risk performance to that of the preferred portfolio – under the base case and each of the above CO <sub>2</sub> compliance scenarios. The utility should provide its assessment of whether a CO <sub>2</sub> regulatory future that is equally or more stringent than the identified trigger point will be mandated. | portfolio-development definitions. Comparative analysis of these case results is included in Volume I, Chapter 8 (Modeling and Portfolio Selection Results).   |
| 8.d  | Oregon compliance portfolio: If none of the above portfolios is consistent with Oregon energy policies (including state goals for reducing greenhouse gas emissions) as those policies are applied to the utility, the utility should construct the best cost/risk portfolio that achieves that consistency, present its cost and risk parameters, and compare it to those in the preferred and alternative portfolios.   | Several portfolios yield system emissions aligned with state goals for reducing greenhouse gas emissions. These cases are summarized in Volume I, Chapter 8 (Modeling and Portfolio Selection Results).  |
| <b>Guideline 9: Direct Access Loads</b>    |   |  |
| 9  | An electric utility’s load-resource balance should exclude customer loads that are effectively committed to service by an alternative electricity supplier.   | Oregon Docket UE 267 established a long-term opt out option for eligible PacifiCorp customers. Going forward PacifiCorp will cease planning for customers who elect direct-access service on a long-term basis (i.e. five-year opt out customers).   |
| <b>Guideline 10: Multi-state Utilities</b> |   |  |
| 10   | Multi-state utilities should plan their generation and transmission systems, or gas supply and delivery, on an integrated system basis that achieves a best cost/risk portfolio for all their retail customers.   | The 2019 IRP conforms to the multi-state planning approach as stated in Volume I, Chapter 2 under the section “The Role of PacifiCorp’s Integrated Resource Planning”. The company notes the challenges in complying with multi-state integrated planning given differing state energy policies and resource preferences.                          |
| <b>Guideline 11: Reliability</b>           |   |  |
| 11   | Electric utilities should analyze reliability within the risk modeling of the actual portfolios being considered. Loss of load probability, expected planning reserve margin, and expected and worst-case unserved energy should be determined by year for top-performing portfolios. Natural gas utilities should analyze, on an integrated basis, gas supply, transportation, and storage, along with demand-side resources, to reliably meet peak, swing, and base-load system requirements. Electric and natural gas utility plans should demonstrate that the utility’s chosen portfolio achieves its stated reliability, cost and risk objectives.    | See the response to 1.c.3.1 above. Volume I, Chapter 8 (Modeling and Portfolio Selection Results) walks through the role of reliability, cost, and risk measures in determining the preferred portfolio. Scatter plots of portfolio cost versus risk at different CO <sub>2</sub> cost levels were used to inform the cost/risk tradeoff analysis. |

| No.   | Requirement   | How the Guideline is Addressed in the 2019 IRP  |
|---|---|---|
| <b>Guideline 12: Distributed Generation</b> |   |   |
| 12  | Electric utilities should evaluate distributed generation technologies on par with other supply-side resources and should consider, and quantify where possible, the additional benefits of distributed generation.   | PacifiCorp contracted with Navigant to provide estimates of expected private generation penetration. The study was incorporated in the analysis as a deduction to load. Sensitivities looked at both high and low penetration rates for private generation. The study is included in Volume II, Appendix O (Private Generation Study).  |
| <b>Guideline 13: Resource Acquisition</b>   |   |   |
| 13.a  | An electric utility should, in its IRP:<br>1. Identify its proposed acquisition strategy for each resource in its action plan.<br>2. Assess the advantages and disadvantages of owning a resource instead of purchasing power from another party.<br>3. Identify any Benchmark Resources it plans to consider in competitive bidding. | Chapter 9 (Action Plan) outlines the procurement approaches for resources identified in the preferred portfolio.<br><br>A discussion of the advantages and disadvantages of owning a resource instead of purchasing it is included in Chapter 9 (Action Plan).<br>PacifiCorp has not at this time identified any specific benchmark resources it plans to consider in the competitive bidding process summarized in the 2019 IRP action plan. |
| 13.b  | For gas utilities only.   | Not applicable.   |
| <b>Flexible Capacity Resources</b>          |   |   |
| 1   | Forecast the Demand for Flexible Capacity: The electric utilities shall forecast the balancing reserves needed at different time intervals (e.g. ramping needed within 5 minutes) to respond to variation in load and intermittent renewable generation over the 20-year planning period.   | See Volume II, Appendix F (Flexible Reserve Study).   |
| 2   | Forecast the Supply of Flexible Capacity: The electric utilities shall forecast the balancing reserves available at different time intervals (e.g. ramping available within 5 minutes) from existing generating resources over the 20-year planning period.   | See Volume II, Appendix F (Flexible Reserve Study).   |
| 3   | Evaluate Flexible Resources on a Consistent and Comparable Basis: In planning to fill any gap between the demand and supply of flexible capacity, the electric utilities shall evaluate all resource options, including the use of EVs, on a consistent and comparable basis.   | See Volume II, Appendix F (Flexible Reserve Study).   |

**Table B.4 – Utah Public Service Commission IRP Standard and Guidelines**

| No.                      | Requirement   | How the Standards and Guidelines are Addressed in the 2019 IRP             |
|--------------------------|---|--|
| <b>Procedural Issues</b> |   |  |
| 1                        | The Commission has the legal authority to promulgate Standards and Guidelines for integrated resource planning. | Not addressed; this is a Public Service Commission of Utah responsibility. |

| No.                             | Requirement  | How the Standards and Guidelines are Addressed in the 2019 IRP  |
|---------------------------------|--|---|
| 2                               | Information Exchange is the most reasonable method for developing and implementing integrated resource planning in Utah.   | Information exchange has been conducted throughout the IRP process.   |
| 3                               | Prudence reviews of new resource acquisitions will occur during ratemaking proceedings.  | Not an IRP requirement as the Commission acknowledges that prudence reviews will occur during ratemaking proceedings, outside of the IRP process.   |
| 4                               | PacifiCorp's integrated resource planning process will be open to the public at all stages. The Commission, its staff, the Division, the Committee, appropriate Utah state agencies, and other interested parties can participate. The Commission will pursue a more active-directive role if deemed necessary, after formal review of the planning process. | PacifiCorp's public process is described in Volume I, Chapter 2 (Introduction). A description of public-input meetings is provided in Volume II, Appendix C (Public Input Process). Public-input meeting materials can also be found on PacifiCorp's website at: <a href="http://www.pacificorp.com/energy/integrated-resource-plan/public-input-process.html">www.pacificorp.com/energy/integrated-resource-plan/public-input-process.html</a> |
| 5                               | Consideration of environmental externalities and attendant costs must be included in the integrated resource planning analysis.  | PacifiCorp used a scenario analysis approach along with externality cost adders to model environmental externality costs. See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) for a description of the methodology employed, including how CO <sub>2</sub> cost uncertainty is factored into the determination of relative portfolio performance through a base case planning assumption and other price-policy scenarios.     |
| 6                               | The integrated resource plan must evaluate supply-side and demand-side resources on a consistent and comparable basis.   | Supply, transmission, and demand-side resources were evaluated on a comparable basis using PacifiCorp's capacity expansion optimization model. Also see the response to number 4.b.ii below.  |
| 7                               | Avoided cost should be determined in a manner consistent with the company's Integrated Resource Plan.  | Consistent with Utah rules, PacifiCorp determination of avoided costs in Utah will be handled in a manner consistent with the IRP, with the caveat that the costs may be updated if better information becomes available.   |
| 8                               | The planning standards and guidelines must meet the needs of the Utah service area, but since coordination with other jurisdictions is important, must not ignore the rules governing the planning process already in place in other jurisdictions.  | This IRP was developed in consultation with parties from all state jurisdictions, and meets all formal state IRP guidelines.  |
| 9                               | The company's Strategic Business Plan must be directly related to its Integrated Resource Plan.  | Volume I, Chapter 9 (Action Plan) describes the linkage between the 2019 IRP preferred portfolio and December 2018 business plan resources. Significant resource differences are highlighted. The business plan portfolio was run consistent with requirements outlined in the Order issued by the Utah Public Service Commission on September 16, 2016, Docket No. 15-035-04.  |
| <b>Standards and Guidelines</b> |  |   |
| 1                               | Definition: Integrated resource planning is a utility planning process which evaluates all known resources on a consistent and comparable basis, in order to meet current and future customer electric energy services needs at the lowest total cost to the utility and its customers,  | Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) outlines the portfolio performance evaluation and preferred portfolio selection process, while Chapter 8 (Modeling and Portfolio Selection Results) chronicles the modeling and preferred portfolio selection process. This IRP  |



| No.    | Requirement   | How the Standards and Guidelines are Addressed in the 2019 IRP  |
|--------|---|---|
|        | and in a manner consistent with the long-run public interest. The process should result in the selection of the optimal set of resources given the expected combination of costs, risk and uncertainty.   | also addresses concerns expressed by Utah stakeholders and the Utah commission concerning comprehensiveness of resources considered, consistency in applying input assumptions for portfolio modeling, and explanation of PacifiCorp's decision process for selecting top-performing portfolios and the preferred portfolio.  |
| 2      | The company will submit its Integrated Resource Plan biennially.  | The company submitted its last IRP on April 4, 2017, and filed this IRP on October 18, 2019 meeting the requirement. PacifiCorp requested and was granted an extension of time to file the 2019 IRP in Docket No. 19-035-02.  |
| 3      | IRP will be developed in consultation with the Commission, its staff, the Division of Public Utilities, the Committee of Consumer Services, appropriate Utah state agencies and interested parties. PacifiCorp will provide ample opportunity for public input and information exchange during the development of its Plan.   | PacifiCorp's public process is described in Volume I, Chapter 2 (Introduction). A record of public meetings is provided in Volume II, Appendix C (Public Input Process).  |
| 4.a    | PacifiCorp's integrated resource plans will include: a range of estimates or forecasts of load growth, including both capacity (kW) and energy (kWh) requirements.  | PacifiCorp implemented a load forecast range for both capacity expansion optimization scenarios as well as for stochastic variability, covering both capacity and energy. Details concerning the load forecasts used in the 2019 IRP are provided in Volume I, Chapter 5 (Resource Needs Assessment) and Volume II, Appendix A (Load Forecast Details).                               |
| 4.a.i  | The forecasts will be made by jurisdiction and by general class and will differentiate energy and capacity requirements. The company will include in its forecasts all on-system loads and those off-system loads which they have a contractual obligation to fulfill. Non-firm off-system sales are uncertain and should not be explicitly incorporated into the load forecast that the utility then plans to meet. However, the Plan must have some analysis of the off-system sales market to assess the impacts such markets will have on risks associated with different acquisition strategies. | Load forecasts are differentiated by jurisdiction and differentiate energy and capacity requirements. See Volume I, Chapter 5 (Resource Needs Assessment) and Volume II, Appendix A (Load Forecast Details). Non-firm off-system sales are not incorporated into the load forecast. Off-system sales markets are included in IRP modeling and are used for system balancing purposes. |
| 4.a.ii | Analyses of how various economic and demographic factors, including the prices of electricity and alternative energy sources, will affect the consumption of electric energy services, and how changes in the number, type and efficiency of end-uses will affect future loads.   | Volume II, Appendix A (Load Forecast Details) documents how demographic and price factors are used in PacifiCorp's load forecasting methodology.  |
| 4.b    | An evaluation of all present and future resources, including future market opportunities (both demand-side and supply-side), on a consistent and comparable basis.  | Resources were evaluated on a consistent and comparable basis using the System Optimizer model and Planning and Risk production cost model using both supply side and demand side alternatives. See explanation in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and the results in Volume I, Chapter 8 (Modeling and Portfolio                                    |

| No.     | Requirement   | How the Standards and Guidelines are Addressed in the 2019 IRP  |
|---------|---|---|
|         |   | Selection Results). Resource options are summarized in Volume I, Chapter 6 (Resource Options).  |
| 4.b.i   | An assessment of all technically feasible and cost-effective improvements in the efficient use of electricity, including load management and conservation.  | PacifiCorp included supply curves for Demand Response (Class 1) DSM (dispatchable/schedulable load control) and Energy Efficiency (Class 2) DSM in its capacity expansion model. Details are provided in Volume I, Chapter 6 (Resource Options).  |
| 4.b.ii  | An assessment of all technically feasible generating technologies including: renewable resources, cogeneration, power purchases from other sources, and the construction of thermal resources.  | PacifiCorp considered a wide range of resources including renewables, cogeneration (combined heat and power), power purchases, thermal resources, energy storage, and Energy Gateway transmission configurations. Volume I, Chapters 6 (Resource Options) and 7 (Modeling and Portfolio Evaluation Approach) contain assumptions and describe the process under which PacifiCorp developed and assessed these technologies and resources.   |
| 4.b.iii | The resource assessments should include: life expectancy of the resources, the recognition of whether the resource is replacing/adding capacity or energy, dispatchability, lead-time requirements, flexibility, efficiency of the resource and opportunities for customer participation.   | <p>PacifiCorp captures and models these resource attributes in its IRP models. Resources are defined as providing capacity, energy, or both. The DSM supply curves used for portfolio modeling explicitly incorporate estimated rates of program and event participation. The private generation study, modeled as a reduction to load, also considered rates of participation. Replacement capacity is considered in the case of early coal unit retirements as evaluated in this IRP as an alternative to coal unit environmental investments.</p> <p>Dispatchability is accounted for in both IRP models used; however, the Planning and Risk model provides a more detailed representation of unit dispatch than System Optimizer, and includes modeling of unit commitment and reserves.</p> |
| 4.c     | An analysis of the role of competitive bidding for demand-side and supply-side resource acquisitions  | A description of the role of competitive bidding and other procurement methods is provided in Volume I, Chapter 9 (Action Plan).  |
| 4.d     | A 20-year planning horizon.   | This IRP uses a 20-year study horizon (2019-2038).  |
| 4.e     | An action plan outlining the specific resource decisions intended to implement the integrated resource plan in a manner consistent with the company's strategic business plan. The action plan will span a four-year horizon and will describe specific actions to be taken in the first two years and outline actions anticipated in the last two years. The action plan will include a status report of the specific actions contained in the previous action plan. | <p>The IRP action plan is provided in Volume I, Chapter 9 (Action Plan). A status report of the actions outlined in the previous action plan (2017 IRP Update) is provided in Volume I, Chapter 9 (Action Plan).</p> <p>In Volume I, Chapter 9 (Action Plan) Table 9.1 identifies actions anticipated in the next two years and in the next four years.</p>   |
| 4.f     | A plan of different resource acquisition paths for different economic circumstances with a decision mechanism to select among and modify these paths as the future unfolds.   | Volume I, Chapter 9 (Action Plan) includes an acquisition path analysis that presents broad resource strategies based on regulatory trigger events, change in load growth, extension of federal renewable resource tax incentives and procurement delays.   |



| No. | Requirement  | How the Standards and Guidelines are Addressed in the 2019 IRP  |
|-----|--|---|
| 4.g | An evaluation of the cost-effectiveness of the resource options from the perspectives of the utility and the different classes of ratepayers. In addition, a description of how social concerns might affect cost effectiveness estimates of resource options.   | <p>PacifiCorp provides resource-specific utility and total resource cost information in Volume I, Chapter 6 (Resource Options).</p> <p>The IRP document addresses the impact of social concerns on resource cost-effectiveness in the following ways:</p> <ul style="list-style-type: none"> <li>• Top performing portfolios were evaluated using a range of CO<sub>2</sub> price-policy scenarios.</li> <li>• A discussion of environmental policy status and impacts on utility resource planning is provided in Volume I, Chapter 3 (The Planning Environment).</li> <li>• State and proposed federal public policy preferences for clean energy are considered for development of the preferred portfolio, which is documented in Volume I, Chapter 8 (Modeling and Portfolio Selection Results).</li> <li>• Volume II, Appendix G (Plant Water Consumption) reports historical water consumption for PacifiCorp's thermal plants.</li> </ul> |
| 4.h | An evaluation of the financial, competitive, reliability, and operational risks associated with various resource options and how the action plan addresses these risks in the context of both the Business Plan and the 20-year Integrated Resource Plan. The company will identify who should bear such risk, the ratepayer or the stockholder. | <p>The handling of resource risks is discussed in Volume I, Chapter 9 (Action Plan), and covers managing environmental risk for existing plants, risk management and hedging and treatment of customer and investment risk. Transmission expansion risks are discussed in Chapter 4 (Transmission).</p> <p>Resource capital cost uncertainty and technological risk is addressed in Volume I, Chapter 6 (Resource Options).</p> <p>For reliability risks, the stochastic simulation model incorporates stochastic volatility of forced outages for new thermal plants and hydro availability. These risks are factored into the comparative evaluation of portfolios and the selection of the preferred portfolio upon which the action plan is based.</p> <p>Identification of the classes of risk and how these risks are allocated to ratepayers and investors is discussed in Volume I, Chapter 9 (Action Plan).</p>                          |
| 4.i | Considerations permitting flexibility in the planning process so that the company can take advantage of opportunities and can prevent the premature foreclosure of options.  | Flexibility in the planning and procurement processes is highlighted in Volume I, Chapter 9 (Action Plan), specifically, Table 9.1.   |
| 4.j | An analysis of tradeoffs; for example, between such conditions of service as reliability and dispatchability and the acquisition of lowest cost resources.   | PacifiCorp examined the trade-off between portfolio cost and risk, taking into consideration a broad range of resource alternatives defined with varying levels of dispatchability. This trade-off analysis is documented in Volume I, Chapter 8 (Modeling and Portfolio Selection Results).  |
| 4.k | A range, rather than attempts at precise quantification, of estimated external costs which   | PacifiCorp incorporated environmental externality costs for CO <sub>2</sub> and costs for complying with current  |

| No. | Requirement   | How the Standards and Guidelines are Addressed in the 2019 IRP  |
|-----|---|---|
|     | may be intangible, in order to show how explicit consideration of them might affect selection of resource options. The company will attempt to quantify the magnitude of the externalities, for example, in terms of the amount of emissions released and dollar estimates of the costs of such externalities.  | and proposed U.S. EPA regulatory requirements. For CO <sub>2</sub> externality costs, the company used scenarios with various compliance requirements to capture a reasonable range of cost impacts. These modeling assumptions are described in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach).  |
| 4.1 | A narrative describing how current rate design is consistent with the company's integrated resource planning goals and how changes in rate design might facilitate integrated resource planning objectives.   | See Volume I, Chapter 3 (The Planning Environment). The role of Class 3 DSM (price response programs) at PacifiCorp and how these resources are modeled in the IRP are described in Volume I, Chapter 6 (Resource Options).   |
| 5   | PacifiCorp will submit its IRP for public comment, review and acknowledgment.   | <p>PacifiCorp distributed draft IRP materials for external review throughout the process prior to each of the public-input meetings and solicited/and received feedback at various times when developing the 2019 IRP. The materials shared with stakeholders at these meetings, outlined in Volume I Chapter 2 (Introduction), is consistent with materials presented in Volumes I and II of the 2019 IRP report. Public-input meetings materials can be located on PacifiCorp's website at:<br/> <a href="http://www.pacificorp.com/energy/integrated-resource-plan/public-input-process.html">www.pacificorp.com/energy/integrated-resource-plan/public-input-process.html</a></p> <p>PacifiCorp requested and responded to comments from stakeholders in throughout its 2019 IRP process. The company also considered comments received via Stakeholder Feedback Forms that can be located on PacifiCorp's website at:<br/> <a href="http://www.pacificorp.com/energy/integrated-resource-plan/comments.html">www.pacificorp.com/energy/integrated-resource-plan/comments.html</a> A total of 133 Stakeholder Feedback Forms were received and responded to during the 2019 IRP public-input process.</p> |
| 6   | The public, state agencies and other interested parties will have the opportunity to make formal comment to the Commission on the adequacy of the Plan. The Commission will review the Plan for adherence to the principles stated herein, and will judge the merit and applicability of the public comment. If the Plan needs further work the Commission will return it to the company with comments and suggestions for change. This process should lead more quickly to the Commission's acknowledgment of an acceptable Integrated Resource Plan. The company will give an oral presentation of its report to the Commission and all interested public parties. Formal hearings on the acknowledgment of the Integrated Resource Plan might be appropriate but are not required. | Not addressed; this is a post-filing activity.  |
| 7   | Acknowledgment of an acceptable Plan will not guarantee favorable ratemaking treatment of future resource acquisitions.   | Not addressed; this is not a PacifiCorp activity.   |

| No. | Requirement   | How the Standards and Guidelines are Addressed in the 2019 IRP |
|-----|---|--|
| 8   | The Integrated Resource Plan will be used in rate cases to evaluate the performance of the utility and to review avoided cost calculations. | Not addressed; this refers to a post-filing activity.          |

**Table B.5 – Washington Utilities and Transportation Commission IRP Standard and Guidelines (RCW 19.280.030 and WAC 480-100-238)**

| No.  | Requirement   | How the Standards and Guidelines are Addressed in the 2019 IRP   |
|--|---|--|
| <b>Requirements prior to IRP Filing</b>    |   |  |
| (4)  | Work plan filed no later than 12 months before next IRP due date.   | PacifiCorp filed the 2019 IRP work plan on July 17, 2019 in Docket No. UE-180259, given an anticipated IRP filing date of October 18, 2019. PacifiCorp was granted approval in Docket No. UE-180259 on July 26, 2019 to file the IRP October 18, 2019.   |
| (4)  | Work plan outlines content of IRP.  | See pages 1-2 of the Work Plan document for a summarization of anticipated IRP contents.   |
| (4)  | Work plan outlines method for assessing potential resources. (See LRC analysis below)                                       | See pages 3-5 of the Work Plan document for a summarization of anticipated resource analysis.  |
| (5)  | Work plan outlines timing and extent of public participation.   | See pages 5-6 of the Work Plan. Table 1, page 6, document for the anticipated IRP schedule. PacifiCorp was granted approval in Docket No. UE-180259 on July 26, 2019 to file the 2019 IRP on October 18, 2019.   |
| (4)  | Integrated resource plan submitted within two years of previous plan.   | The WUTC issued an Order on December 11, 2008, under Docket No. UE-070117, granting the company permission to file its IRP on March 31 of each odd numbered year. PacifiCorp filed the 2017 IRP on April 4, 2017. PacifiCorp was granted approval in Docket No. UE-180259 on July 26, 2019 to file the IRP October 18, 2019.   |
| (5)  | WUTC issues notice of public hearing after company files plan for review.   | This obligation is not applicable to the company; this is a WUTC obligation.   |
| (5)  | WUTC holds public hearing.  | This obligation is not applicable to the company; this is a WUTC obligation.   |
| <b>Requirements specific to IRP filing</b> |   |  |
| (2)(a)                                     | Plan describes the mix of energy supply resources.  | Volume I, Chapter 5 (Resource Needs Assessment) describes the mix of existing resources, while Volume I, Chapter 8 (Modeling and Portfolio Selection Results) describes the 2019 IRP preferred portfolio.  |
| (2)(a)                                     | Plan describes conservation supply.   | See Volume I, Chapter 6 (Resource Options) for a description of how conservation supplies are represented and modeled, and Volume I, Chapter 8 (Modeling and Portfolio Selection Results) for conservation supply in the preferred portfolio. Additional information on energy efficiency resource characteristics is available on PacifiCorp's IRP website.   |
| (2)(a)                                     | Plan addresses supply in terms of current and future needs at the lowest reasonable cost to the utility and its ratepayers. | The 2019 IRP preferred portfolio was based on a resource needs assessment that accounted for forecasted load growth, expiration of existing power purchase contracts, resources under construction, contract, or reflected in the company's capital budget, as well as a capacity planning reserve margin. Details on PacifiCorp's findings of resource need are described in Volume I, Chapter 5 (Resource Needs Assessment). |
| (2)(b)                                     | Plan uses lowest reasonable cost (LRC) analysis to select the mix of resources.   | PacifiCorp uses portfolio performance measures based on the Present Value of Revenue Requirements (PVRR) methodology. See the section on portfolio performance measures in Volume I, Chapter   |

| No.    | Requirement  | How the Standards and Guidelines are Addressed in the 2019 IRP   |
|--------|--|--|
|        |  | 7 (Modeling and Portfolio Evaluation Approach) and Volume I Chapter 8 (Modeling and Portfolio Selection Results).  |
| (2)(b) | LRC analysis considers resource costs.   | Volume I, Chapter 6 (Resource Options), provides detailed information on costs and other attributes for all resources analyzed for the IRP.  |
| (2)(b) | LRC analysis considers market-volatility risks.  | PacifiCorp employs Monte Carlo production cost simulation with a stochastic model to characterize market price and gas price volatility. Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) provides a summary of the modeling approach.   |
| (2)(b) | LRC analysis considers demand side resource uncertainties.   | PacifiCorp captured demand-side resource uncertainties through the development of numerous portfolios based on different sets of input assumptions.  |
| (2)(b) | LRC analysis considers resource dispatchability.   | PacifiCorp uses two IRP models that simulate the dispatch of existing and future resources based on such attributes as heat rate, availability, fuel cost, and variable O&M cost. The chronological production cost simulation model also incorporates unit commitment logic for handling start-up, shutdown, ramp rates, minimum up/down times, and run up rates, and reserve holding characteristics of individual generators.   |
| (2)(b) | LRC analysis considers resource effect on system operation.  | PacifiCorp's IRP models simulate the operation of its entire system, reflecting dispatch/unit commitment, forced/unforced outages, access to markets, and system reliability and transmission constraints.   |
| (2)(b) | LRC analysis considers risks imposed on ratepayers.  | <p>PacifiCorp explicitly models risk associated with uncertain CO<sub>2</sub> regulatory regimes, wholesale electricity and natural gas price escalation and volatility, load growth uncertainty, resource reliability, renewable portfolio standard requirement uncertainty, plant construction cost escalation, and resource affordability. These risks and uncertainties are handled through stochastic modeling and scenarios depicting alternative futures.</p> <p>In addition to risk modeling, the IRP discusses a number of resource risk topics not addressed in the IRP system simulation models. For example, Volume I, Chapter 9 (Action Plan) covers the following topics: (1) managing carbon risk for existing plants, (2) assessment of owning vs. purchasing power, (3) purpose of hedging, (4) procurement delays and (5) treatment of customer and investor risks. Volume I, Chapter 4 (Transmission) covers similar risks associated with transmission system expansion.</p> |
| (2)(b) | LRC analysis considers public policies regarding resource preference adopted by Washington state or federal government.  | In Volume I, Chapter 7 (Modeling and Portfolio Evaluation) the IRP modeling incorporates resource expansion constraints tied to renewable portfolio standards (RPS) currently in place for Washington. I-937 conservation requirements are explicitly accounted for in developing Washington conservation resource costs.  |
| (2)(b) | LRC analysis considers cost of risks associated with environmental effects including emissions of carbon dioxide.  | See (2)(b) above.  |
| (2)(c) | Plan defines conservation as any reduction in electric power consumption that results from increases in the efficiency of energy use, production, or distribution. | A description of how PacifiCorp classifies and defines energy conservation is provided in Volume I, Chapter 6 (Resource Options).  |

| No.    | Requirement  | How the Standards and Guidelines are Addressed in the 2019 IRP  |
|--------|--|---|
| (3)(a) | Plan includes a range of forecasts of future demand.   | PacifiCorp implemented a load forecast range. Details concerning the load forecasts used in the 2017 IRP (high, low, and extreme peak temperature) are provided in Volume II, Appendix A (Load Forecast Details).   |
| (3)(a) | Plan develops forecasts using methods that examine the effect of economic forces on the consumption of electricity.  | PacifiCorp's load forecast methodology employs econometric forecasting techniques that include such economic variables as household income, employment, and population. See Volume II, Appendix A (Load Forecast Details) for a description of the load forecasting methodology.  |
| (3)(a) | Plan develops forecasts using methods that address changes in the number, type and efficiency of electrical end-uses.  | Residential sector load forecasts use a statistically-adjusted end-use model that accounts for equipment saturation rates and efficiency. See Volume II, Appendix A (Load Forecast Details), for a description of the residential sector load forecasting methodology.  |
| (3)(b) | Plan includes an assessment of commercially available conservation, including load management.   | PacifiCorp updated the system-wide demand-side management potential study in the 2019 IRP, which served as the basis for developing DSM resource supply curves for resource portfolio modeling. The supply curves account for technical and achievable (market) potential, while the IRP capacity expansion model identifies a cost-effective mix of DSM resources based on these limits and other model inputs. The DSM potential study is included on the data disc, and available on PacifiCorp's IRP website at: <a href="http://www.pacificorp.com/energy/integrated-resource-plan/support.html">www.pacificorp.com/energy/integrated-resource-plan/support.html</a> . |
| (3)(b) | Plan includes an assessment of currently employed and new policies and programs needed to obtain the conservation improvements.                                | A description of the current status of DSM programs and on-going activities to implement current and new programs is provided in Volume I, Chapter 5 (Resource Needs Assessment).   |
| (3)(c) | Plan includes an assessment of a wide range of conventional and commercially available nonconventional generating technologies.                                | PacifiCorp considered a wide range of resources including renewables, cogeneration (combined heat and power), customer standby generation, power purchases, thermal resources, energy storage, and transmission. Volume I, Chapters 6 (Resource Options) and Chapter 7 (Modeling and Portfolio Evaluation Approach) document how PacifiCorp developed and assessed these technologies.  |
| (3)(d) | Plan includes an assessment of transmission system capability and reliability; to the extent such information can be provided consistent with applicable laws. | PacifiCorp modeled transmission system capability to serve its load obligations, factoring in updates to the representation of major load and generation centers, regional transmission congestion impacts, import/export availability, external market dynamics, and significant transmission expansion plans explained in Volume I, Chapter 4 (Transmission) and Chapter 7 (Modeling and Portfolio Evaluation Approach). System reliability given transmission capability was analyzed using stochastic production cost simulation and measures of insufficient energy and capacity for a load area (Energy Not Served and Unmet Capacity, respectively).                 |
| (3)(e) | Plan includes a comparative evaluation of energy supply resources (including transmission and distribution) and improvements in conservation using LRC.        | PacifiCorp's capacity expansion optimization model (System Optimizer) is designed to compare alternative resources—including transmission expansion options—for the least-cost resource mix. System Optimizer was used to develop numerous resource portfolios for comparative evaluation on the basis of cost, risk, reliability, and other performance attributes. Potential energy savings associated with conservation voltage reduction are discussed in Volume I, Chapter 5 (Resource Needs Assessment).  |
| (3)(f) | Plan includes integration of the demand forecasts and resource evaluations into a long range integrated resource plan describing                               | PacifiCorp integrates demand forecasts, resources, and system operations in the context of a system modeling framework described in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach). The portfolio evaluation covers a 20-year period (2019-   |

| No.  | Requirement  | How the Standards and Guidelines are Addressed in the 2019 IRP  |
|--|--|---|
|  | the mix of resources that is designated to meet current and project future needs at the lowest reasonable cost to the utility and its ratepayers.  | 2038). PacifiCorp developed its preferred portfolio of resources judged to be least-cost after considering load requirements, risk, uncertainty, supply adequacy/reliability, and government resource policies in accordance with this rule.  |
| (3)(g)   | Plan includes a two-year action plan that implements the long range plan.  | See Table 9.1 in Volume I, Chapter 9 (Action Plan), for PacifiCorp's 2019 IRP action plan.  |
| (3)(h)   | Plan includes a progress report on the implementation of the previously filed plan.  | See Table 9.2 for a status report on action plan implementation from the 2017 IRP and 2017 IRP Update in Volume I, Chapter 9 (Action Plan).   |
| Requirements from RCW 19.280.030 not discussed above |  |   |
| (1)(e)   | An assessment of methods, commercially available technologies, or facilities for integrating renewable resources, and addressing overgeneration events, if applicable to the utility's resource portfolio;   | See Volume I, Chapter 6 (Resource Options) for discussion of resource options in the 2019 IRP. Also see Volume II, Appendix P (Renewable Resources Assessment).   |
| (1)(f)   | The integration of the demand forecasts and resource evaluations into a long-range assessment describing the mix of supply side generating resources and conservation and efficiency resources that will meet current and projected needs, including mitigating overgeneration events, at the lowest reasonable cost and risk to the utility and its ratepayers; | See Volume II, Appendix A (Load Forecast Details) for a discussion of the load forecasts, supply-side and demand-side resources are discussed in Volume I, Chapter 6 (Resource Options). Also included is a discussion of DSM in Volume II, Appendix D (DSM Resources) are included in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and Chapter 8 (Modeling and Portfolio Selection Results) discuss the modeling methodology and selection of the preferred portfolio using least cost/least risk metrics. |

**Table B.6 – Wyoming Public Service Commission Guidelines Regarding Electric IRP**

| No. | Requirement  | How the Guideline is Addressed in the 2019 IRP  |
|-----|--|---|
| A   | The public comment process employed as part of the formulation of the utility's IRP, including a description, timing and weight given to the public process; | PacifiCorp's public process is described in Volume I, Chapter 2 (Introduction) and in Volume II, Appendix C (Public Input Process).   |
| B   | The utility's strategic goals and resource planning goals and preferred resource portfolio;  | Volume I, Chapter 8 (Modeling and Portfolio Selection Results) documents the preferred resource portfolio and rationale for selection. Volume I, Chapter 9 (Action Plan) constitutes the IRP action plan and the descriptions of resource strategies and risk management.   |
| C   | The utility's illustration of resource need over the near-term and long-term planning horizons;  | See Volume I, Chapter 5 (Resource Needs Assessment).  |
| D   | A study detailing the types of resources considered;   | Volume, I Chapter 6 (Resource Options), presents the resource options used for resource portfolio modeling for this IRP.  |
| F   | Changes in expected resource acquisitions and load growth from that presented in the utility's previous IRP;   | A comparison of resource changes relative to the 2017 IRP Update is presented in Volume I, Chapter 9 (Action Plan). A chart comparing the peak load forecasts for the 2017 IRP, 2017 IRP Update, and 2019 IRP is included in Volume II, Appendix A (Load Forecast Details).   |
| G   | The environmental impacts considered;  | Portfolio comparisons for CO <sub>2</sub> and a broad range of environmental impacts are considered, including prospective early retirement and gas conversions of existing coal units as alternatives to environmental investments. See Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and Chapter 8 (Modeling and Portfolio |



| No. | Requirement                                      | How the Guideline is Addressed in the 2019 IRP  |
|-----|--|---|
|     |  | Selection) as well as Volume II, Appendix L (Stochastic Simulation Results).  |
| H   | Market purchases evaluation;                     | Modeling of firm market purchases (front office transactions) and spot market balancing transactions is included in the 2019 IRP.   |
| I   | Reserve Margin analysis; and                     | PacifiCorp's planning reserve margin study, which documents selection of a capacity planning reserve margin is in Volume I, Appendix I (Planning Reserve Margin Study).   |
| J   | Demand-side management and conservation options; | See Volume I, Chapter 6 (Resource Options) for a detailed discussion on DSM and energy efficiency resource options. Additional information on energy efficiency resource characteristics is available on the company's website. |





## APPENDIX C – PUBLIC INPUT PROCESS

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A critical element of this Integrated Resource Plan (IRP) is the public-input process. PacifiCorp has pursued an open and collaborative approach involving the commissions, customers and other stakeholders in PacifiCorp's IRP prior to making resource planning decisions. Since these decisions can have significant economic and environmental consequences, conducting the IRP with transparency and full participation from interested and affected parties is essential.

Stakeholders have been involved in the development of the 2019 IRP from the beginning. The public-input meetings held beginning in June 2018 were the cornerstone of the direct public-input process. There were a total of 18 public-input meetings, with eight lasting two days, the remainder being single days. Meetings were held jointly in both Salt Lake City, Utah and Portland, Oregon via video conference, with expanded video conference locations in Denver, Colorado and Cheyenne, Wyoming. Three meetings were held via phone conference. For all meetings, attendees off-site were able to conference in via phone.

The IRP public-input process also included state-specific stakeholder dialogue sessions held in June and August of 2018. The goal of these sessions was to capture key IRP issues of most concern to each state, as well as discuss how to tackle these from a system planning perspective. PacifiCorp wanted to ensure stakeholders understood IRP planning principles. These meetings continued to enhance interaction with stakeholders in the planning cycle and provided a forum to directly address stakeholder concerns regarding equitable representation of state interests during public-input meetings.

PacifiCorp solicited agenda item recommendations from stakeholders in advance of the state meetings. There was additional open time to ensure participants had adequate opportunity for dialogue.

PacifiCorp's integrated resource plan website housed feedback form discussed earlier in Chapter 2 - Introduction. This standardized form allowed stakeholders opportunities to provide comments, questions, and suggestions. PacifiCorp also posted its response to the feedback forms at the same location. Feedback forms and PacifiCorp's responses can be found via the following link: ([www.pacificorp.com/energy/integrated-resource-plan/comments.html](http://www.pacificorp.com/energy/integrated-resource-plan/comments.html)).

### Participant List

PacifiCorp's 2019 IRP was a robust process involving input from many parties throughout. Organizations actively participated in the development of material, modeling process, and public meetings. Participants included commissions, stakeholders, and industry experts. Among the organizations that were represented and actively involved in this collaborative effort were:

#### Commissions

- Idaho Public Utilities Commission
- Oregon Public Utilities Commission
- Public Service Commission of Utah
- Washington Utilities and Transportation Commission

- Wyoming Public Service Commission

## **Stakeholders and Industry Experts**

- Alliance of Western Energy Consumers
- Applied Energy Group
- Avangrid
- Black & Veatch
- Breathe Utah
- Burns & McDonnell Engineering Company
- Cascade Natural Gas
- City of Kemmerer Wyoming
- Clarke Investments, LLC
- Enel Green Power
- Energy Trust of Oregon
- First Solar
- Gardner Energy
- Glenrock Energy
- Heal Utah
- Holladay United Church of Christ
- Idaho Conservation League
- Idaho Power Company
- Idaho Public Utility Commission Staff
- Individual Customers
- Industrial Customers of Northwest Utilities
- Intermountain Wind
- Lincoln County Commission
- Magnum Development
- National Grid Ventures
- Natural Resources Defense Council
- Navigant Consulting, Inc.
- Northwest Pipeline GP
- Oregon Department of Energy
- Oregon Department of Justice
- Oregon Public Utility Commission Staff
- Portland General Electric
- Power Quip
- Renewables Northwest
- Sierra Club
- Utah Clean Energy
- Utah Division of Public Utilities
- Utah Office of Consumer Services
- Utah Office of Energy Development
- Washington Office of Attorney General, Public Council Unit
- Western Resource Advocates
- Westmoreland

- Wyoming Coalition of Local Governments & Lincoln County
- Wyoming Department of Workforce Services
- Wyoming House District 18
- Wyoming Infrastructure Authority
- Wyoming Liberty Group
- Wyoming Office Of Consumer Advocate

PacifiCorp extends its gratitude for the time and energy participants have given to the IRP process. Their participation has contributed significantly to the quality of this plan and their continued participation will help PacifiCorp as it strives to improve its planning efforts going forward.

## Public-Input Meetings

As mentioned above, PacifiCorp hosted 18 public-input meetings, as well as six state meetings during the public-input process. During the 2019 IRP public-input process presentations and discussions covered various issues regarding inputs, assumptions, risks, modeling techniques, and analytical results. Below are the agendas from the public-input meetings; the presentations can be located at: [www.pacificorp.com/energy/integrated-resource-plan.html](http://www.pacificorp.com/energy/integrated-resource-plan.html).

## General Meetings

### June 28-29, 2018 – General Public Meeting

Day One (Confidential Discussion)

- Introductions
- Model Overview (System Optimizer / Planning and Risk)
- Unit-by-Unit Coal Study Results

Day Two (Public Discussion)

- 2017 IRP Update Highlights / 2019 IRP Topics and Timeline
- Demand-Side Management Workshop

### July 26-27, 2018 – General Public Meeting

Day One

- Energy Storage Workshop
- Renewable Resource Schedules and Load Forecast
- Distribution System Planning
- Supply-Side Resource Study Efforts

Day Two

- Environmental Policy
- Renewable Portfolio Standards
- 2019 IRP Modeling Assumptions and Study Updates
  - Intra-Hour Dispatch Credit
  - Stochastic Parameters Update
  - Overview of Planning Reserve Margin and Capacity Contribution Studies

**August 30-31, 2018 – General Public Meeting**

## Day One

- Private Generation Study
- Conservation Potential Assessment and Energy Efficiency Credits
- Portfolio Development Process / Initial Sensitivity Studies
- Flexible Reserve Study
- Process Improvement / Next Steps

## Day 2

- Market Reliance Assessment
- Planning Reserve Margin Study / Capacity Contribution Study

**September 26-27, 2018 – General Public Meeting**

## Day One

- Draft Supply-Side Resource Table
- Intra-Hour Flexible Resource Credit
- Environmental Policy / Price-Policy Scenarios
- Transmission Overview and Updates
- Stakeholder Feedback Form Recap

## Day Two

- Flexible Reserve Study Cost Results
- Planning Reserve Margin / Capacity Contribution Results
- Portfolios Discussion / Coal Studies Next Steps
- Demand-Side Management Transmission and Distribution Credit / Conservation Potential Assessment

**October 9, 2018 – General Public Meeting (Conference Call Only)**

- Supply-Side Resource Table Levelized Costs
- Intra-Hour Flexible Resource Credits
- Updated CO<sub>2</sub> Assumption

**November 1, 2018 – General Public Meeting**

- Supply-Side Resource Table
- Modeling Improvements and Updates
- Update on Coal Analysis
- Stakeholder Feedback Form Recap

**December 3-4, 2018 – General Public Meeting**

## Day One

- Coal Studies Discussion

## Day Two

- Coal Studies Discussion (continued)
- Stakeholder Feedback Form Recap

**January 24, 2019 – General Public Meeting**

- Capacity-Contribution Values for Energy-Limited Resources
- Coal Studies Discussion
- Stakeholder Feedback Form Recap

**February 21, 2019 – General Public Meeting (Conference Call Only)**

- General Updates
- Summary of Oregon Energy Efficiency Analysis Results
- Stakeholder Feedback Form Recap

**March 21, 2019 – General Public Meeting**

- Coal Studies Modeling Improvements and Updates
- Modeling Next Steps
- Stakeholder Feedback Form Recap

**April 25, 2019 – General Public Meeting**

- Coal Studies Discussion
- Stakeholder Feedback Form Recap

**May 20-21, 2019 – General Public Meeting**

## Day One

- Conservation Potential Assessment Cost Correction
- DSM Bundling Portfolio Methodology
- Updated Portfolio Matrix
- Portfolio Analysis Results Discussion

## Day Two

- Portfolio Analysis Results Discussion (continued)
- Stakeholder Feedback Form Recap

**June 20-21, 2019 – General Public Meeting**

## Day One

- Modeling Updates
- Portfolio Analysis Results

## Day Two

- Portfolio Analysis Results
- Stakeholder Feedback Form Recap

**July 12, 2019 – DSM Workshop**

- Conservation Potential Assessment
- Demand-Side Management Portfolio Methodology

**July 18, 2019 – General Public Meeting (Conference Call Only)**

- General Updates
- Stakeholder Feedback Form Recap

**September 5, 2019 – General Public Meeting**

- Portfolio Analysis Results
- Stakeholder Feedback Form Recap

**October 3-4, 2019 – General Public Meeting**

## Day One

- Preferred Portfolio and Action Plan
- Portfolio Development and Selection

## Day Two

- Portfolio Development and Selection
- Sensitivities
- Stakeholder Feedback Form Recap

**November 12, 2019 – General Public Meeting (Planned)**

- Stakeholder Q&A
- Transmission Modeling Workshop

**State-Specific Input Meetings**

June 11, 2018 – Oregon State Stakeholder Meeting

June 12, 2018 – Washington State Stakeholder Meeting

June 18, 2018 – Idaho State Stakeholder Meeting

June 19, 2018 – Wyoming State Stakeholder Meeting

June 20, 2018 – Utah State Stakeholder Meeting

August 9, 2018 – Utah State Stakeholder Meeting

**Stakeholder Comments**

For the 2019 IRP, PacifiCorp offered a Stakeholder Feedback Form which provided stakeholders a direct opportunity to provide comments, questions, and suggestions outside opportunities for discussion at public-input meetings. PacifiCorp recognizes the importance of stakeholder feedback to the IRP public-input process. A blank form, as well as those submitted by stakeholders and PacifiCorp's response, can be located on the PacifiCorp website at the IRP comments webpage at: [www.pacificorp.com/energy/integrated-resource-plan/comments.html](http://www.pacificorp.com/energy/integrated-resource-plan/comments.html).

During the 2019 IRP development process, PacifiCorp received 132 Stakeholder Feedback Forms with a combined 564 questions. The Stakeholder Feedback Form allowed the company to review and summarize issues by topic as well as identify specific recommendations that were provided. Information collected was used to inform the 2019 IRP development process, including feedback related to process improvements and input assumptions, as well as responding directly to stakeholder questions. Stakeholder Feedback Forms were received from the following stakeholders:

- City of Kemmerer, Wyoming
- Energy Strategies, LLC
- First Solar
- Gridflex Energy, LLC

- Idaho Conservation League
- Idaho Public Utility Commission Staff
- Individual Stakeholders
- Interwest Energy Alliance
- Key Capture Energy
- Lawrence Berkeley National Laboratory
- Lincoln County School District
- National Grid Ventures
- Northwest Energy Coalition
- Northwest Power and Conservation Council
- Oregon Citizens' Utility Board
- Oregon Public Utility Commission Staff
- Oyster Ridge BOCES
- Powder River Basin Resource Council
- Renewable Northwest
- Sierra Club
- Sound Geothermal Corporation
- South Lincoln EMS
- South Lincoln Medical Center
- Southwest Energy Efficiency Project
- Utah Association of Energy Users
- Utah Clean Energy
- Washington Utilities and Transportation Commission Staff
- Western Resource Advocates
- Wyoming Business Council
- Wyoming Coalition of Local Governments & Lincoln County
- Wyoming House District 18
- Wyoming Office of Consumer Advocate

Some topics of note addressed in the forms include:

- Capacity Factors
- Coal Analysis
- Coal Combustion Residuals
- Coal Studies
- Conservation Credit
- Conservation Potential Assessment
- Consultant Reports
- Demand Response
- Demand-Side Management
- Demand-Side Management Modeling
- Distribution System Planning
- Energy Efficiency
- Energy Storage
- Environmental Policy
- Flexible Reserve Study

- General Comments
- Inflation Assumption
- Initial Sensitivity Studies
- Intra-hour Dispatch Credits
- IRP Filing Date
- IRP Public-Input Meeting Process
- Legislation
- Levelized Cost Curves
- Load Forecasting
- Market Purchases
- Market Reliance Assessment
- Modeling Assumptions
- Modeling Improvements
- Planning Reserve Margin
- Portfolio Analysis
- Private Generation Study
- Reliability Assessment
- Renewable Energy Resources
- Sensitivity Studies
- Supply-side Resource Costs
- Supply-side Resource Table
- Transmission
- Unit Specific Questions

## Contact Information

PacifiCorp's IRP website: [www.pacificorp.com/energy/integrated-resource-plan.html](http://www.pacificorp.com/energy/integrated-resource-plan.html).

PacifiCorp requests any informal request be sent to the following address or email.

PacifiCorp  
IRP Resource Planning Department  
825 N.E. Multnomah, Suite 600  
Portland, Oregon 97232

*Email Address:*  
IRP@PacifiCorp.com

*Phone Number:*  
(503) 813-5245



## APPENDIX D – DEMAND-SIDE MANAGEMENT RESOURCES

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### Introduction

This appendix reviews the studies and reports used to support the demand-side management (DSM) resource information used in the modeling and analysis of the 2019 Integrated Resource Plan (IRP). In addition, it provides information on the economic DSM selections in the 2019 IRP's Preferred Portfolio, a summary of existing DSM program services and offerings, and an overview of the DSM planning process in each of PacifiCorp's service areas.

### Conservation Potential Assessment (CPA) for 2019-2038

Since 1989, PacifiCorp has developed biennial IRPs to identify an optimal mix of resources that balance considerations of cost, risk, uncertainty, supply reliability/deliverability, and long-run public policy goals. The optimization process accounts for capital, energy, and ongoing operation costs as well as the risk profiles of various resource alternatives, including: traditional generation and market purchases, renewable generation, and DSM resources such as energy efficiency, and demand response or capacity-focused resources. Since the 2008 IRP, DSM resources have competed directly against supply-side options, allowing the IRP model to guide decisions regarding resource mixes, based on cost and risk.

The Conservation Potential Assessment (CPA) for 2019-2038,<sup>1</sup> conducted by Applied Energy Group (AEG) on behalf of PacifiCorp, primarily seeks to develop reliable estimates of the magnitude, timing, and costs of DSM resources likely available to PacifiCorp over the IRP's 20-year planning horizon. The study focuses on resources realistically achievable during the planning horizon, given normal market dynamics that may hinder resource acquisition. Study results were incorporated into PacifiCorp's 2019 IRP and will be used to inform subsequent DSM planning and program design efforts. This study serves as an update of similar studies completed since 2007.

For resource planning purposes, PacifiCorp classifies DSM resources into four classifications, differentiated by two primary characteristics: reliability and customer choice. These resources classifications can be defined as: demand response (Class 1 DSM) (e.g., a firm, capacity focused resource such as a load control), energy efficiency (Class 2 DSM) (e.g., a firm energy intensity resource such as conservation), Class 3 DSM (e.g., a non-firm, capacity focused such as pricing response or load shifting), and Class 4 DSM (e.g., a behavioral-based resource such as education and information).

From a system-planning perspective, demand response resources can be considered the most reliable, as they can be dispatched by the utility. In contrast, Class 4 DSM resources are the least reliable due to the resource's dependence on voluntary behavioral changes. With respect to customer choice, demand response and energy efficiency resources should be considered involuntary in that, once equipment and systems have been put in place, savings can be expected

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<sup>1</sup> PacifiCorp's Demand-Side Resource Potential Assessment for 2017-2036, completed by AEG, can be found at: [www.pacificorp.com/energy/integrated-resource-plan/support.html](http://www.pacificorp.com/energy/integrated-resource-plan/support.html).

to occur over a certain period of time. Class 3 and Class 4 DSM activities involve greater customer choice and control. This assessment estimates potential from demand response, energy efficiency, and Class 3 DSM.

The CPA excludes an assessment of Oregon’s energy efficiency resource potential, as this work is performed by the Energy Trust of Oregon, which provides energy efficiency potential in Oregon to PacifiCorp for resource planning purposes.

### **Current DSM Program Offerings by State**

Currently, PacifiCorp offers a robust portfolio of DSM programs and initiatives, most of which are offered in multiple states, depending on size of the opportunity and the need. Programs are reassessed on a regular bases. PacifiCorp has the most up-to-date programs on its website.<sup>2</sup> Demand response and energy efficiency program services and offerings are available by state and sector. Energy efficiency services listed for Oregon, except for low income weatherization services, are provided in collaboration with the Energy Trust of Oregon.<sup>3</sup> Table D.1 provides an overview of the breadth of demand response and energy efficiency program services and offerings available by Sector and State.

PacifiCorp has numerous Class 3 DSM offerings currently available. They include metered time-of-day and time-of-use pricing plans (in all states, availability varies by customer class), residential seasonal inverted block rates (Idaho and Utah) and residential year-round inverted block rates (California, Oregon, Washington, and Wyoming). System-wide, approximately 17,500 customers were participating in metered time-of-day and time-of-use programs as of December 31, 2017.

All of PacifiCorp’s residential customers not opting for Class 3 DSM time-of-use rates are currently subject to seasonal or year-round inverted block rate plans. Savings associated with these resources are captured within the company’s load forecast and are thus captured in the integrated resource planning framework. PacifiCorp continues to evaluate Class 3 DSM programs for applicability to long-term resource planning.

PacifiCorp provides Class 4 DSM offerings. Educating customers regarding energy efficiency and load management opportunities is an important component of PacifiCorp’s long-term resource acquisition plan. A variety of channels are used to educate customers including television, radio, newspapers, bill inserts and messages, newsletters, school education programs, and personal contact. Load reductions due to Class 4 DSM activity will show up in demand response and energy efficiency program results and non-program reductions in the load forecast over time. Table D.2 provides an overview of DSM related *wattsmart* Outreach and Communication activities (Class 4 DSM activities) by state.

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<sup>2</sup> Programs for Rocky Mountain Power can be found at [www.rockymountainpower.net/savings-energy-choices.html](http://www.rockymountainpower.net/savings-energy-choices.html) and programs for Pacific Power can be found at [www.pacificcorp.com/environment/demand-side-management.html](http://www.pacificcorp.com/environment/demand-side-management.html).

<sup>3</sup> Funds for low-income weatherization services are forwarded to Oregon Housing and Community Services.

**Table D.1– Current Demand Response and Energy Efficiency Program Services and Offerings by Sector and State**

| Program Services & Offerings by Sector and State                    | California | Oregon | Washington | Idaho | Utah | Wyoming |
|---|------------|--------|------------|-------|------|---------|
| <b>Residential Sector</b>   |            |        |            |       |      |         |
| Air Conditioner Direct Load Control                                 | √          | √      | √          | √     | √    | √       |
| Lighting Incentives   | √          | √      | √          | √     | √    | √       |
| New Appliance Incentives  | √          | √      | √          | √     | √    | √       |
| Heating And Cooling Incentives                                      | √          | √      | √          | √     | √    | √       |
| Weatherization Incentives - Windows, Insulation, Duct Sealing, etc. | √          | √      | √          | √     | √    | √       |
| New Homes   | √          | √      | √          | √     | √    | √       |
| Low-Income Weatherization   | √          | √      | √          | √     | √    | √       |
| Home Energy Reports   |            |        | √          | √     | √    | √       |
| School Curriculum   |            | √      | √          |       | √    |         |
| Energy Saving Kits  | √          | √      | √          | √     | √    | √       |
| Financing Options With On-Bill Payments                             |            | √      |            |       |      |         |
| Trade Ally Outreach   | √          | √      | √          | √     | √    | √       |

| Program Services & Offerings by Sector and State            | California | Oregon | Washington | Idaho | Utah | Wyoming |
|---|------------|--------|------------|-------|------|---------|
| <b>Non-Residential Sector</b>                               |            |        |            |       |      |         |
| Air Conditioner Direct Load Control                         |            | √      |            | √     | √    |         |
| Irrigation Load Control                                     |            | √      |            | √     | √    |         |
| Standard Incentives   | √          | √      | √          | √     | √    | √       |
| Energy Engineering Services                                 | √          | √      | √          | √     | √    | √       |
| Billing Credit Incentive (offset to DSM charge)             |            | √      |            |       | √    | √       |
| Energy Management   | √          | √      | √          | √     | √    | √       |
| Energy Profiler Online                                      | √          | √      | √          | √     | √    | √       |
| Business Solutions Toolkit                                  | √          | √      | √          | √     | √    | √       |
| Trade Ally Outreach   | √          | √      | √          | √     | √    | √       |
| Small Business Lighting                                     | √          | √      | √          | √     | √    | √       |
| Lighting Instant Incentives                                 | √          | √      | √          | √     | √    | √       |
| Small to Mid-Sized Business Facilitation                    | √          | √      | √          | √     | √    | √       |
| DSM Project Managers Partner With Customer Account Managers | √          | √      | √          | √     | √    | √       |

**Table D.2 – Current wattsmart Outreach and Communications Activities**

| Wattsmart Outreach & Communications (incremental to program specific advertising) | California | Oregon | Washington | Idaho | Utah | Wyoming |
|---|------------|--------|------------|-------|------|---------|
| Advertising   |            | √      | √          | √     | √    | √       |
| Sponsorships  |            | √      |            |       | √    |         |

| Wattsmart Outreach & Communications (incremental to program specific advertising)                          | California | Oregon | Washington | Idaho | Utah | Wyoming |
|--|------------|--------|------------|-------|------|---------|
| Social Media   | √          | √      | √          | √     | √    | √       |
| Public Relations   | √          | √      | √          |       | √    | √       |
| Business Advocacy (awards at customer meetings, sponsorships, chamber partnership, university partnership) | √          | √      | √          | √     | √    | √       |
| Wattsmart Workshops and Community Outreach   | √          | √      | √          | √     | √    | √       |
| Be wattsmart, Begin at Home - in school energy education   |            |        | √          | √     | √    | √       |

## State-Specific DSM Planning Processes

A summary of the DSM planning process in each state is provided below.

### Utah, Wyoming and Idaho

The company's biennial IRP and associated action plan provides the foundation for DSM acquisition targets in each state. Where appropriate, the company maintains and uses external stakeholder groups and vendors to advise on a range of issues including annual goals for conservation programs, development of conservation potential assessments, development of multi-year DSM plans, program marketing, incentive levels, budgets, adaptive management and the development of new and pilot programs.

### Washington

The company is one of three investor-owned utilities required to comply with the Energy Independence Act (also referred to as I-937) approved in November 2006. The Act requires utilities to pursue all conservation that is cost-effective, reliable, and feasible. Every two years, each utility must identify its 10-year conservation potential and two-year acquisition target based on its IRP and using methodologies that are consistent with those used by the Northwest Power and Conservation Council. Each utility must maintain and use an external conservation stakeholder group that advises on a wide range of issues including conservation programs, development of conservation potential assessments, program marketing, incentive levels, budgets, adaptive management and the development of new and pilot programs. PacifiCorp works with the conservation stakeholder group annually on its energy efficiency program design and planning.

### California

On September 15, 2017, PacifiCorp filed Application 17-09-010 requesting authorization to continue offering its energy efficiency programs (through 2020). The Commission issued Decision 18-11-033 on December 6, 2018, approving the company's application to continue administering its programs through 2020. PacifiCorp expects to submit an application for the continuation of energy efficiency programs beyond 2020.

### Oregon

Energy efficiency programs for Oregon customers are planned for and delivered by the Energy Trust of Oregon in collaboration with PacifiCorp. The Energy Trust's planning process is

comparable to PacifiCorp's other states, including establishing resource acquisition targets based on resource assessment and integrated resource planning, developing programs based on local market conditions, and coordinating with stakeholders and regulators to ensure efficient and cost-effective delivery of energy efficiency resources.



## APPENDIX E – SMART GRID

### Introduction

The smart grid is the application of advanced communications and controls to the electric power system. Areas of installation include generation, transmission, distribution, and customer facilities. A wide array of applications can be defined under the smart grid umbrella. Smart grid includes technologies such as dynamic line rating, phasor measurement units (synchrophasors), energy storage, power line sensors, distribution automation, integrated volt/var optimization, advanced metering infrastructure, automated demand response, and smart renewable and/or distributed generation controls (e.g., smart inverters).

PacifiCorp has reviewed relevant smart grid technologies for transmission, substation, and distribution systems. When considering smart grid technologies, the communications network is often the most critical infrastructure decision. This network must have high speed, reliability, and security. It must be interoperable for many device types, manufacturers, and generations of technology and must be scalable in order to support PacifiCorp's entire service territory.

PacifiCorp regularly evaluates integrating smart grid technologies and implements those that show a positive net benefit for its customers. PacifiCorp has tested or implemented smart grid devices and functions such as dynamic line rating, synchrophasors, and communicating faulted circuit indicators. Advanced metering infrastructure, distribution automation, and distributed energy resource systems (including electric vehicles) are also underway or under consideration.

PacifiCorp will leverage smart grid technologies to align investments with the least-cost/least-risk goals of the Integrated Resource Plan (IRP). This will optimize the electrical grid when and where it is economically feasible, operationally beneficial, and in the best interest of customers. PacifiCorp is committed to consistently evaluating the value of emerging technologies and recommend them for demonstration or integration if they are found to be appropriate investments. PacifiCorp is working with state commissions to improve reliability, energy efficiency, customer service, and integration of renewable resources by analyzing the total cost of ownership, performing thorough cost-benefit analyses, and reaching out to customers concerning smart grid applications and technologies. As technology advances and development continues, PacifiCorp is able to improve estimates of the costs and benefits of smart grid technologies. Progressing large-scale deployments and demonstration projects will reveal the effect of large-scale rollouts and assist PacifiCorp in identifying the best suited technologies for implementation.

### Transmission System Efforts

#### Dynamic Line Rating

Dynamic line rating is the application of sensors to transmission lines to indicate the real-time current-carrying capacity of the lines in relation to thermal restrictions. Transmission line ratings are typically based on line loading calculations given a set of worst-case weather assumptions such as high ambient temperatures and very low wind speeds. Dynamic line rating allows an increase in current-carrying capacity when more favorable weather conditions are present and the



transmission path is not constrained by other operating elements. Two dynamic line rating projects were implemented in 2014, Miners-Platte and West-of-Populus.

The Miners-Platte project uses a dynamic line rating system to determine the resulting cooling effect of the wind on the line. The current carrying capacity is then updated to a new weather dependent line rating. The Miners-Platte 230 kV transmission line was one of the limitations of the TOT4A transmission path with wind farms significantly impacting the loading of the line. As a result of this project, the TOT4A Western Electricity Coordinating Council (WECC) non-simultaneous path rating was increased.

The West-of-Populus project was the second dynamic line rating project in 2014. The dynamic line rating enabled lines experienced low line loading due to peak loads between Pacific Power and Rocky Mountain Power coinciding over time. As a result of this low loading, the thermal reading of the lines is dependent upon ambient weather conditions without being greatly affected by line loading. Until higher line loading is experienced from high flow scenarios or outages, conclusions concerning the dynamic line rating project in West-of-Populus are difficult to ascertain. PacifiCorp will continue to collect and analyze future data as high line loading is experienced.

Dynamic line rating will be considered for all future transmission needs as a means for increasing capacity in relation to traditional construction methods. Dynamic line rating is only applicable for thermal constraints and only provides additional site-dependent capacity during finite time periods. It may or may not align with the expected transmission need of future projects. PacifiCorp will continue to look for opportunities to cost-effectively employ dynamic line rating systems.

### **Thermal Replicating Relays**

PacifiCorp extensively considered a project to install thermal replicating relays to adhere to protection and control compliance standards in the Soda Springs area of Idaho. Thermal replicating relays utilize dynamic line rating to monitor the thermal properties of the line, then send a trip signal if the thermal limit has been exceeded. These relays may only be used where line tripping will not cause cascading outages. A remedial action scheme (RAS) was also analyzed as an alternative to thermal replicating relays for the Soda Springs area. In this particular case, because the remedial action scheme was deemed more cost-effective, the thermal replicating relay project alternative will not be employed.

### **Synchrophasors**

Synchrophasors, also called phasor measurement units, can lead to a more reliable transmission network by comparing phase angles of certain network elements with a base element measurement. Phasor measurement units can also be used to increase reliability by relaying line condition data through the communication network quickly. Phasor measurement unit implementation may enable transmission operators to integrate variable resources and energy storage more effectively while minimizing service disruptions.

PacifiCorp participated in the Western Interconnection Synchrophasor Project (WISP). The project resulted in eight phasor measurement units installed in eight PacifiCorp substations. These devices are currently collecting data and will support PacifiCorp's and Peak Reliability's<sup>1</sup> goal of maintaining power system stability. The system of synchrophasors will be used to identify and analyze system vulnerabilities and disturbances. It will also assist in preventing system blackouts and provide historical data for the analysis of any future power system failure. Peak Reliability is continuing to develop data access for utility participants. PacifiCorp has discontinued sending data to Peak Reliability as part of their WISP program since they currently do not operationally utilize the data. Once Peak Reliability has their advanced application functionality enabled, which is expected in 2017, PacifiCorp expects to reinitiate data flow to Peak Reliability.

Phasor measurement units will also be used to satisfy the validation requirements in North American Electric Reliability Corporation (NERC)-MOD-033, a reliability standard proposed to improve accurate data collection and planning models. Planning models analyzing the transmission system reliability are required to compare model results to real-world values in order to meet model validation requirements.

## Distribution System Efforts

### Distribution Automation

Distribution automation (DA) is a wide field of smart grid technology and applications, which focuses on using sensors and data collection on the distribution system, as well as automatically adjusting the system to optimize performance. It can also provide operational efficiency, peak load management, equipment failure prediction, and decreased restoration times after failure. PacifiCorp is working on several distribution automation initiatives.

- In Oregon, PacifiCorp has identified 40 circuits on which a DA cost benefit analysis will be performed. These 40 circuits were selected based on a set of criteria intended to minimize the cost of implementation and maximize the reliability benefit. The feasibility of utilizing an advanced metering infrastructure network for the communications of the distribution automation system will also be addressed.
- PacifiCorp has installed Fusesaver<sup>TM</sup> devices and electronic reclosers with the capability of enabling communications through a retrofit in the future.
- A pilot project in Walla Walla, Washington is underway to demonstrate the feasibility and effectiveness of distribution automation, including a fault location isolation and restoration application.
- A feasibility study to determine the cost and benefit of retrofitting an existing source/transfer scheme to a distribution automation scheme is underway in Salt Lake City, Utah.
- PacifiCorp installed communicating faulted circuit indicators on five circuits in eastern Utah in March 2014. These devices have proven capable of improving reliability by reducing the time required to report and locate a fault. PacifiCorp is still evaluating the cost and feasibility of integrating these devices in its outage management system before further deployment.

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<sup>1</sup> Peak Reliability (Peak) is a company wholly independent of WECC that performs the Reliability Coordinator (RC) function in its RC Area in the Western Interconnection.

## Customer Information Efforts

### Advanced Metering Infrastructure

A key effort for PacifiCorp in 2016 was the development of a detailed business case for advanced metering infrastructure in Oregon. Advanced metering infrastructure is an integrated system of smart meters, communications networks, and data management systems with two-way communication. PacifiCorp's objectives were to identify a solution and strategy that would deliver tangible projected benefits to our customers and deliver economically-driven financial results while minimizing the impact on consumer rates. A request for information followed by a request for proposals was solicited to further evaluate the economics and impacts of an advanced metering infrastructure rollout in Oregon. The financial analysis of proposals indicated a positive business case due to decreasing costs of advance metering technology and increasing operations and maintenance costs. As a result, Pacific Power committed to proceed with deployment of an advanced metering infrastructure system in Oregon.

The advanced metering infrastructure program in Oregon will replace 590,000 existing customer meters with smart meters and install an advanced metering system to remotely read and operate customer meters. The project will provide a web portal for customers, capture hourly meter data, perform on demand meter reads, remotely connect and disconnect power, verify outage inquiries, remotely reprogram meters, and collect data on power quality and tampering. This advanced metering infrastructure project will provide a network and metering infrastructure to improve customer service and enable future smart grid applications. Project benefits include reduced operations and maintenance costs, a platform for future smart grid applications, increased worker safety, reduced emissions, and increased data for efficient management of the network. Meter installations began in 2017 and the project completion date is scheduled for the end of 2019.

### Future Smart Grid

PacifiCorp is continuing to evaluate smart grid technologies and piloted projects that might benefit customers. PacifiCorp regularly develops smart grid reports to examine the quantifiable costs and benefits of individual components of the smart grid. While the net present value of implementing a comprehensive smart grid system throughout PacifiCorp is negative at this time, PacifiCorp has implemented specific projects and programs that have positive benefits for customers, and continues to explore pilot projects in other areas of interest. In order to reduce risks to the company, grid, customers, and supporting systems, it is essential to identify affordable leading technologies and implement industry best practices.

## APPENDIX F – FLEXIBLE RESERVE STUDY

### Introduction

This 2019 Flexible Reserve Study (FRS) estimates the regulation reserve required to maintain PacifiCorp’s system reliability and comply with North American Electric Reliability Corporation (NERC) reliability standards as well as the incremental cost of this regulation reserve. The FRS also compares PacifiCorp’s overall operating reserve requirements, including both regulation reserve and contingency reserve, to its flexible resource supply over the Integrated Resource Plan (IRP) study period.

PacifiCorp operates two Balancing Authority Areas (BAAs) in the Western Electricity Coordinating Council (WECC) NERC region, PacifiCorp East (PACE) and PacifiCorp West (PACW). The PACE and PACW BAAs are interconnected by a limited amount of transmission across a third-party transmission system and the two BAAs are each required to comply with NERC standards. PacifiCorp must provide sufficient regulation reserve to remain within NERC’s balancing authority area control error (ACE) limit in compliance with BAL-001-2,<sup>1</sup> as well as the amount of contingency reserve required in order to comply with NERC standard BAL-002-WECC-2.<sup>2</sup> BAL-001-2 is a regulation reserve standard that became effective July 1, 2016, and BAL-002-WECC-2a is a contingency reserve standard that became effective January 24, 2017. Regulation reserve and contingency reserve are components of operating reserve, which NERC defines as “the capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection.”<sup>3</sup>

Apart from disturbance events that are addressed through contingency reserve, regulation reserve is necessary to compensate for changes in load demand and generation output, so as to maintain ACE within mandatory parameters established by the BAL-001-2 standard. The FRS estimates the amount of regulation reserve required to manage variations in load, variable energy resources<sup>4</sup> (VERs), and resources that are not VERs (“Non-VERs”) in each of PacifiCorp’s BAAs. Load, wind, solar, and Non-VERs were each studied because PacifiCorp’s data indicates that these components or customer classes place different regulation reserve burdens on PacifiCorp’s system due to differences in the magnitude, frequency, and timing of their variations from forecasted levels.

The FRS is based on PacifiCorp operational data recorded from January 2017 through December 2017 for load, wind, solar, and Non-VERs. PacifiCorp’s primary analysis, focuses on the

<sup>1</sup> NERC Standard BAL-001-2, [www.nerc.com/files/BAL-001-2.pdf](http://www.nerc.com/files/BAL-001-2.pdf), which became effective July 1, 2016. ACE is the difference between a BAA’s scheduled and actual interchange, and reflects the difference between electrical generation and Load within that BAA.

<sup>2</sup> NERC Standard BAL-002-WECC-2a, [www.nerc.com/files/BAL-002-WECC-2a.pdf](http://www.nerc.com/files/BAL-002-WECC-2a.pdf), which became effective January 24, 2017. BAL-002-WECC-2a clarified that non-traditional resources can qualify as spinning reserves if they meet technical and performance requirements.

<sup>3</sup> NERC Glossary of Terms: [www.nerc.com/files/glossary\\_of\\_terms.pdf](http://www.nerc.com/files/glossary_of_terms.pdf), updated May 13, 2019.

<sup>4</sup> VERs are resources that resources that: (1) are renewable; (2) cannot be stored by the facility owner or operator; and (3) have variability that is beyond the control of the facility owner or operator. *Integration of Variable Energy Resources*, Order No. 764, 139 FERC ¶ 61,246 at P 281 (2012) (“Order No. 764”); *order on reh’g*, Order No. 764-A, 141 FERC ¶ 61,232 (2012) (“Order No. 764-A”); *order on reh’g and clarification*, Order No. 764-B, 144 FERC ¶ 61,222 at P 210 (2013) (“Order No. 764-B”).

variability of load, wind, solar, and Non-VERs during 2017. A supplemental analysis discusses how the total variability of the PacifiCorp system changes with varying levels of load, wind and solar capacity. The estimated regulation reserve amounts determined in this study represent the incremental capacity needed to ensure compliance with BAL-001-2 for a particular operating hour. The regulation reserve requirement covers variations in load, wind, solar, and Non-VERs, while implicitly accounting for the diversity between the different classes. An explicit adjustment is also made to account for diversity benefits realized as a result of PacifiCorp's participation in the Energy Imbalance Market (EIM) operated by the California Independent System Operator Corporation (CAISO).

The methodology in the FRS is similar to that employed in PacifiCorp's previous regulation reserve requirement analysis in the 2017 IRP, but has been enhanced in some key ways.<sup>5</sup> First, regulation reserve requirements are co-optimized in a quantile regression model. Second, actual hourly load schedules are employed as compared to the proxy schedules developed in the previous study. Third, the FRS uses actual solar schedules reflecting the widespread penetration of utility scale solar facilities that has occurred since the previous study. Fourth, the FRS reflects updated data based on actual operational experience, including the data and benefits from PacifiCorp's participation in the EIM.<sup>6</sup>

The FRS results produce an hourly forecast of the regulation reserve requirements for each of PacifiCorp's BAAs that is sufficient to ensure the reliability of the transmission system and compliance with NERC and WECC standards. This regulation reserve forecast covers the combined deviations of the load, wind, solar and Non-VERs on PacifiCorp's system and varies as a function of the wind and solar capacity on PacifiCorp's system, as well as forecasted levels of wind, solar and load.

The regulation reserve requirement methodologies produced by the FRS was applied in the Planning and Risk (PaR) production cost model to determine the cost of the reserve requirements associated with incremental wind and solar capacity. These integration costs are applied to potential wind and solar resource options in the System Optimizer (SO) model portfolio expansion model, which does not otherwise account for regulation reserve requirements. When a portfolio is studied in the PaR model, the regulation reserve requirements specific to that portfolio are calculated and included in the study inputs, such that the production cost of the requirements is incorporated in the reported results, so it is not necessary to add integration costs to the PaR results.

## Overview

The FRS first estimates the regulation reserve necessary to maintain compliance with NERC Standard BAL-001-2 given a specified portfolio of wind and solar resources. The FRS next calculates the cost of holding regulation reserve for incremental wind and solar resources. Finally, the FRS compares PacifiCorp's overall operating reserve requirements over the IRP study period, including both regulation reserve and contingency reserve, to its flexible resource supply.

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<sup>5</sup> 2017 Flexible Reserve Study, Appendix F in Volume II of PacifiCorp's 2017 IRP report:

[www.pacificorp.com/content/dam/pacificorp/doc/Energy\\_Sources/Integrated\\_Resource\\_Plan/2017\\_IRP/2017\\_IRP\\_VolumeII\\_2017\\_IRP\\_Final.pdf](http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2017_IRP/2017_IRP_VolumeII_2017_IRP_Final.pdf)

<sup>6</sup> PacifiCorp presented the FRS for the 2019 IRP to the Technical Review Committee (TRC) that reviewed the FRS for the 2017 IRP. In light of the robust methodology developed for the 2017 IRP, and the relatively limited modifications for the 2019 IRP, TRC members indicated that continuing the formal review process was unnecessary.

The FRS estimates regulation reserve based on the specific requirements of NERC Standard BAL-001-2. It also incorporates the current timeline for EIM market processes, as well as EIM resource deviations and diversity benefits based on actual results. The FRS also includes adjustments to regulation reserve requirements to account for the changing portfolio of solar and wind resources on PacifiCorp's system and accounts for the diversity of using a single portfolio of regulation reserve resources to cover variations in load, wind, solar, and Non-VERs. A comparison of the results of the current analysis and that from the 2017 IRP is shown in Table F.1 and Table F.2.

**Table F.1 - Portfolio Regulation Reserve Requirements**

| Case           | Wind Capacity (MW) | Solar Capacity MW | Stand-alone Regulation Requirement (MW) | Portfolio Diversity Credit (%) | Regulation Requirement with Diversity (MW) |
|----------------|--------------------|-------------------|---|--------------------------------|--|
| 2017 Base Case | 2,757              | 1,050             | 998                                     | 38%                            | 617  |
| 2019 Base Case | 2,750              | 1,021             | 994                                     | 47%                            | 531  |

**Table F.2 - 2019 FRS Flexible Resource Costs as Compared to 2017 Costs, \$/MWh**

|                              | Wind 2017 FRS (2016\$) | Solar 2017 FRS (2016\$) | Wind 2019 FRS (2018\$) | Solar 2019 FRS (2018\$) |
|------------------------------|------------------------|-------------------------|------------------------|-------------------------|
| Study Period                 | 2017                   | 2017                    | 2018-2036              | 2018-2036               |
| Intra-hour Reserve           | \$0.43                 | \$0.46                  | \$1.11                 | \$0.85                  |
| Inter-hour System Balancing  | \$0.14                 | \$0.14                  | n/a                    | n/a                     |
| Total Flexible Resource Cost | \$0.57                 | \$0.60                  | \$1.11                 | \$0.85                  |

In the 2017 FRS, PacifiCorp calculated an inter-hour system balancing integration cost reflecting sub-optimal gas plant commitment based on day-ahead load, wind, and solar forecasts, rather than actuals. However, gas plants are dispatched in EIM to meet regional demand, not just the PacifiCorp demand reflected in the PaR model, and quick-start gas plants can be committed within EIM. In light of the minimal impact of the calculated cost in the 2017 IRP, and possible interaction with EIM, the company opted not to include inter-hour system balancing integration costs in the 2019 IRP.

The 2019 FRS results are applied in the 2019 IRP portfolio development process as a cost for wind and solar generation resources. Once candidate resource portfolios are developed using the SO model, the PaR model is used to evaluate portfolio risks. The PaR model inputs include regulation reserve requirements specific to the resource portfolio developed using the SO model. As a result, the IRP risk analysis using PaR includes the impact of differences in regulation reserve requirements between portfolios.

## Flexible Resource Requirements

PacifiCorp's flexible resource needs are the same as its operating reserve requirements over the planning horizon for maintaining reliability and compliance with the North American Electric Reliability Corporation (NERC) regional reliability standards. Operating reserve generally consists of three categories: (1) contingency reserve (i.e., spinning and supplemental reserve), (2) regulation reserve, and (3) frequency response reserve. Contingency reserve is capacity that PacifiCorp holds available to ensure compliance with the NERC regional reliability standard BAL-



002-WECC-2a.<sup>7</sup> Regulation reserve is capacity that PacifiCorp holds available to ensure compliance with the NERC Control Performance Criteria in BAL-001-2.<sup>8</sup> Frequency response reserve is capacity that PacifiCorp holds available to ensure compliance with NERC standard BAL-003-1.<sup>9</sup> Each type of operating reserve is further defined below.

## Contingency Reserve

**Purpose:** Contingency reserve may be deployed when unexpected outages of a generator or a transmission line occur. Contingency reserve may not be deployed to manage other system fluctuations such as changes in load or wind generation output.

**Volume:** NERC regional reliability standard BAL-002-WECC-2a specifies that each BAA must hold as contingency reserve an amount of capacity equal to three percent of load and three percent of generation in that BAA.

**Duration:** Except within 60 minutes of a qualifying contingency event, a BAA must maintain the required level of contingency reserve at all times. Generally, this means that up to 60 minutes of generation are required to provide contingency reserve, though successive outage events may result in contingency reserves being deployed for longer periods. To restore contingency reserves, other resources must be deployed to replace any generating resources that experienced outages, typically either market purchases or generation from resources with slower ramp rates.

**Ramp Rate:** Only up capacity available within ten minutes can be counted as contingency reserve. In accordance with Requirement 2 of BAL-002-WECC-2a, at least half of a BAA's requirement must be met with "spinning" resources that are online and immediately responsive to system frequency deviations, while the remainder can come from "non-spinning" resources that do not respond immediately, though they must still be fully deployed in ten minutes.<sup>10</sup>

## Regulation Reserve

**Purpose:** NERC standard BAL-001-2, which became effective July 1, 2016, does not specify a regulation reserve requirement based on a simple formula, but instead requires utilities to hold sufficient reserve to meet specified control performance standards. The primary requirement relates to area control error ("ACE"), which is the difference between a BAA's scheduled and actual interchange, and reflects the difference between electrical generation and load within that BAA. Requirement 2 of BAL-001-2 defines the compliance standard as follows:

*Each Balancing Authority shall operate such that its clock-minute average of Reporting ACE does not exceed its clock-minute Balancing Authority ACE Limit (BAAL) for more than 30 consecutive clock-minutes...*

<sup>7</sup> NERC Standard BAL-002-WECC-2a – Contingency Reserve: [www.nerc.com/files/BAL-002-WECC-2.pdf](http://www.nerc.com/files/BAL-002-WECC-2.pdf)

<sup>8</sup> NERC Standard BAL-001-2 – Real Power Balancing Control Performance: [www.nerc.com/files/BAL-001-2.pdf](http://www.nerc.com/files/BAL-001-2.pdf)

<sup>9</sup> NERC Standard BAL-003-1 — Frequency Response and Frequency Bias Setting: [www.nerc.com/pa/Stand/Reliability%20Standards/BAL-003-1.pdf](http://www.nerc.com/pa/Stand/Reliability%20Standards/BAL-003-1.pdf)

<sup>10</sup> Retirement of the minimum spinning reserve obligation in BAL-002-WECC-2a is being considered due to redundancy with frequency response obligations under BAL-003-1. More information is available online at: [www.wecc.org/Standards/Pages/WECC-0115.aspx](http://www.wecc.org/Standards/Pages/WECC-0115.aspx)



In addition, Requirement 1 of BAL-001-2 specifies that PacifiCorp's Control Performance Standard 1 ("CPS1") score must be greater than equal to 100 percent for each preceding 12 consecutive calendar month period, evaluated monthly. The CPS1 score compares PacifiCorp's ACE with interconnection frequency during each clock minute. A higher score indicates PacifiCorp's ACE is helping interconnection frequency, while a lower score indicates it is hurting interconnection frequency. Because CPS1 is averaged and evaluated on a monthly basis, it does not require a response to each and every ACE event, but rather requires that PacifiCorp meet a minimum aggregate level of performance in each month. Regulation reserve is thus the capacity that PacifiCorp holds available to respond to changes in generation and load to manage ACE within the limits specified in BAL-001-2.

**Volume:** NERC standard BAL-001-2 does not specify a regulation reserve requirement based on a simple formula, but instead requires utilities to hold sufficient reserve to meet performance standards as discussed above. The 2019 FRS estimates the regulation reserve necessary to meet Requirement 2 by compensating for the combined deviations of the load, wind, solar and Non-VERs on PacifiCorp's system. These regulation reserve requirements are discussed in more detail later on in the study.

**Ramp Rate:** Because Requirement 2 includes a 30 minute time limit for compliance, ramping capability that can be deployed within 30 minutes contributes to meeting PacifiCorp's regulation reserve requirements. The reserve for CPS1 is not expected to be incremental to the need for compliance with Requirement 2, but may require that a subset of resources held for Requirement 2 be able to make frequent rapid changes to manage ACE relative to interconnection frequency.

**Duration:** PacifiCorp is required to submit balanced load and resource schedules as part of its participation in EIM. PacifiCorp is also required to submit resources with up flexibility and down flexibility to cover uncertainty and expected ramps across the next hour. Because forecasts are submitted prior to the start of an hour, deviations can begin before an hour starts. As a result, a flexible resource might be called upon for the entire hour. In order to continue providing flexible capacity in the following hour, energy must be available in storage for that hour as well. The likelihood of actually deploying for two hours or more for reliability compliance (as opposed to economics) is expected to be small.

## Frequency Response Reserve

**Purpose:** NERC standard BAL-003-1 specifies that each BAA must arrest frequency deviations and support the interconnection when frequency drops below the scheduled level. When a frequency drop occurs as a result of an event, PacifiCorp will deploy resources that increase the net interchange of its BAAs and the flow of generation to the rest of the interconnection.

**Volume:** When a frequency drop occurs, each BAA is expected to deploy resources that are at least equal to its Frequency Response Obligation. The incremental requirement is based on the size of the frequency drop and the BAA's Frequency Response Obligation, expressed in megawatt (MW)/0.1 Hertz (Hz). To comply with the standard, a BAA's median measured frequency response during a sampling of under-frequency events must be equal to or greater than its Frequency Response Obligation. PacifiCorp's 2019 Frequency Response Obligation was 20.2 MW/0.1Hz for PACW, and 47.4 MW/0.1Hz for PACE. PacifiCorp's combined obligation amounts to 67.6 MW for a frequency drop of 0.1 Hz, or 202.8 MW for a frequency drop of 0.3 Hz.

The performance measurement for contingency reserve under the Disturbance Control Standard (BAL-002-3)<sup>11</sup>, allows for recovery to the lesser of zero or the ACE value prior to the contingency event, so increasing ACE above zero during a frequency event reduces the additional deployment needed if a contingency event occurs. Because contingency, regulation, and frequency events are all relatively infrequent, they are unlikely to occur simultaneously. Because the frequency response standard is based on median performance during a year, overlapping requirements that reduced PacifiCorp's response during a limited number of frequency events would not impact compliance.

As a result, any available capacity not being used for generation is expected to contribute to meeting PacifiCorp's Frequency Response Obligation, up to the technical capability of each unit, including that designated as contingency or regulation reserves. Frequency response must occur very rapidly, and a generating unit's capability is limited based on the unit's size, governor controls, and available capacity, as well as the size of the frequency drop. As a result, while a few resources could hold a large amount of contingency or regulation reserve, frequency response may need to be spread over a larger number of resources. Additionally, only resources that have active and tuned governor controls as well as outer loop control logic will respond properly to frequency events.

**Ramp Rate:** Frequency response performance is measured over a period of seconds, amounting to under a minute. Compliance is based on the average response over the course of an event. As a result, a resource that immediately provides its full frequency response capability will provide the greatest contribution. That same resource will contribute a smaller amount if it instead ramps up to its full frequency response capability over the course of a minute or responds after a lag.

**Duration:** Frequency response events are less than one minute in duration.

## Black Start Requirements

Black start service is the ability of a generating unit to start without an outside electrical supply and is necessary to help ensure the reliable restoration of the grid following a blackout. At this time, PACW grid restoration would occur in coordination with Bonneville Power Administration black start resources. The Gadsby combustion turbine resources are capable of supporting grid restoration in PACE. PacifiCorp has not identified any incremental needs for black start service during the IRP study period.

## Ancillary Services Operational Distinctions

In actual operations, PacifiCorp identifies two types of flexible capacity as part of its participation in the EIM. The contingency reserve held on each resource is specifically identified and is not available for economic dispatch within the EIM. Any remaining flexible capacity on participating resources that is not designated as contingency reserve can be economically dispatched in EIM based on its operating cost (i.e. bid) and system requirements and can contribute to meeting regulation reserve obligations. Because of this distinction, resources must either be designated as contingency reserve or as regulation reserve. Contingency events are relatively rare while opportunities to deploy additional regulation reserve in EIM occur frequently. As a result,

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<sup>11</sup> NERC Standard BAL-002-3 – Disturbance Control Standard – Contingency Reserve for Recovery from a Balancing Contingency Event: [www.nerc.com/pa/Stand/ReliabilityStandards/BAL-002-3.pdf](http://www.nerc.com/pa/Stand/ReliabilityStandards/BAL-002-3.pdf)

PacifiCorp typically schedules its lowest-cost flexible resources to serve its load, and blocks off capacity on its highest-cost flexible resources to meet its contingency obligations, subject to any ramping limitations at each resource. This leaves resources with moderate costs available for dispatch up by EIM, while lower-cost flexible resources remain available to be dispatched down by EIM.

## Regulation Reserve Data Inputs

### Overview

This section describes the data used to determine PacifiCorp's regulation reserve requirements. In order to estimate PacifiCorp's required regulation reserve amount, PacifiCorp must determine the difference between the expected load and resources and actual load and resources. The difference between load and resources is calculated every four seconds and is represented by the ACE. ACE must be maintained within the limits established by BAL-001-2, so PacifiCorp must estimate the amount of regulation reserve that is necessary in order to maintain ACE within these limits.

To estimate the amount of regulation reserve that will be required in the future, the FRS identifies the scheduled use of the system as compared to the actual use of the system during the study term. For the baseline determination of scheduled use for load and resources, the FRS used hourly base schedules. Hourly base schedules are the power production forecasts used for imbalance settlement in the EIM and represent the best information available concerning the upcoming hour.<sup>12</sup>

The deviation from scheduled use was derived from data provided through participation in the EIM. The deviations of generation resources in EIM were measured on a five-minute basis, so five-minute intervals are used throughout the regulation reserve analysis.

EIM base schedule and deviation data for each wind, solar and Non-VER transaction point were downloaded using the SettleCore application, which is populated with data provided by the CAISO. Since PacifiCorp's implementation of EIM on November 1, 2014, PacifiCorp requires certain operational forecast data from all of its transmission customers pursuant to the provisions of Attachment T to PacifiCorp's Federal Energy Regulatory Commission (FERC) approved Open Access Transmission Tariff (OATT). This includes EIM base schedule data (or forecasts) from all resources included in the EIM network model at transaction points. EIM base schedules are submitted by transmission customers with hourly granularity, and are settled using hourly data for load, and fifteen-minute and five-minute data for resources. A primary function of the EIM is to measure load and resource imbalance (or deviations) as the difference between the hourly base schedule and the actual metered values.

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<sup>12</sup> The CAISO, as the market operator for the EIM, requests base schedules at 75 minutes (T-75) prior to the hour of delivery. PacifiCorp's transmission customers are required to submit base schedules by 77 minutes (T-77) prior to the hour of delivery – two minutes in advance of the EIM Entity deadline. This allows all transmission customer base schedules enough time to be submitted into the EIM systems before the overall deadline of T-75 for the entirety of PacifiCorp's two BAAs. The base schedules are due again to CAISO at 55 minutes (T-55) prior to the delivery hour and can be adjusted up until that time by the EIM Entity (i.e., PacifiCorp Grid Operations). PacifiCorp's transmission customers are required to submit updated, final base schedules no later than 57 minutes (T-57) prior to the delivery hour. Again, this allows all transmission customer base schedules enough time to be submitted into the EIM systems before the overall deadline of T-55 for the entirety of PacifiCorp's two BAAs. Base schedules may be finally adjusted again, by the EIM Entity only, at 40 minutes (T-40) prior to the delivery hour in response to CAISO sufficiency tests. T-40 is the base schedule time point used throughout this study

A summary of the data gathered for this analysis is listed below, and a more detailed description of each type of source data is contained in the following subsections.

**Source data:**

- Load data
  - o Five-minute interval actual load
  - o Hourly base schedules
- VER data
  - o Five-minute interval actual generation
  - o Hourly base schedules
- Non-VER data
  - o Five-minute interval actual generation
  - o Hourly base schedules

## **Load Data**

The Load class represents the aggregate firm demand of end users of power from the electric system. While the requirements of individual users vary, there are diurnal and seasonal patterns in aggregated demand. The Load class can generally be described to include three components: (1) average load, which is the base load during a particular scheduling period; (2) the trend, or “ramp,” during the hour and from hour-to-hour; and (3) the rapid fluctuations in load that depart from the underlying trend. The need for a system response to the second and third components is the function of regulation reserve in order to ensure reliability of the system.

The PACE BAA includes several large industrial loads with unique patterns of demand. Each of these loads is either interruptible at short notice or includes behind the meter generation. Due to their large size, abrupt changes in their demand are magnified for these customers in a manner which is not representative of the aggregated demand of the large number of small customers which make up the majority of PacifiCorp’s loads.

In addition, interruptible loads can be curtailed if their deviations are contributing to a resource shortfall. Because of these unique characteristics, these loads are excluded from the FRS. This treatment is consistent with that used in the CAISO load forecast methodology (used for PACE and PACW operations), which also nets these interruptible customer loads out of the PACE BAA.

Actual average load data was collected separately for the PACE and PACW BAAs for each five-minute interval. Load data was downloaded from PacifiCorp’s Ranger PI system and has not been adjusted for transmission and distribution losses.

## **Wind and Solar Data**

The wind and solar classes include resources that: (1) are renewable; (2) cannot be stored by the facility owner or operator; and (3) have variability that is beyond the control of the facility owner or operator.<sup>13</sup> Wind and solar, in comparison to load, often have larger upward and downward

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<sup>13</sup> Order No. 764 at P 281; Order No. 764-B at P 210.

fluctuations in output that impose significant and sometimes unforeseen challenges when attempting to maintain reliability. For example, as recognized by FERC in Order No. 764, “Increasing the relative amount of [VERs] on a system can increase operational uncertainty that the system operator must manage through operating criteria, practices, and procedures, *including the commitment of adequate reserves*.”<sup>14</sup> The data included in the FRS for the wind and solar classes include all wind and solar resources in PacifiCorp’s BAAs, which includes: (1) third-party resources (OATT or legacy contract transmission customers); (2) PacifiCorp-owned resources; and (3) other PacifiCorp-contracted resources, such as qualifying facilities, power purchases, and exchanges. In total, the FRS includes 2,750 megawatts of wind and 1,021 megawatts of solar.

## Non-VER Data

The Non-VER class is a mix of thermal and hydroelectric resources and includes all resources which are not VERs, and which do not provide either contingency or regulation reserve. Non-VERs, in contrast to VERs, are often more stable and predictable. Non-VERs are thus easier to plan for and maintain within a reliable operating state. For example, in Order No. 764, FERC suggested that many of its rules were developed with Non-VERs in mind and that such generation “could be scheduled with relative precision.”<sup>15</sup> The output of these resources is largely in the control of the resource operator, particularly when considered within the hourly timeframe of the FRS. The deviations by resources in the Non-VER class are thus significantly lower than the deviations by resources in the Wind class. The Non-VER class includes third-party resources (OATT or legacy transmission customers); many PacifiCorp-owned resources; and other PacifiCorp-contracted resources, such as qualifying facilities, power purchases, and exchanges. In total, the FRS includes 2,202 megawatts of Non-VERs.

In the FRS, resources that provide contingency or regulation reserve are considered a separate, dispatchable resource class. The dispatchable resource class compensates for deviations resulting from other users of the transmission system in all hours. While non-dispatchable resources may offset deviations in loads and other resources in some hours, they are not in the control of the system operator and contribute to the overall requirement in other hours. Because the dispatchable resource class is a net provider rather than a user of regulation reserve service, its stand-alone regulation reserve requirement is zero (or negative), and its share of the system regulation reserve requirement is also zero. The allocation of regulation reserve requirements and diversity benefits is discussed in more detail later on in the study.

## Regulation Reserve Data Analysis and Adjustment

### Overview

This section provides details on adjustments made to the data to align the ACE calculation with actual operations, and address data issues.

### Base Schedule Ramping Adjustment

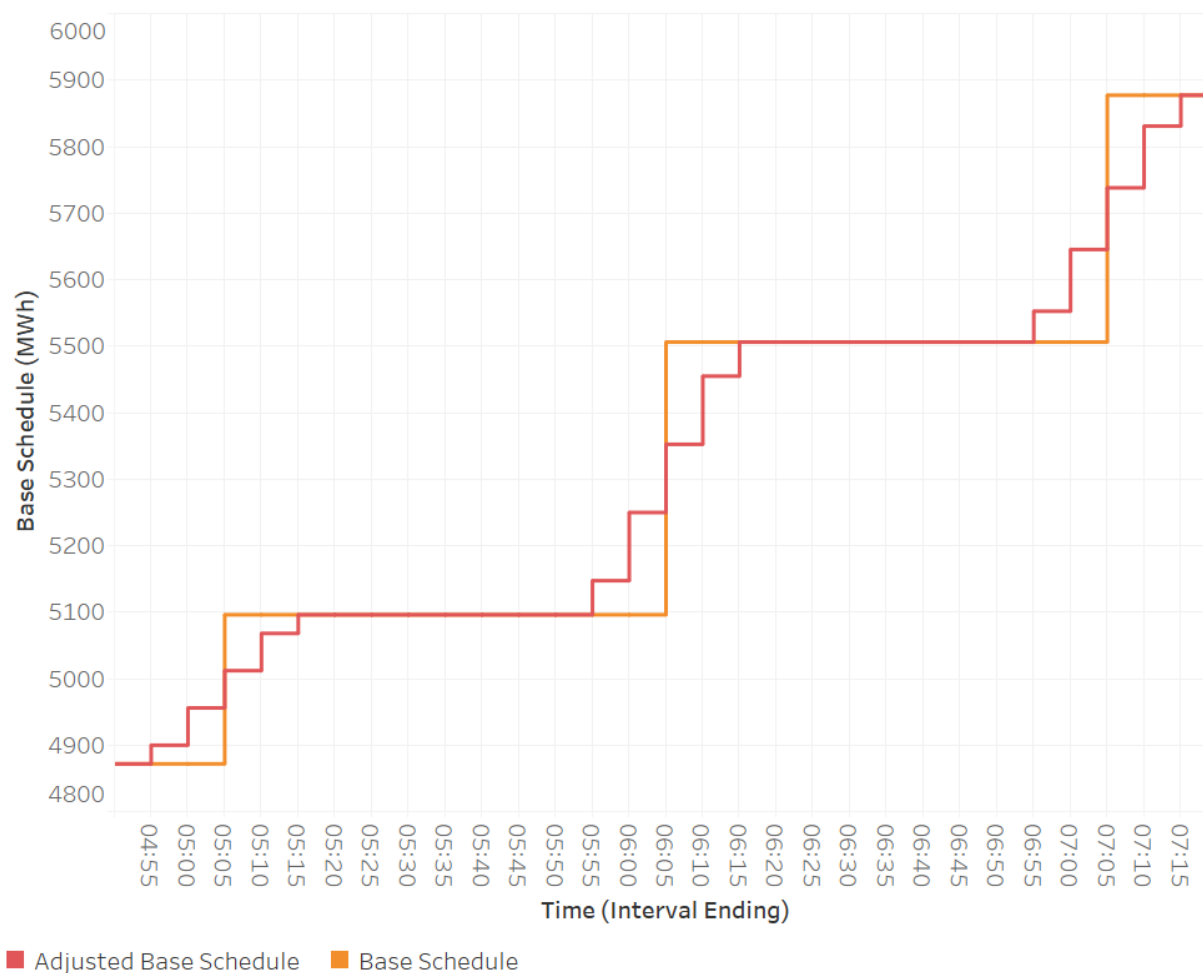
In actual operations, PacifiCorp’s ACE calculation includes a linear ramp from the base schedule in one hour to the base schedule in the next hour, starting ten-minutes before the hour and

<sup>14</sup> Order No. 764 at P 20 (emphasis added).

<sup>15</sup> *Id.* at P 92.

continuing until ten-minutes past the hour. The hourly base schedules used in the study are adjusted to reflect this transition from one hour to the next. This adjustment step is important because, to the extent actual load or generation is transitioning to the levels expected in the next hour, the adjusted base schedules will result in reduced deviations during these intervals, potentially reducing the regulation reserve requirement. Figure F.1 below illustrates the hourly base schedule and the ramping adjustment. The same calculation applies to all base schedules: Load, Wind, Non-VERs, and the combined portfolio.

**Figure F.1 - Base Schedule Ramping Adjustment**



## Data Corrections

The data extracted from PacifiCorp's systems for, wind, solar and Non-VERs was sourced from CAISO settlement quality data. This data has already been verified for inconsistencies as part of the settlement process and needs minimal cleaning as described below. Regarding five minute interval load data from the PI Ranger system, intervals were excluded from the FRS results if any five-minute interval suffered from at least one of the data anomalies that are described further below:

### Load:

- Stuck meter/flat meter reading



- Telemetry spike/poor connection to meter

**Wind, Solar, and Non-VERs:**

- Generator trip events
- Curtailment events

Load in PacifiCorp's BAAs changes continuously. While a BAA could potentially maintain the exact same load levels in two five-minute intervals in a row, it is extremely unlikely for the exact same load level to persist over longer time frames. When PacifiCorp's energy management system (EMS) load telemetry fails, updated load values may not be logged, and the last available load measurement for the BAA will continue to be reported.

Similarly, rapid spikes in load either up or down are also unlikely to be a result of conditions which require deployment of regulation reserve, particularly when they are transient. Such events could be a result of a transmission or distribution outage, which would allow for the deployment of contingency reserve, and would not require deployment of regulation reserve. Load telemetry spike irregularities were identified by examining the intervals with the largest changes from one interval to the next, either up or down. Intervals with inexplicably large and rapid changes in load, particularly where the load reverts back within a short period, were assumed to have been covered through contingency reserve deployment or to reflect inaccurate load measurements. Because they don't reflect periods that require regulation reserve deployment, such intervals are excluded from the analysis.

As with Load, certain Wind and Non-VER deviations are more likely to be a result of conditions that allow for the deployment of contingency reserve, rather than regulation reserve. In particular, contingency reserve can be deployed to compensate for unexpected generator outages. For Non-VERs, these are relatively straightforward—namely, periods when generation drops to zero despite base schedules indicating otherwise. Certain Wind outages also qualify as contingency events. Notably, wind generators can be curtailed when wind speed exceeds the maximum rating of the equipment (sometimes referred to as "high speed cutout"). In such instances, generation is curtailed until wind speeds drop back into a safe operating range in order to protect the equipment. When wind speed oscillates above and below the cut-off point, generation may ramp down and up repeatedly. Because events which qualify for deployment of contingency reserve do not require deployment of regulation reserve they have been excluded from the analysis.

As the regulation reserve requirements are calculated using a rolling thirty-minute timeline, data from the prior hour is necessary during the first several five-minute intervals of the next hour. An error in one hour thus results in the need to remove the following hour. This is relevant to error adjustments for both Wind and Non-VERs.

After review of the data for each of the above anomaly types, and out of 105,120 five-minute intervals evaluated, only 1.1 percent and 0.52 percent of the total FRS term hours were removed from PACW and PACE, respectively. The system-wide error rate was 1.36 percent, slightly lower than the sum of the PACW and PACE rates due to coincident hours. While cleaning up or replacing anomalous hours could yield a more complete data set, determining the appropriate conditions in those hours would be difficult and subjective. By removing anomalies, the FRS sample is smaller but remains reflective of the range of conditions PacifiCorp actually experiences, including the impact on regulation reserve requirements of weather events experienced during the study period.



## Regulation Reserve Requirement Methodology

### Overview

This section presents the methodology used to determine the initial regulation reserve needed to manage the load and resource balance within PacifiCorp’s BAAs. The five-minute interval load and resource deviation data described above informs a regulation reserve forecast methodology that achieves the following goals:

- Complies with NERC standard BAL-001-2;
- Minimizes regulation reserve held; and
- Uses data available at time of EIM base schedule submission at T-40.<sup>16</sup>

The components of the methodology are described below, and include:

- Operating Reserve: Reserve Categories;
- Calculation of Regulation Reserve Need;
- Balancing Authority ACE Limit: Allowed Deviations;
- Planning Reliability Target: Loss of Load Probability (“LOLP”); and
- Regulation Reserve Forecast: Amount Held.

Following the explanation below of the components of the methodology, the next section details the forecasted amount of regulation reserve for:

- Wind;
- Solar;
- Non-VERs; and
- Load.

### Components of Operating Reserve Methodology

#### Operating Reserve: Reserve Categories

Operating reserve consists of three categories: (1) contingency reserve (i.e., spinning and supplemental reserve), (2) regulation reserve, and (3) frequency response reserve. These requirements must be met by resources that are incremental to those needed to meet firm system demand. The purpose of the FRS is to determine the regulation reserve requirement. The contingency reserve and frequency response requirements are defined formulaically by their respective reliability standards.

Of the three categories of reserve referenced above, the FRS is primarily focused on the requirements associated with regulation reserve. Contingency reserve may not be deployed to manage other system fluctuations such as changes in load or wind generation output. Because deviations caused by contingency events are covered by contingency reserve rather than regulation reserve, they are excluded from the determination of the regulation reserve requirements. Because frequency response reserve can overlap with that held for contingency and regulation reserve requirements it is similarly excluded from the determination of regulation reserve requirements.

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<sup>16</sup> See footnote 12 above for explanation of PacifiCorp’s use of the T-40 base schedule time point in the FRS.

The types of operating reserve and relationship between them are further defined in in the Flexible Resource Requirements section above.

Regulation reserve is capacity that PacifiCorp holds available to ensure compliance with the NERC Control Performance Criteria in BAL-001-2, which requires a BAA to carry regulation reserve incremental to contingency reserve to maintain reliability.<sup>17</sup> The regulation reserve requirement is not defined by a simple formula, but instead is the amount of reserve required by each BAA to meet specified control performance standards. Requirement two of BAL-001-2 defines the compliance standard as follows:

*Each Balancing Authority shall operate such that its clock-minute average of Reporting ACE does not exceed its clock-minute Balancing Authority ACE Limit (BAAL) for more than 30 consecutive clock-minutes...*

PacifiCorp has been operating under BAL-001-2 since March 1, 2010, as part of a NERC Reliability-Based Control field trial in the Western Interconnection, so PacifiCorp has experience operating under the new standard, even though it did not become effective until July 1, 2016.

The three key elements in BAL-001-2 are: (1) the length of time (or “interval”) used to measure compliance; (2) the percentage of intervals that a BAA must be within the limits set in the standard; and (3) the bandwidth of acceptable deviation used under each standard to determine whether an interval is considered out of compliance. These changes are discussed in further detail below.

The first element is the length of time used to measure compliance. Compliance under BAL-001-2 is measured over rolling thirty-minute intervals, with 60 overlapping periods per hour, some of which include parts of two clock-hours. In effect, this means that every minute of every hour is the beginning of a new, thirty-minute compliance interval under the new BAL-001-2 standard. If ACE is within the allowed limits at least once in a thirty-minute interval, that interval is in compliance, so only the minimum deviation in each rolling thirty-minute interval is considered in determining compliance. As a result PacifiCorp does not need to hold regulation reserve for deviations with duration less than 30 minutes.

The second element is the number of intervals where deviations are allowed to be outside the limits set in the standard. BAL-001-2 requires 100 percent compliance, so deviations must be maintained within the requirement set by the standard for all rolling thirty-minute intervals.

The third element is the bandwidth of acceptable deviation before an interval is considered out of compliance. Under BAL-001-2, the acceptable deviation for each BAA is dynamic, varying as a function of the frequency deviation for the entire interconnect. When interconnection frequency exceeds 60 Hz, the dynamic calculation does not require regulation resources to be deployed regardless of a BAA’s ACE. As interconnection frequency drops further below 60 Hz, a BAA’s permissible ACE shortfall is increasingly restrictive.

### **Planning Reliability Target: Loss of Load Probability**

When conducting resource planning, it is common to use a reliability target that assumes a specified loss of load probability (LOLP). In effect, this is a plan to curtail firm load in rare

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<sup>17</sup> NERC Standard BAL-001-2, [www.nerc.com/files/BAL-001-2.pdf](http://www.nerc.com/files/BAL-001-2.pdf)

circumstances, rather than acquiring resources for extremely unlikely events. The reliability target balances the cost of additional capacity against the benefit of incrementally more reliable operation. By planning to curtail firm load in the rare event of a regulation reserve shortage, PacifiCorp can maintain the required 100 percent compliance with the BAL-001-2 standard and the Balancing Authority ACE Limit. This balances the cost of holding additional regulation reserve against the likelihood of regulation reserve shortage events.

The 2019 FRS assumes that a regulation reserve forecasting methodology that results in 0.50 loss of load hours per year due to regulation reserve shortages is appropriate for planning and ratemaking purposes. This is in addition to any loss of load resulting from transmission or distribution outages, resource adequacy, or other causes. The FRS applies this reliability target as follows:

- If the regulation reserve available is greater than the regulation reserve need for an hour, the LOLP is zero for that hour.
- If the regulation reserve held is less than the amount needed, the LOLP is derived from the Balancing Authority ACE Limit probability distribution as illustrated below.

### **Balancing Authority ACE Limit: Allowed Deviations**

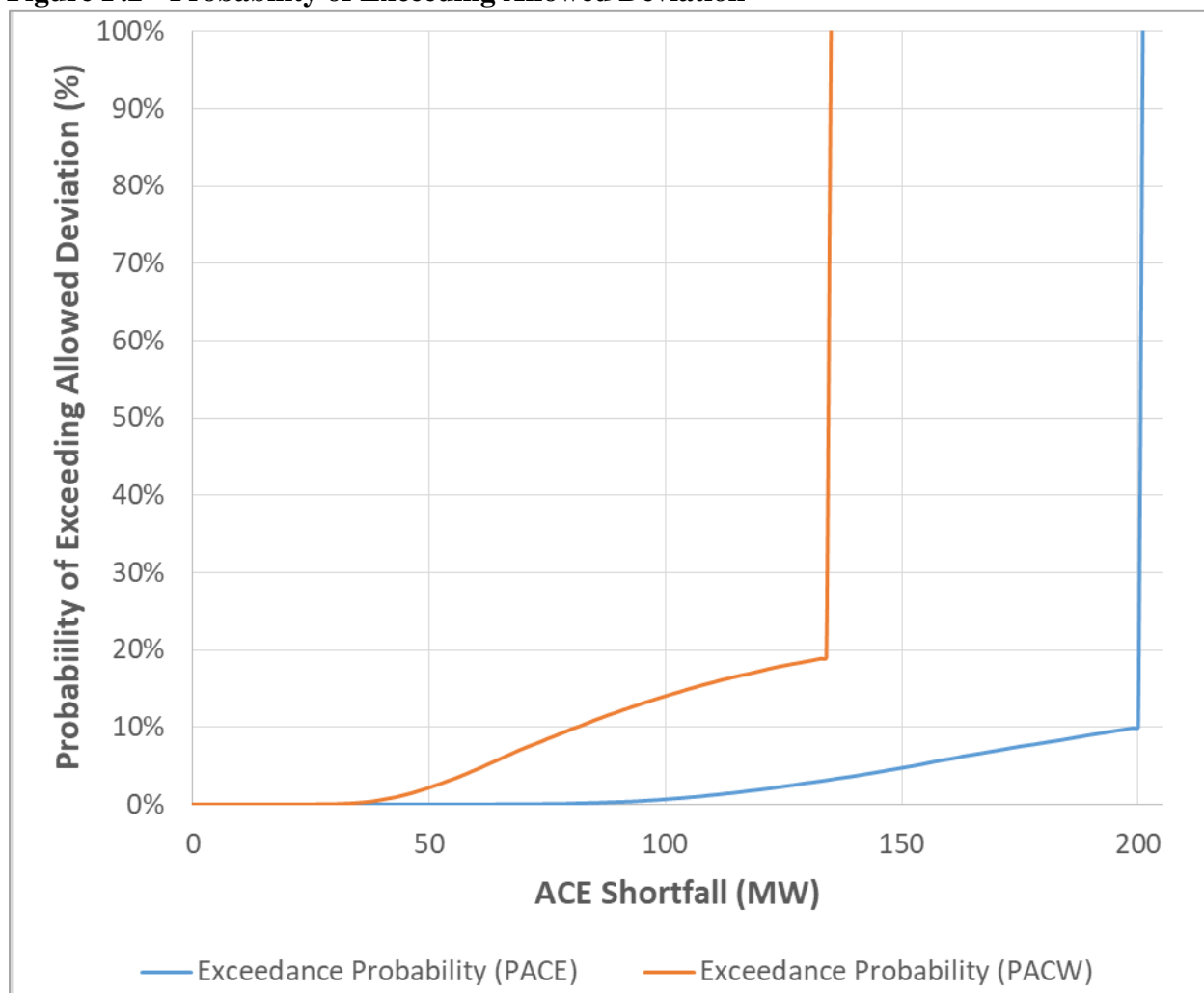
Even if insufficient regulation reserve capability is available to compensate for a thirty-minute sustained deviation, a violation of BAL-001-2 does not occur unless the deviation also exceeds the Balancing Authority ACE Limit.

The Balancing Authority ACE Limit is specific to each BAA and is dynamic, varying as a function of interconnection frequency. When WECC frequency is close to 60 Hz, the Balancing Authority ACE Limit is large and large deviations in ACE are allowed. As WECC frequency drops further and further below 60 Hz, ACE deviations are increasingly restricted for BAAs that are contributing to the shortfall, *i.e.* those BAAs with higher loads than resources. A BAA commits a BAL-001-2 reliability violation if in any thirty-minute interval it doesn't have at least one minute when its ACE is within its Balancing Authority ACE Limit.

While the specific Balancing Authority ACE Limit for a given interval cannot be known in advance, the historical probability distribution of Balancing Authority ACE Limit values is known. Figure F.2 below shows the probability of exceeding the allowed deviation during a five-minute interval for a given level of ACE shortfall. For instance, a 43 MW ACE shortfall in PACW has a one percent chance of exceeding the Balancing Authority ACE Limit. WECC-wide frequency can change rapidly and without notice, and this causes large changes in the Balancing Authority ACE Limit over short time frames. Maintaining ACE within the Balancing Authority ACE Limit under those circumstances can require rapid deployment of large amounts of operating reserve. To limit the size and speed of resource deployment necessitated by variation in the Balancing Authority ACE Limit, PacifiCorp's operating practice caps permissible ACE at the lesser of the Balancing Authority ACE Limit or four times  $L_{10}$ . This also limits the occurrence of transmission flows that exceed path ratings as result of large variations in ACE.<sup>18,19</sup> This cap is reflected in Figure F.2.

<sup>18</sup> "Regional Industry Initiatives Assessment." NWPP MC Phase 3 Operations Integration Work Group. Dec. 31, 2014. Pg. 14. Available at: [www.nwpp.org/documents/MC-Public/NWPP-MC-Phase-3-Regional-Industry-Initiatives-Assessment12-31-2014.pdf](http://www.nwpp.org/documents/MC-Public/NWPP-MC-Phase-3-Regional-Industry-Initiatives-Assessment12-31-2014.pdf)

<sup>19</sup> "NERC Reliability-Based Control Field Trial Draft Report." Western Electricity Coordinating Council. Mar. 25, 2015. Available at: [www.wecc.biz/Reliability/RBC%20Field%20Trial%20Report%20Approved%203-25-2015.pdf](http://www.wecc.biz/Reliability/RBC%20Field%20Trial%20Report%20Approved%203-25-2015.pdf)

**Figure F.2 - Probability of Exceeding Allowed Deviation**

In 2017, PacifiCorp’s deviations and Balancing Authority ACE Limits were uncorrelated, which indicates that PacifiCorp’s contribution to WECC-wide frequency is small. PacifiCorp’s deviations and Balancing Authority ACE Limits were also uncorrelated when periods with large deviations were examined in isolation. If PacifiCorp’s large deviations made distinguishable contributions to the Balancing Authority ACE Limit, ACE shortfalls would be more likely to exceed the Balancing Authority ACE Limit during large deviations. Since this is not the case, the probability of exceeding the Balancing Authority ACE Limit is lower, and less regulation reserve is necessary to comply with the BAL-001-2 standard.

### Regulation Reserve Forecast: Amount Held

In order to calculate the amount of regulation reserve required to be held while being compliant with BAL-001-2 – using a LOLP of 0.5 hours per year or less – a quantile regression methodology was used. The regression variables consist of:

- The combined deviation of load, wind, solar, and Non-VERs;
- Forecasted load as a percentage of peak load;
- Forecasted wind generation as a percentage of total system wind capacity;
- Forecasted solar generation as a percentage of total system solar capacity; and
- Forecasted Non-VER generation as a percentage of maximum Non-VER schedules.

The combined deviations of load, wind, solar and non-VERs (Combined Diversity Error) is calculated as [Load Error – Wind Error – Solar Error – Non VER Error] as illustrated below in Table F.3 for PACE.

**Table F.3 - Combined Diversity Error Example**

| Trading Date | Trading Hour | Trading Interval | Load Error | Non VER Error | Wind Error | Solar Error | Combined Diversity Error |
|--------------|--------------|------------------|------------|---------------|------------|-------------|--------------------------|
| 1/1/2017     | 3            | 5                | 49         | -5            | -21        | 0           | 75                       |
| 1/1/2017     | 3            | 10               | 40         | -6            | -16        | 0           | 61                       |
| 1/1/2017     | 3            | 15               | 36         | -3            | -14        | 0           | 53                       |
| 1/1/2017     | 3            | 20               | 35         | -6            | -55        | 0           | 97                       |
| 1/1/2017     | 3            | 25               | 34         | -6            | -48        | 0           | 87                       |
| 1/1/2017     | 3            | 30               | 36         | -4            | -26        | 0           | 67                       |
| 1/1/2017     | 3            | 35               | 36         | -7            | -41        | 0           | 84                       |
| 1/1/2017     | 3            | 40               | 32         | -8            | -39        | 0           | 80                       |
| 1/1/2017     | 3            | 45               | 30         | -5            | -39        | 0           | 74                       |
| 1/1/2017     | 3            | 50               | 31         | 2             | -37        | 0           | 66                       |
| 1/1/2017     | 3            | 55               | 37         | 1             | -37        | 0           | 73                       |
| 1/1/2017     | 3            | 60               | 45         | 2             | -32        | 0           | 75                       |

The individual errors (load, wind, solar and non-VERs) are calculated as the difference between the actual meter data and the adjusted hourly base schedules as illustrated below for PACE wind in Table F.4.

**Table F.4 – Wind Error Example**

| Trading Date | Trading Hour | Trading Interval | Adjusted Base Schedules | Actuals | Wind Error |
|--------------|--------------|------------------|-------------------------|---------|------------|
| 1/1/2017     | 3            | 5                | 957                     | 936     | -21        |
| 1/1/2017     | 3            | 10               | 956                     | 940     | -16        |
| 1/1/2017     | 3            | 15               | 955                     | 941     | -14        |
| 1/1/2017     | 3            | 20               | 955                     | 900     | -55        |
| 1/1/2017     | 3            | 25               | 955                     | 908     | -48        |
| 1/1/2017     | 3            | 30               | 955                     | 929     | -26        |
| 1/1/2017     | 3            | 35               | 955                     | 914     | -41        |
| 1/1/2017     | 3            | 40               | 955                     | 916     | -39        |
| 1/1/2017     | 3            | 45               | 955                     | 916     | -39        |
| 1/1/2017     | 3            | 50               | 955                     | 918     | -37        |
| 1/1/2017     | 3            | 55               | 954                     | 917     | -37        |
| 1/1/2017     | 3            | 60               | 951                     | 919     | -32        |

An illustration of the combined diversity error and the forecasted levels of load as a percentage of peak load, the forecasted levels of wind as a percentage of total system capacity, the forecasted levels of solar as a percentage of total system capacity and the forecasted levels of Non-VERs as a percentage of peak schedule are illustrated below in Table F.5 for PACE.

**Table F.5 – Regression Inputs Example**

| Trading Date | Trading Hour | Trading Interval | Combined Diversity Error | Wind Forecast | Solar Forecast | Load Forecast | Non VER Forecast |
|--------------|--------------|------------------|--------------------------|---------------|----------------|---------------|------------------|
| 1/1/2017     | 3            | 5                | 72                       | 50.5%         | 0%             | 56%           | 55%              |
| 1/1/2017     | 3            | 10               | 60                       | 50.4%         | 0%             | 56%           | 55%              |
| 1/1/2017     | 3            | 15               | 53                       | 50.3%         | 0%             | 56%           | 55%              |

|          |   |    |    |       |    |     |     |
|----------|---|----|----|-------|----|-----|-----|
| 1/1/2017 | 3 | 20 | 97 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 25 | 87 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 30 | 67 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 35 | 84 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 40 | 80 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 45 | 74 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 50 | 66 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 55 | 68 | 50.3% | 0% | 56% | 55% |
| 1/1/2017 | 3 | 60 | 58 | 50.1% | 0% | 56% | 55% |

The Load Forecast, Wind Forecast, Solar Forecast and Non VER Forecast are calculated as a percentage of some measure of capacity or peak. The forecasted levels of PACE wind as a percentage of total system capacity is illustrated below in Table F.6.

**Table F.6 – Wind Forecast Level Example**

| Trading Date | Trading Hour | Trading Interval | Adjusted Base Schedules | Capacity | Wind Forecast |
|--------------|--------------|------------------|-------------------------|----------|---------------|
| 1/1/2017     | 3            | 5                | 957                     | 1898     | 50.5%         |
| 1/1/2017     | 3            | 10               | 956                     | 1898     | 50.4%         |
| 1/1/2017     | 3            | 15               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 20               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 25               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 30               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 35               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 40               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 45               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 50               | 955                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 55               | 954                     | 1898     | 50.3%         |
| 1/1/2017     | 3            | 60               | 951                     | 1898     | 50.1%         |

Quantile regression is a type of regression analysis. Whereas the typical method of ordinary least squares results in estimates of the conditional mean (50<sup>th</sup> percentile) of the response variable given certain values of the predictor variables, quantile regression aims at estimating other specified percentiles of the response variable. For the 2019 FRS the response variable – Combined Diversity Error – was expressed as a function of four predictor variables – Wind Forecast, Solar Forecast, Load Forecast and Non VER Forecast. Each predictor variable contributes to the regression as a combination of linear, square, and cubic effects. Specifically:

$$\begin{aligned}
 &\text{Combined Diversity Error varies as a function of:} \\
 &\text{Wind Forecast} + \text{Wind Forecast}^2 + \text{Wind Forecast}^3 + \\
 &\text{Solar Forecast} + \text{Solar Forecast}^2 + \text{Solar Forecast}^3 + \\
 &\text{Load Forecast} + \text{Load Forecast}^2 + \text{Load Forecast}^3 + \\
 &\text{Non VER Forecast} + \text{Non VER Forecast}^2
 \end{aligned}$$

The instances requiring the largest amounts of regulation reserve occur infrequently, and many hours have very low requirements. If periods when requirements are likely to be low can be distinguished from periods when requirements are likely to be high, less regulation reserve is necessary to achieve a given reliability target. The regulation reserve forecast is not intended to compensate for every potential deviation. Instead, when a shortfall occurs, the size of that shortfall determines the probability of exceeding the Balancing Authority ACE Limit and a reliability

violation occurring. The forecast is adjusted to achieve a cumulative LOLP that corresponds to the annual reliability target.

## 2017 Regulation Reserve Forecast

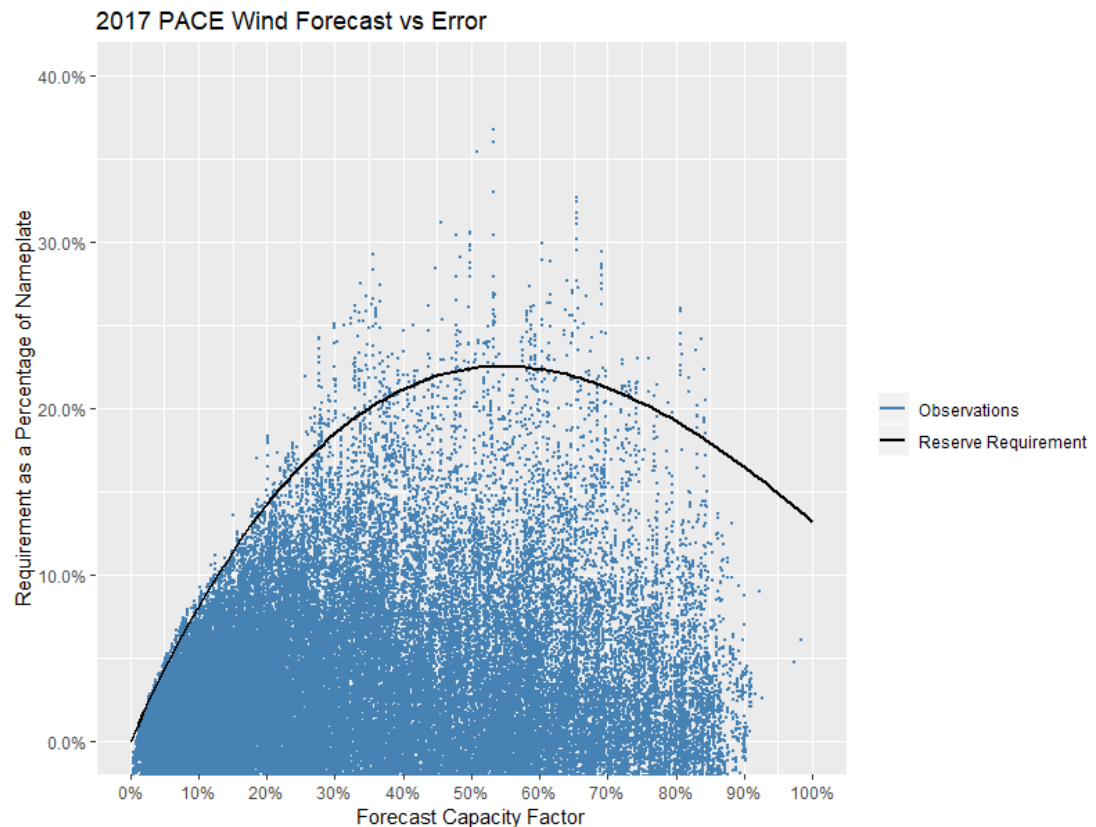
### Overview

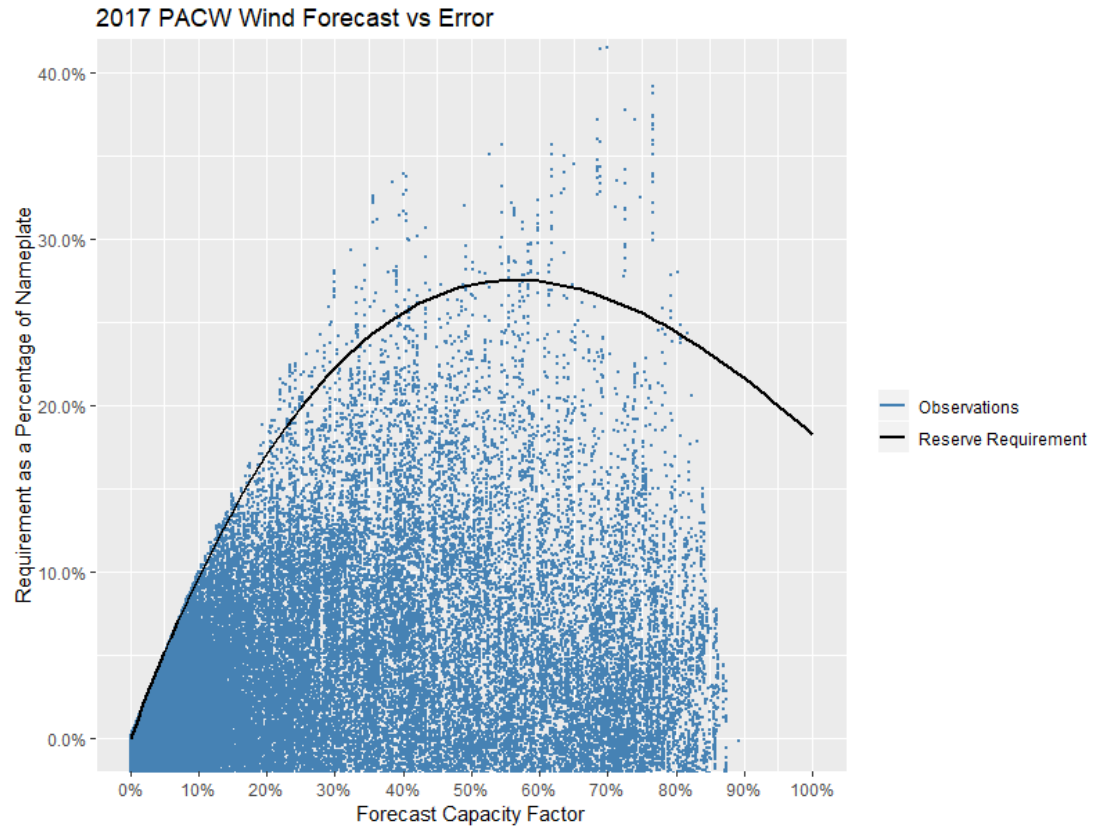
The following forecasts are polynomial functions that cover a targeted percentile of all historical deviations. These forecasts are stand-alone forecasts - based on the difference between hour-ahead base schedules and actual meter data - expressing the errors as a function of the level of forecast. The stand-alone reserve requirement shown achieves the annual reliability target of 0.5 hours per year, after accounting for the dynamical Balancing Authority ACE Limit. The combined diversity error system requirements are discussed later on in the study.

### Wind

Figure F.3 illustrates the relationship between the regulation reserve requirements for PACE wind during 2017 and the forecasted level of output, stated as a capacity factor (*i.e.*, a percentage of the nameplate wind capacity). Figure F.4 illustrates this relationship for PACW.

**Figure F.3 - Wind Regulation Reserve Requirements by Forecast - PACE**



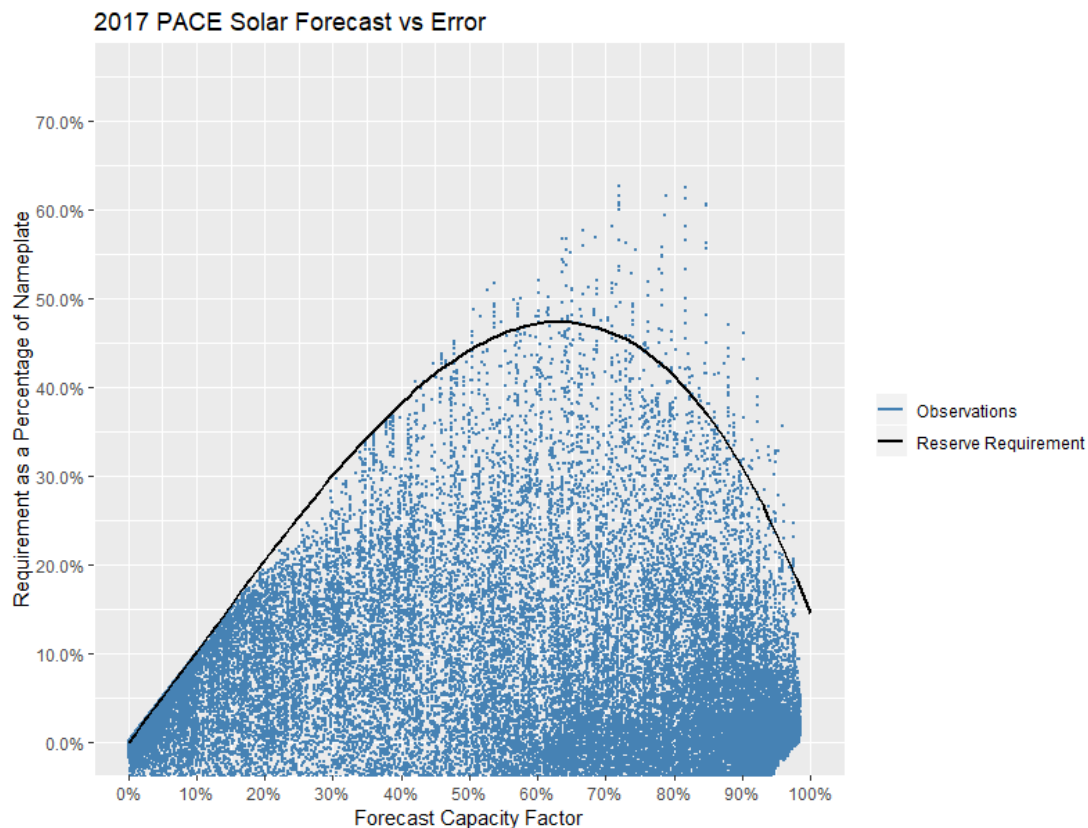
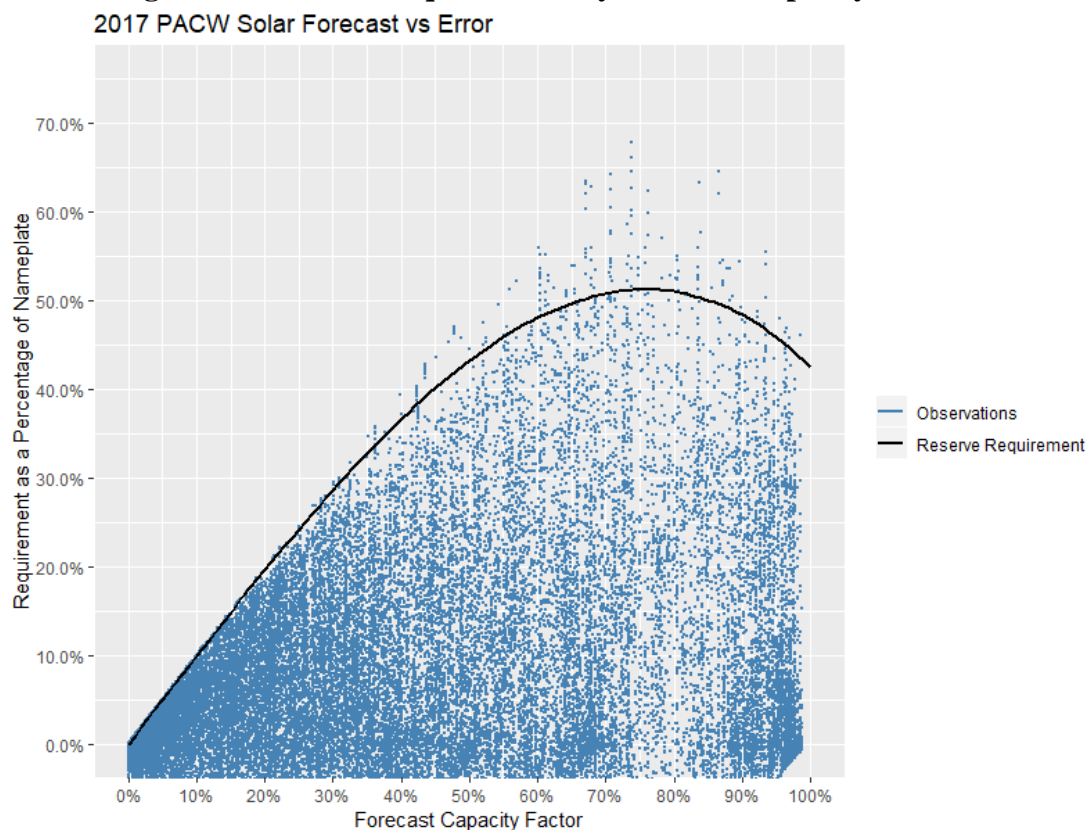
**Figure F.4 - Wind Regulation Reserve Requirements by Forecast Capacity Factor-PACW**

The forecast results in an average 2017 stand-alone regulation reserve requirement for wind of 434 MW for the PacifiCorp system, or approximately 15.8 percent of nameplate capacity.

### Solar

Figure F.5 illustrates the relationship between the regulation reserve requirements for PACE solar during 2017 and the forecasted level of output, stated as a capacity factor (*i.e.*, a percentage of the nameplate solar capacity). Figure F.6 illustrates this relationship for PACW.



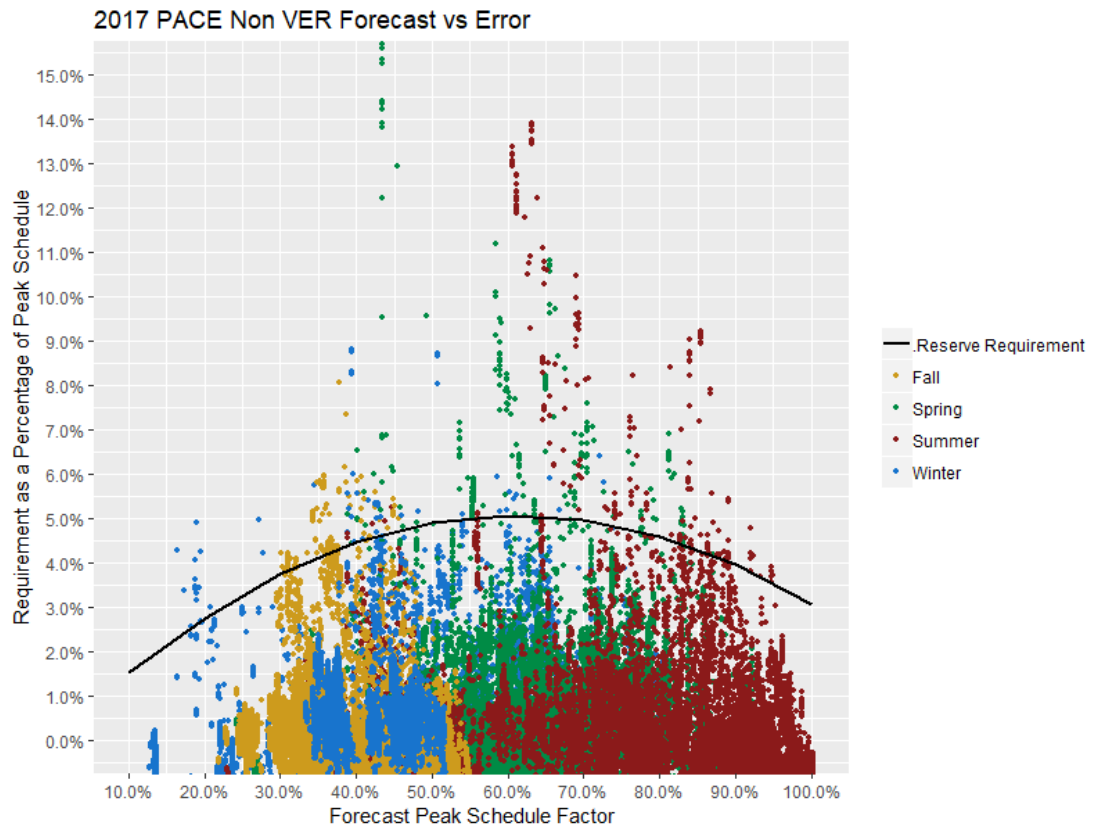
**Figure F.5 - Solar Regulation Reserve Requirements by Forecast Capacity Factor-PACE****Figure F.6 - Solar Regulation Reserve Requirements by Forecast Capacity Factor-PACW**

The forecast results in an average 2017 stand-alone regulation reserve requirement for solar of 145 MW for the PacifiCorp system, or approximately 14.8 percent of nameplate capacity.

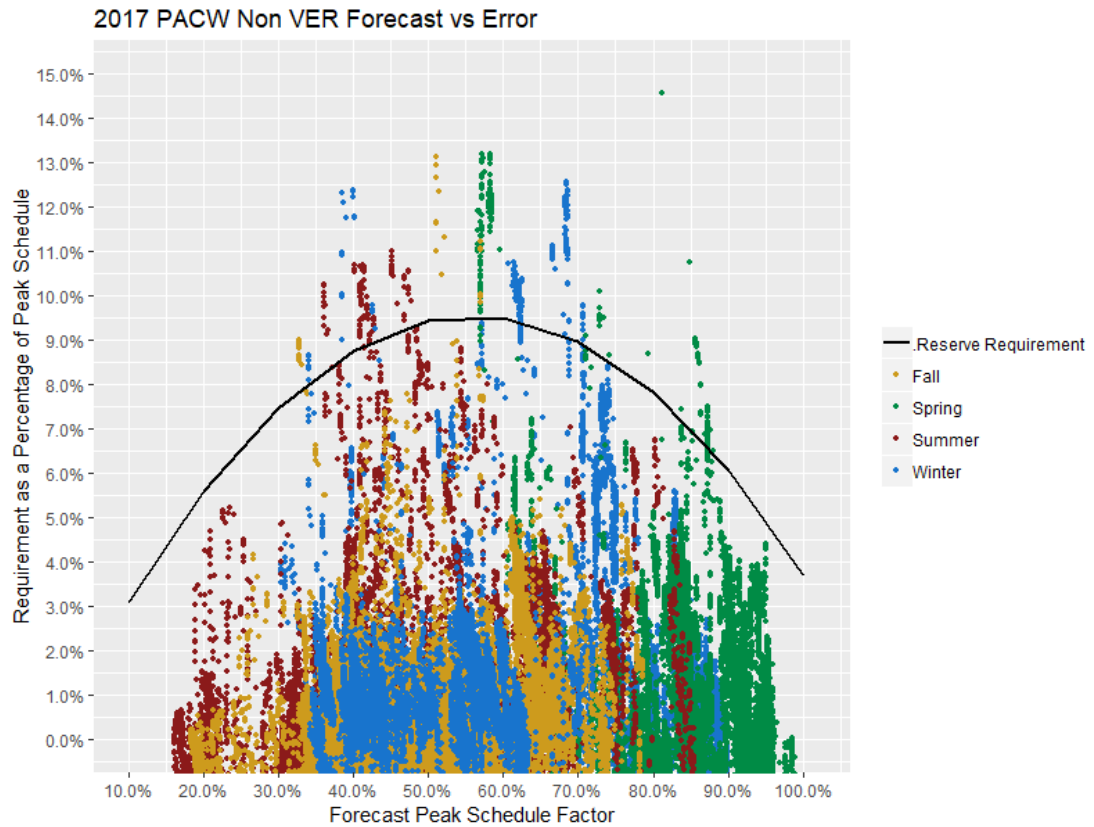
### Non-VERs

Figure F.7 below illustrates the regulation reserve requirements for PACE Non-VERs during 2017 as a function of the forecasted level of output, stated as a peak schedule factor (*i.e.*, a percentage of the peak Non-VER schedule observed for 2017). Figure F.8 illustrates this relationship for PACW.

**Figure F.7 – Non-VER Regulation Reserve Requirements by Forecast Schedule Factor- PACE**



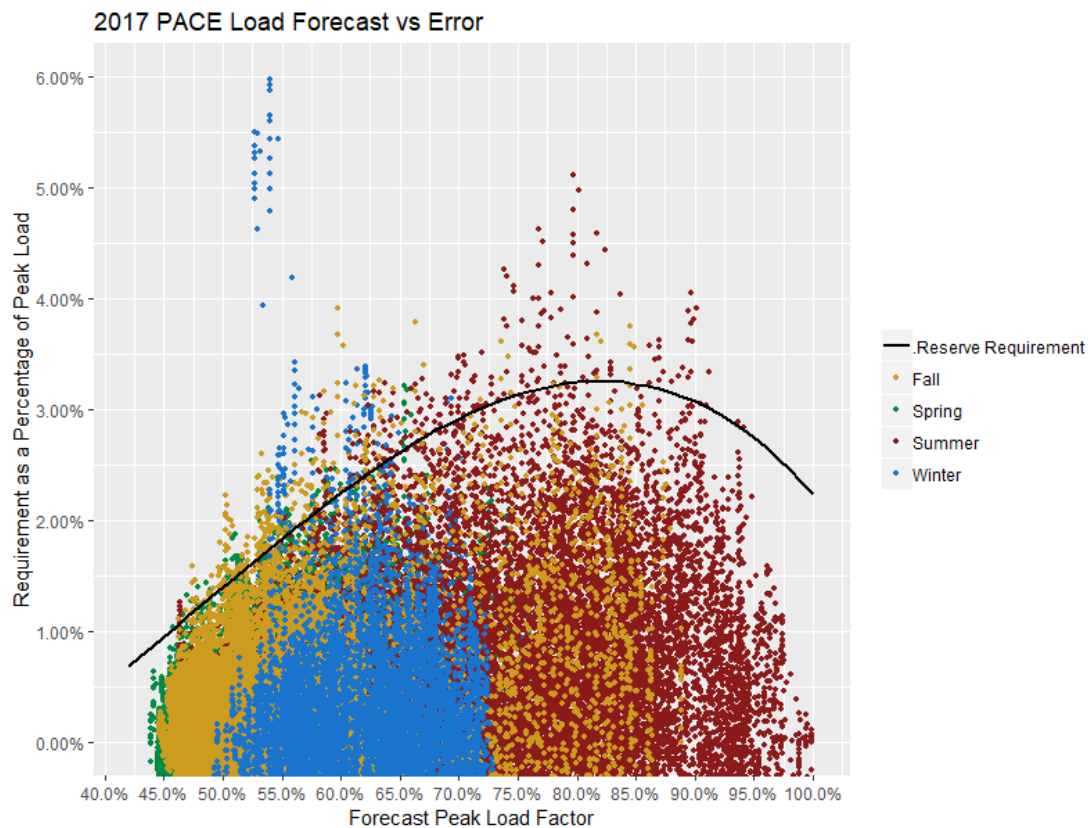
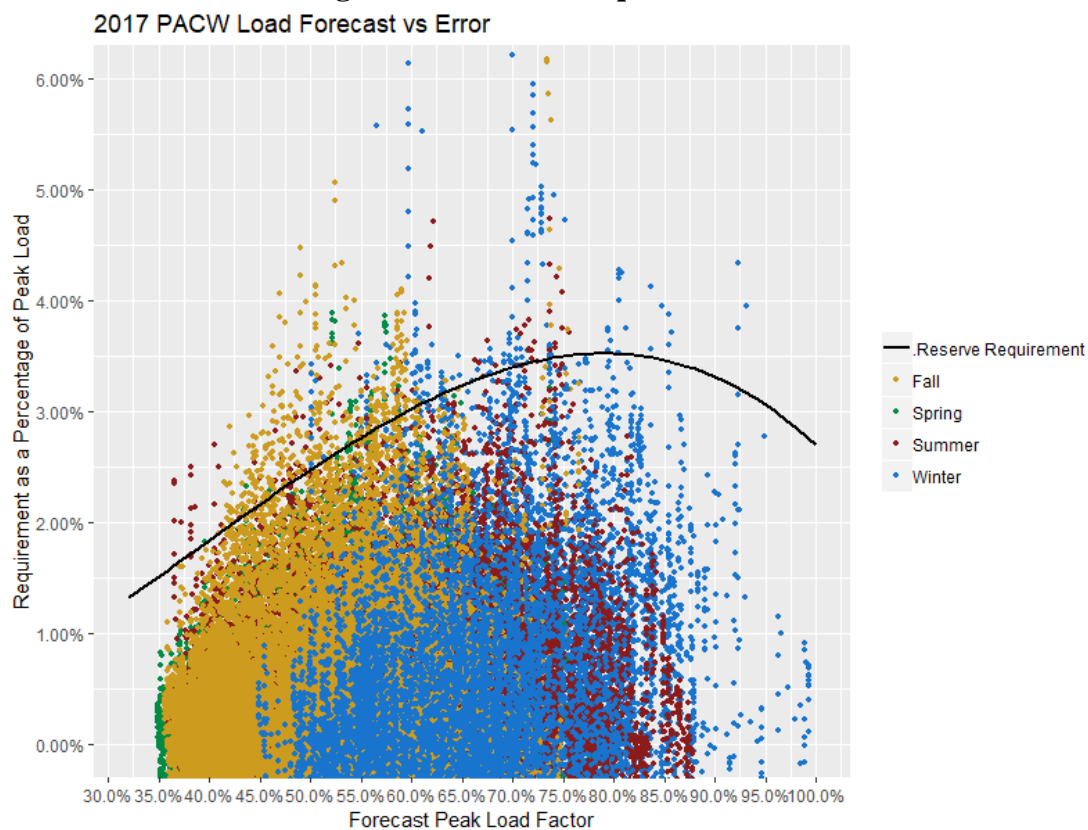
**Figure F.8 – Non-VER Regulation Reserve Requirements by Forecast Schedule Factor-PACW**



The forecast results in an average 2017 stand-alone regulation reserve requirement for non VERs of 110 MW for the PacifiCorp system, or approximately 5.7 percent of the peak schedule.

### Load

Figure F.9 below illustrates the regulation reserve requirements for PACE load during 2017 as a function of the forecasted level of output, stated as a peak load factor (*i.e.*, a percentage of the peak load observed during 2017) for PACE. Figure F.10 illustrates this relationship for PACW.

**Figure F.9 – Stand-alone Load Regulation Reserve Requirements-PACE****Figure F.10 – Stand-alone Load Regulation Reserve Requirements-PACW**

The forecast results in an average 2017 stand-alone regulation reserve requirement for load of 305 MW for the PacifiCorp system, or approximately 3.0 percent of the peak load.

## **Portfolio Diversity and EIM Diversity Benefits**

The EIM is a voluntary energy imbalance market service through the CAISO where market systems automatically balance supply and demand for electricity every fifteen and five minutes, dispatching least-cost resources every five minutes.

PacifiCorp and CAISO began full EIM operation on November 1, 2014. A number of additional participants have since joined the EIM, and more participants are scheduled to join in the next several years. PacifiCorp's participation in the EIM results in improved power production forecasting and optimized intra-hour resource dispatch. This brings important benefits including reduced energy dispatch costs through automatic dispatch, enhanced reliability with improved situational awareness, better integration of renewable energy resources, and reduced curtailment of renewable energy resources.

The EIM also has direct effects related to regulation reserve requirements. First, as a result of EIM participation, PacifiCorp has improved data used in the analysis contained in this FRS. The data and control provided by the EIM allow PacifiCorp to achieve the portfolio diversity benefits described in the first part of this section. Second, the EIM's intra-hour capabilities across the broader EIM footprint provide the opportunity to reduce the amount of regulation reserve necessary for PacifiCorp to hold, as further explained in the second part of this section.

### **Portfolio Diversity Benefit**

The regulation reserve forecasts described above independently ensure that the probability of a reliability violation for each class remains within the reliability target; however, the largest deviations in each class tend not to occur simultaneously, and in some cases deviations will occur in offsetting directions. Because the deviations are not occurring at the same time, the regulation reserve held can cover the expected deviations for multiple classes at once and a reduced total quantity of reserve is sufficient to maintain the desired level of reliability. This reduction in the reserve requirement is the diversity benefit from holding a single pool of reserve to cover deviations in Solar, Wind, Non-VERs, and Load. As a result, the regulation reserve forecast for the portfolio can be reduced while still meeting the reliability target. For this reason the portfolio regulation requirements were calculated on the Combined Diversity Error.

As shown in Table F.7 below, PacifiCorp calculated the proportional reduction to the standalone requirements that could be applied such that the PacifiCorp system achieves the target determined through the quantile regression on the Combined Diversity Error. A total portfolio requirement of 635 MW was the result of this regression, a reduction of 36 percent. Applying this 36 percent reduction to each of the stand-alone regulation forecasts results in the diversity benefits shown in the second column. The last column shows the regulation requirements for each class after subtracting the portfolio diversity benefit.

**Table F.7 - Results with PacifiCorp Portfolio Diversity**

| <b>Scenario</b> | <b>Stand-alone Regulation Forecast (aMW)</b> | <b>Diversity Benefit (aMW)</b> | <b>Portfolio Regulation Forecast (aMW)</b> |
|-----------------|--|--------------------------------|--|
| Non-VER         | 110  | (40)                           | 70   |
| Load            | 305  | (110)                          | 195  |
| VER - Wind      | 434  | (157)                          | 277  |
| VER - Solar     | 145  | (53)                           | 93   |
| <b>Total</b>    | <b>994</b>                                   | <b>(360)</b>                   | <b>635</b>                                 |

## EIM Diversity Benefit

In addition to the direct benefits from EIM’s increased system visibility and improved intra-hour operational performance described above, the participation of other entities in the broader EIM footprint provides the opportunity to further reduce the amount of regulation reserve PacifiCorp must hold.

By pooling variability in load, wind, and solar output, EIM entities reduce the quantity of reserve required to meet flexibility needs. The EIM also facilitates procurement of flexible ramping capacity in the fifteen-minute market to address variability that may occur in the five-minute market. Because variability across different BAAs may happen in opposite directions, the flexible ramping requirement for the entire EIM footprint can be less than the sum of individual BAA requirements. This difference is known as the “diversity benefit” in the EIM. This diversity benefit reflects offsetting variability and lower combined uncertainty. This flexibility reserve (uncertainty requirement) is in addition to the spinning and supplemental reserve carried against generation or transmission system contingencies under the NERC standards.

The CAISO calculates the EIM diversity benefit by first calculating an uncertainty requirement for each individual EIM BAA and then by comparing the sum of those requirements to the uncertainty requirement for the entire EIM area. The latter amount is expected to be less than the sum of the uncertainty requirements from the individual BAAs due to the portfolio diversification effect of forecasting a larger pool of load and resources using intra-hour scheduling and increased system visibility in the hypothetical, single-BAA EIM. Each EIM BAA is then credited with a share of the diversity benefit calculated by CAISO based on its share of the stand-alone requirement relative to the total stand-alone requirement.

The EIM does not relieve participants of their reliability responsibilities. EIM entities are required to have sufficient resources to serve their load on a standalone basis each hour before participating in the EIM. Thus, each EIM participant remains responsible for all reliability obligations. Despite these limitations, EIM imports from other participating BAAs can help balance PacifiCorp’s loads and resources within an hour, reducing the size of reserve shortfalls and the likelihood of a Balancing Authority ACE Limit violation. While substantial EIM imports do occur in some hours, it is only appropriate to rely on PacifiCorp’s diversity benefit associated with EIM participation, as these are derived from the structure of the EIM rather than resources contributed by other participants.

Table F.8 below provides a numeric example of uncertainty requirements and application of the calculated diversity benefit.



**Table F.8 - EIM Diversity Benefit Application Example**

| Hour | CAISO req't. before benefit (MW) | NEVP req't. before benefit (MW) | PACE req't. before benefit (MW) | PACW req't. before benefit (MW) | Total req't. before benefit (MW) | Total req't. after benefit (MW) | Total diversity benefit (MW) | Diversity benefit ratio (MW) | PACE benefit (MW) | PACE req't. after benefit (MW) |
|------|----------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|---------------------------------|------------------------------|------------------------------|-------------------|--------------------------------|
| 1    | 550                              | 110                             | 165                             | 100                             | 925                              | 583                             | 342                          | 37.0%                        | 61                | 104                            |
| 2    | 600                              | 110                             | 165                             | 100                             | 975                              | 636                             | 339                          | 34.8%                        | 57                | 108                            |
| 3    | 650                              | 110                             | 165                             | 110                             | 1,035                            | 689                             | 346                          | 33.4%                        | 55                | 110                            |
| 4    | 667                              | 120                             | 180                             | 113                             | 1,080                            | 742                             | 338                          | 31.3%                        | 56                | 124                            |

While the diversity benefit is uncertain, that uncertainty is not significantly different from the uncertainty in the Balancing Authority ACE Limit described above. In the 2019 FRS, PacifiCorp has credited the regulation reserve forecast with a historical distribution of calculated EIM diversity benefits. While this FRS considers regulation reserve requirements in 2017, the CAISO identified an error in their calculation of uncertainty requirements in early 2018. CAISO's published uncertainty requirements and associated diversity benefits are now only valid for March 2018 forward. To capture these additional benefits for this analysis, PacifiCorp has applied the historical distribution of EIM diversity benefits from March 2018 through the beginning of this study in July 2018. Relatively small incremental EIM diversity benefits are expected going forward as additional entities participate in EIM; however, operational data on new participants was not available at the time the study was prepared.

The inclusion of EIM diversity benefits in the 2019 FRS reduces the probability of reserve shortfalls and, in doing so, reduces the overall regulation reserve requirement. This allows PacifiCorp's forecasted requirements to be reduced. As shown in Table F.9 below, the resulting regulation reserve requirement is 531 MW, a 47 percent reduction (including the portfolio diversity benefit) compared to the stand-alone requirement for each class. The average regulation reserve requirement is reduced by 104 MW relative to the PacifiCorp portfolio reserve requirement without the EIM diversity benefit. The portfolio regulation forecast is expected to achieve an LOLP of 0.5 hours per year, based on a quantile regression at a 99.35 percent exceedance level.

**Table F.9 - 2017 Results with Portfolio Diversity and EIM Diversity Benefits**

| Scenario     | Stand-alone Regulation Forecast (aMW) | Stand-alone Rate (%) | Portfolio Regulation Forecast w/EIM (aMW) | Portfolio Rate (%) | 2017 Capacity (MW) | Rate Determinant |
|--------------|---------------------------------------|----------------------|---|--------------------|--------------------|------------------|
| Non-VER      | 110                                   | 5.7%                 | 59  | 3.1%               | 1,912              | 12 CP            |
| Load         | 305                                   | 3.0%                 | 163                                       | 1.6%               | 10,044             | 12 CP            |
| VER - Wind   | 434                                   | 15.8%                | 232                                       | 8.4%               | 2,750              | Nameplate        |
| VER - Solar  | 145                                   | 14.8%                | 78  | 7.9%               | 983                | Nameplate        |
| <b>Total</b> | <b>994</b>                            |                      | <b>531</b>                                |                    |                    |                  |

## Fast-Ramping Reserve Requirements

As previously discussed, Requirement 1 of BAL-001-2 specifies that PacifiCorp's CPS1 score must be greater than equal to 100 percent for each preceding 12 consecutive calendar month period, evaluated monthly. The CPS1 score compares PacifiCorp's ACE with interconnection frequency during each clock minute. A higher score indicates PacifiCorp's ACE is helping interconnection

frequency, while a lower score indicates it is hurting interconnection frequency. Because CPS1 is averaged and evaluated on a monthly basis, it does not require a response to each and every ACE event, but rather requires that PacifiCorp meet a minimum aggregate level of performance in each month.

The 2017 Regulation Reserve Forecast described above is evaluating requirements for extreme deviations that are at least 30 minutes in duration, for compliance with Requirement 2 of BAL-001-2. In contrast, compliance with CPS1 requires reserve capability to compensate for the majority of over a minute to minute basis. These fast-ramping resources would be deployed frequently, and would also contribute to compliance with Requirement 2 of BAL-001-2, so they are a subset of the 2017 Regulation Reserve Forecast described above.

To evaluate CPS1 requirements, PacifiCorp compared the net load change for each five-minute interval in 2017 to the corresponding value for Requirement 2 compliance in that hour from the 2017 Regulation Reserve Forecast, after accounting for diversity (resulting in the 531 MW average requirement shown in Table F.9). Resources may deploy for Requirement 2 compliance over up to 30 minutes, so the average requirement of 531 MW would require ramping capability of at least 17.7 MW per minute (531 MW / 30 minutes).

Because CPS1 is averaged and evaluated on a monthly basis, it does not require a response to each and every ACE event, but rather requires that PacifiCorp meet a minimum aggregate level of performance in each month. Resources capable of ensuring compliance in 95 percent of intervals are expected to be sufficient to meet CPS 1, and given that ACE may deviate in either a positive or negative direction, the 97.5<sup>th</sup> percentile of incremental requirements was evaluated. This corresponds to 87 MW, or approximately 16.3 percent of the average Requirement 2 value. Because this value is for a five-minute interval, meeting it would require a ramping capability of at least 17.3 MW per minute (87 MW / 5 minutes). This value is actually slightly lower than the ramping capability for Requirement 2.

Note that resources must respond immediately to ensure compliance with Requirement 1, as performance is measured on a minute to minute basis. As a result, resources that respond after a delay, such as quick-start gas plants or certain interruptible loads, would not be suitable for Requirement 1 compliance, so these resources cannot be allocated the entire regulation reserve requirement. However, because Requirement 1 compliance is a small portion of the total regulation reserve requirement, these restrictions on resource type are unlikely to be a meaningful constraint.

In addition, CPS1 compliance is weighted toward performance during conditions when interconnection frequency deviations are large. The largest frequency deviations would also result in deployment of frequency response reserves, which are somewhat larger in magnitude, though they have a less stringent performance metric under BAL-003-1, based on median response during the largest events.

In light of the overlaps with BAL-001-2 Requirement 2 and BAL-003-1 described above, CPS1 compliance is not expected to result in an additional requirements beyond what is necessary to comply with those standards.



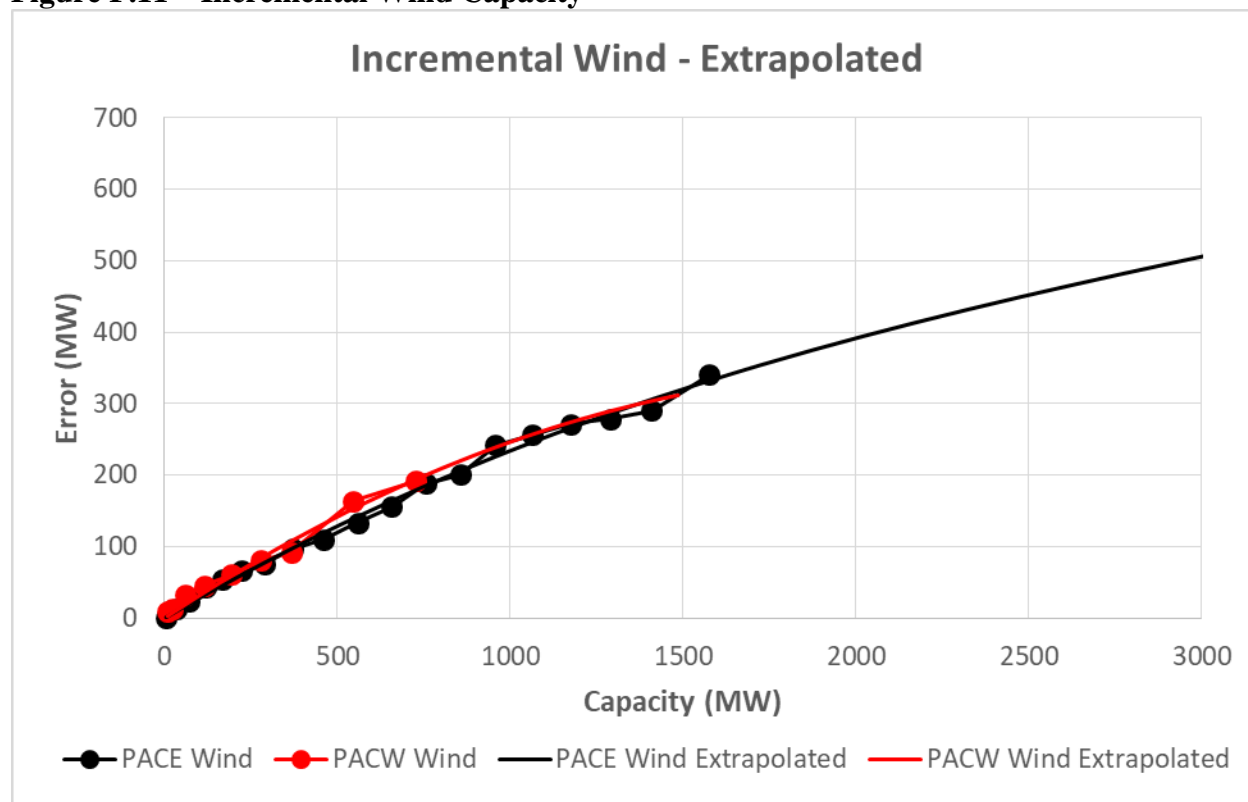
## Incremental Regulation Reserve Requirements

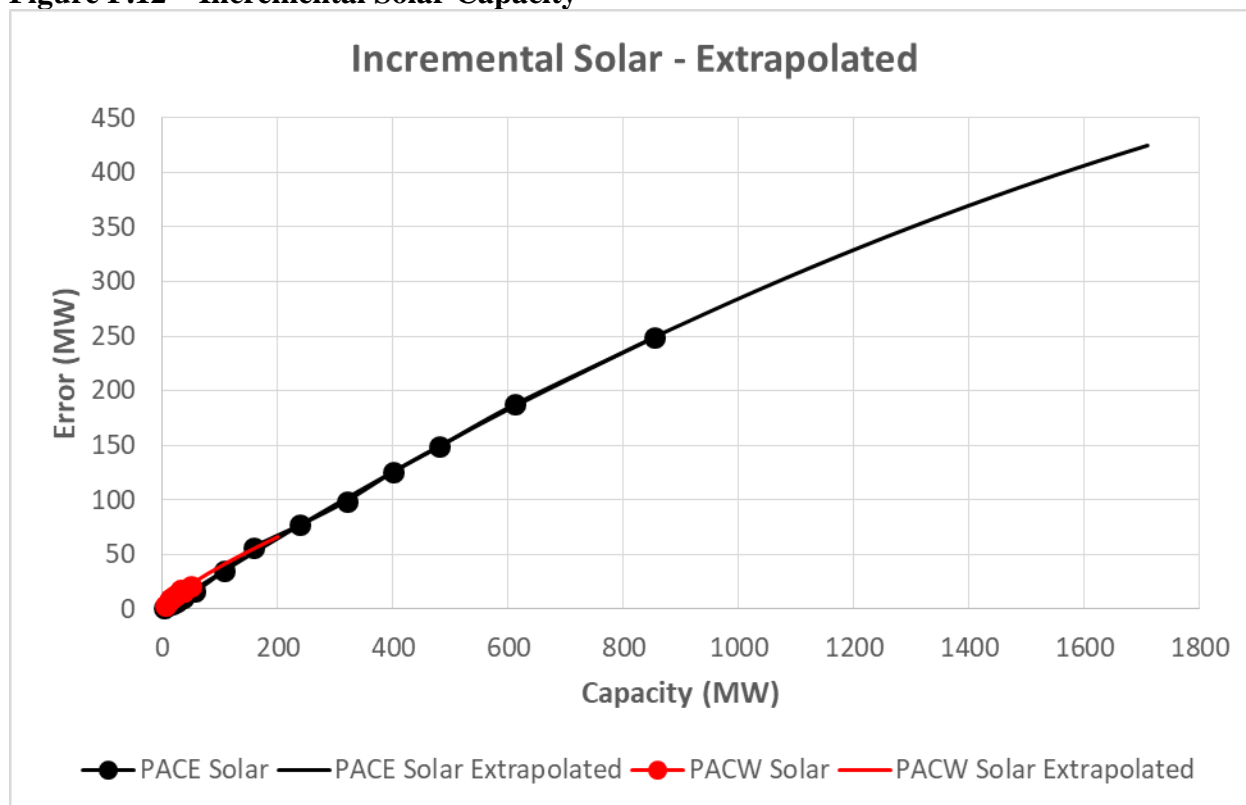
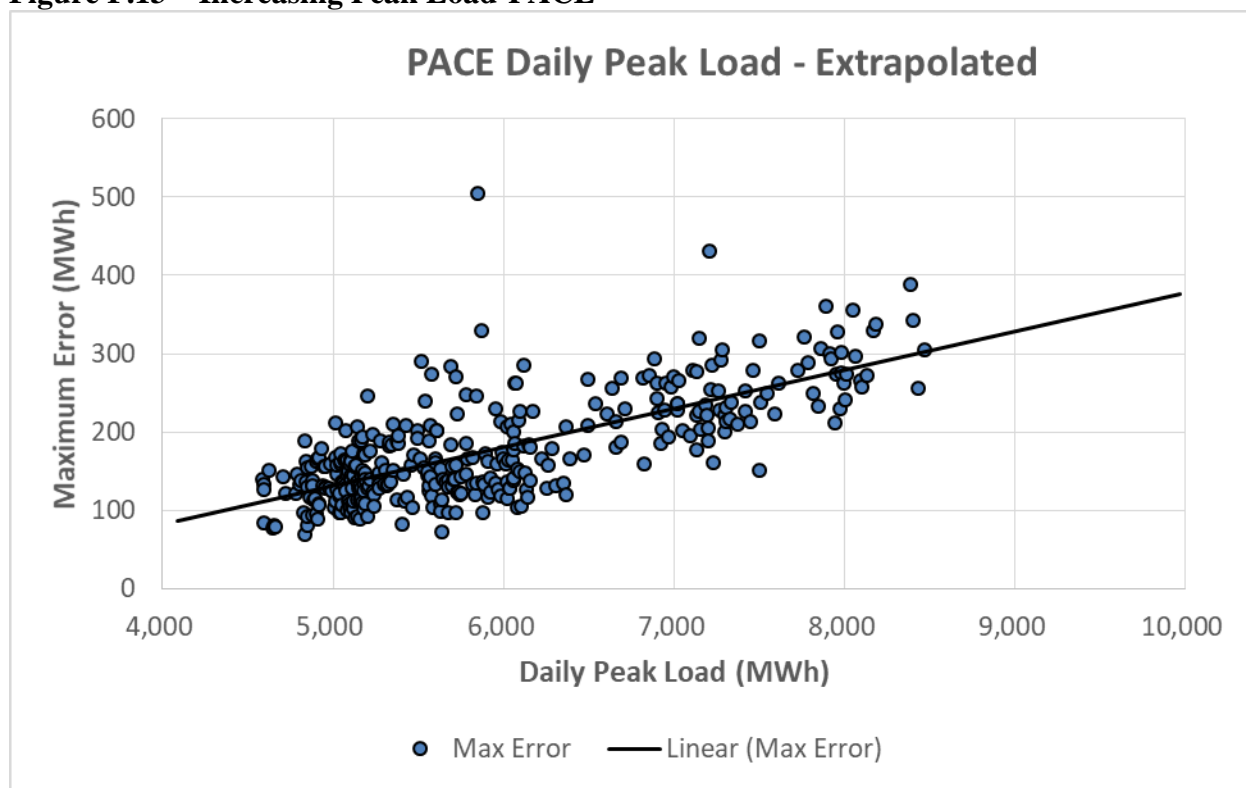
The IRP portfolio optimization process contemplates the addition of new wind and solar capacity as part of its selection of future resources, as well as changes in peak load due to load growth and energy efficiency measures. As PacifiCorp's portfolio grows, the diversity of that portfolio is also expected to increase. As a result, incremental regulation reserve requirements are expected to be lower than the average requirement for a given portfolio.

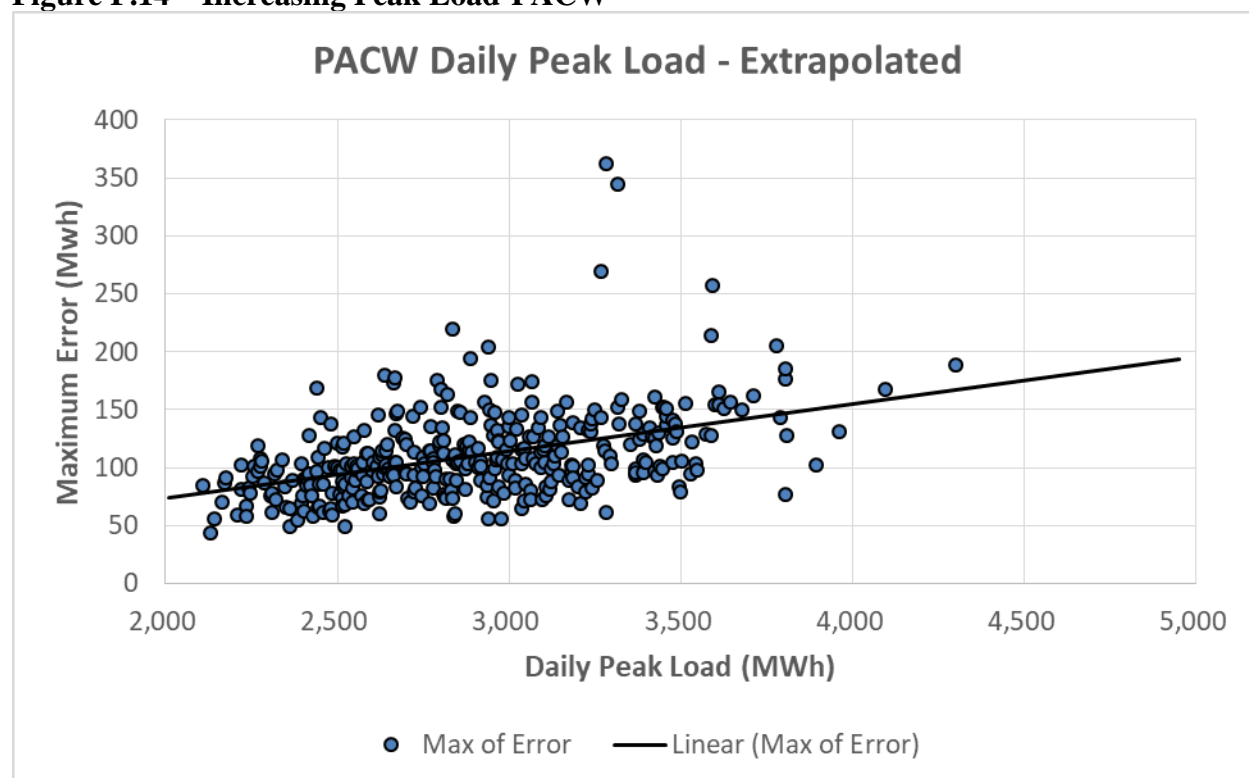
The need to develop realistic deviation data for a period during which resources did not exist makes measuring an incremental diversity effect a difficult proposition. Instead, PacifiCorp's FRS evaluated the change in regulation reserve requirements associated with cumulatively stacking the individual wind and solar facilities throughout the two BAAs. Under this methodology as each MW of VERs is added to the system the rate of increase of the regulation reserve requirement is quantified and incorporated in the forecasted portfolio regulation results discussed later on in the study. Figure F.11 and Figure F.12 show this relationship between increased capacity and increasing reserve requirements for wind and solar by BAA.

Similarly for load the relationship between the daily peak load and the daily maximum error over the course of 2017 was observed for both BAAs and this relationship was extrapolated forward to develop a multiplier for the effect of peak load on the reserve requirements. A linear relationship between daily peak load and daily maximum error was observed for both BAAs as illustrated in Figure F.13 through Figure F.14.

**Figure F.11 – Incremental Wind Capacity**



**Figure F.12 – Incremental Solar Capacity****Figure F.13 – Increasing Peak Load-PACE**

**Figure F.14 – Increasing Peak Load-PACW**

## Portfolio Regulation Reserve Requirements

### Overview

A single pool of regulation reserve is held to cover deviations by load, wind, solar, and non-dispatchable generation. Simultaneous large deviations by all classes are unlikely – as a result, this pool of regulation reserve can be smaller than what these classes would require on their own. The reduction in regulation reserve is a result of the diversity of the portfolio of requirements. The most important element in PacifiCorp’s portfolio diversity estimate is the system diversity, including EIM benefits, associated with load, wind, solar and Non-VERs during 2017. This diversity reduced reserve requirements by 47 percent. This captures the majority of the regulation reserve requirements today and in likely future scenarios over the near term. However, as PacifiCorp’s portfolio evolves over time, the regulation reserve requirements and diversity associated with that portfolio will vary. This section describes how incremental regulation reserve requirements for load, wind, and solar are combined to produce portfolio-specific requirements.

### Results

Table F.10 presents the portfolio regulation requirement results for various scenarios. As the wind and solar capacity on PacifiCorp’s system increases, regulation requirements increase, but those requirements are partially offset by the increasing diversity of the portfolio. The 2019 base case regulation reserve requirements are 531 MW. By comparison, PacifiCorp’s 2017 base case from the 2017 IRP identified regulation reserve requirements of 617 MW.

**Table F.10 – Total Regulation Requirement, by Scenario**

| Case             | Portfolio                      | Wind Capacity (MW) | Solar Capacity (MW) | Regulation Requirement with Diversity (MW) |
|------------------|--------------------------------|--------------------|---------------------|--|
| 2017 Base Case   | 2015 Actuals + Projected Solar | 2,757              | 1,050               | 617  |
| 2019 Base Case   | 2017 Actuals                   | 2,750              | 1,021               | 531  |
| 2019 Forecast    | 2030 Portfolio                 | 3,196              | 2,201               | 672  |
| 2019 Incr. Wind  | 2030 Portfolio + 500 MW Wind   | 3,696              | 2,201               | 722  |
| 2019 Incr. Solar | 2030 Portfolio + 500 MW Solar  | 3,196              | 2,701               | 698  |

Table F.11 presents a comparison of the regulation reserve requirement results in the current study and the prior study.

**Table F.11 - Portfolio Regulation Requirements, Percent of Nameplate/Peak Capacity**

| Study              | Load | Wind  | Non-VER | Solar | Notes                         |
|--------------------|------|-------|---------|-------|-------------------------------|
| 2017 FRS Base Case | 2.8% | 8.9%  | 2.4%    | 4.6%  | 2015 portfolio                |
| 2019 FRS Base Case | 1.6% | 8.4%  | 3.1%    | 7.9%  | 2017 portfolio                |
| Sensitivities:     |      |       |         |       |                               |
| Without diversity  | 3.0% | 15.8% | 5.7%    | 14.8% | 2017 portfolio                |
| Incremental Wind   |      | 10.1% |         |       | 2030 portfolio: +500 MW wind  |
| Incremental Solar  |      |       |         | 5.1%  | 2030 portfolio: +500 MW solar |

The 2019 FRS calculates the regulation reserve requirement for the entire portfolio implicitly accounting for diversity among components at various penetration levels. This allows incremental requirements for load, wind and solar to be aligned with the new resource additions being contemplated in the IRP. The incremental requirements for wind are slightly higher than the average requirements for wind when diversity is included, but still well below the stand-alone requirements for wind without diversity. On the other hand, the incremental requirements for solar are less than the average requirements for solar even when diversity is included. These outcomes are reasonable since solar capacity is smaller than wind capacity in the evaluated portfolio, so incremental solar capacity makes the portfolio relatively more diverse.

For the first time, the 2019 FRS accounts for the incremental impact of changes in forecasted load on regulation reserve requirements. For instance, energy efficiency selections (which reduce load), also reduce reserve requirements. The impact of these changes is accounted for within the results reported by the PaR model.

## Regulation Reserve Cost

A series of PaR scenarios were prepared to isolate the regulation reserve cost associated with incremental wind and solar capacity additions as discussed below. All studies reflect regulation reserve requirements on an hourly basis.

### 1. Base Case

The base case portfolio is the same as that used to set the planning reserve margin for the 2019 IRP, as discussed in Appendix I. This case incorporates assumptions consistent with the 2017 IRP Update, updated to reflect current inputs as of August 2018 and without any wind or solar resources additions beyond those that had already been committed at that time. This case was evaluated over the study period 2018-2036.

**2. Wind Reserve Case**

The wind reserve case adds the incremental regulation reserve requirement associated with 500 MW of proxy wind resource additions. Wind capacity increases by 100 MW at each of five locations: Dave Johnston, Goshen, Utah South, Walla Walla, and Yakima. The addition of this wind capacity results increases regulation reserve requirements by an average of 50 MW. This case was evaluated for the study period 2030. Wind integration costs are equal to the increase in system cost in Study 2 relative to Study 1, divided by the incremental wind generation.

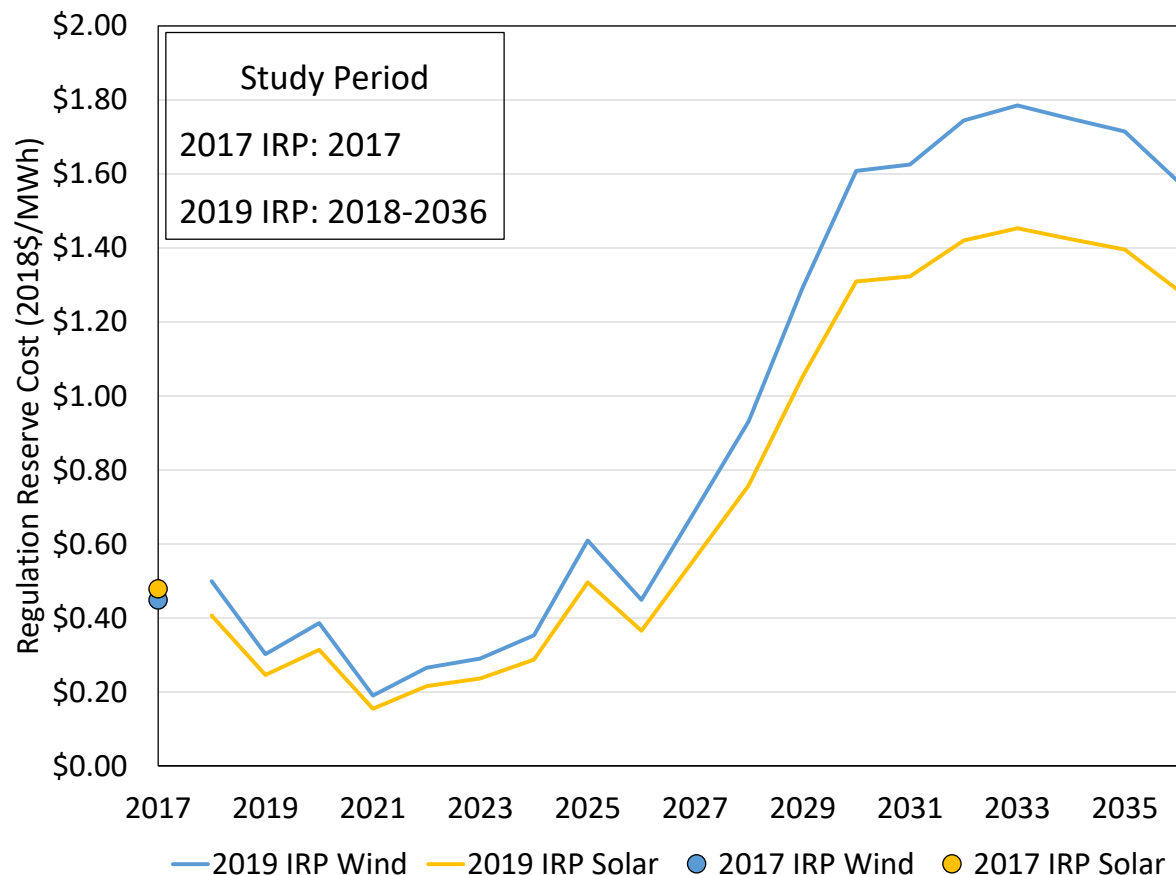
**3. Solar Reserve Case**

The solar reserve case adds the incremental regulation reserve requirement associated with 500 MW of proxy solar resource additions. Solar capacity increases by 250 MW in Utah South and by 125 MW each in Southern Oregon and Yakima. The addition of this solar capacity results increases regulation reserve requirements by an average of 24 MW. This case was evaluated for the study period 2030. Solar integration costs are equal to the increase in system cost in Study 3 relative to Study 1, divided by the incremental solar generation.

**4. 50 MW Reserve Case**

This case includes an additional 50 MW reserve requirement in every hour. This case was evaluated over the study period 2018-2036 and was used to escalate the wind and solar results over time, relative to the 2030 values.

The incremental regulation reserve cost results for wind and solar are shown in Figure F.15. The comparable regulation reserve costs from the 2017 FRS are also shown. While regulation reserve costs in 2018 are comparable to the result in the prior study, the 2019 FRS demonstrates how these costs are expected to vary over time.

**Figure F.15 – Incremental Wind and Solar Regulation Reserve Costs**

The difference in regulation reserve costs for wind and solar reflects timing differences. Per MWh of generation, the wind reserve obligation is approximately 60 percent higher than the solar obligation; however, the solar obligation is higher during the summer when market prices and marginal reserve costs are typically higher. As a result, per MWh of generation, wind integration costs are only slightly higher than solar integration costs.

The 2019 FRS results are applied in the portfolio development process as an additional cost for proxy wind and solar generation resources available for selection within the SO model. Once the SO model has developed a candidate resource portfolio, the PaR model is used to evaluate portfolio risks. The PaR model inputs include regulation reserve requirements specific to the resource portfolio developed using the SO model, so the costs identified in the 2019 FRS are not applied in the PaR results. Instead, the IRP risk analysis using PaR specifically accounts for both differences in regulation reserve requirements and the resources available to meet those requirements in each portfolio.

When evaluated in PaR, a portfolio will be evaluated on its ability to meet operating reserve requirements, including regulation reserves, but as indicated previously, the SO model does not account for either reserve obligations or the reserve capability that resources can provide. While integration costs have previously been used to account for regulation reserve obligations, for the first time in the 2019 IRP an analogous credit has been applied to highly flexible resources that primarily provide operating reserves. This “operating reserve credit” has been applied to proxy storage, gas peaking units, and Class 1 DSM (interruptible load) that are available for selection

within the SO model. While other resources, such as combined cycle gas plants and renewables, are also capable of providing operating reserves these resources primarily provide energy which the SO model is already accounting for. As a result, no operating reserve credits are applied to these other resources. For a resource that is available throughout the year, such as a gas peaking unit, the operating reserve credit amounts to \$50/kw-year (2018\$), based on the costs calculated in the 50 MW Reserve Case relative to the Base Case. For resources with limited availability, such as seasonal Class 1 DSM resources or storage combined with wind or solar, the credits are prorated to account for the periods when a resource provides operating reserves.

## Flexible Resource Needs Assessment

### Overview

In its Order No. 12013 issued on January 19, 2012 in Docket No. UM 1461 on “Investigation of matters related to Electric Vehicle Charging”, the Oregon Public Utility Commission (OPUC) adopted the OPUC staff’s proposed IRP guideline:

1. Forecast the Demand for Flexible Capacity: The electric utilities shall forecast the balancing reserves needed at different time intervals (e.g. ramping needed within 5 minutes) to respond to variation in load and intermittent renewable generation over the 20-year planning period;
2. Forecast the Supply of Flexible Capacity: The electric utilities shall forecast the balancing reserves available at different time intervals (e.g. ramping available within 5 minutes) from existing generating resources over the 20-year planning period; and
3. Evaluate Flexible Resources on a Consistent and Comparable Basis: In planning to fill any gap between the demand and supply of flexible capacity, the electric utilities shall evaluate all resource options including the use of electric vehicles (EVs), on a consistent and comparable basis.

In this section, PacifiCorp first identifies its flexible resource needs for the IRP study period of 2019 through 2038, and the calculation method used to estimate those requirements. PacifiCorp then identifies its supply of flexible capacity from its generation resources, in accordance with the Western Electricity Coordinating Council (WECC) operating reserve guidelines, demonstrating that PacifiCorp has sufficient flexible resources to meet its requirements.

### Forecasted Reserve Requirements

Since contingency reserve and regulation reserve are separate and distinct components, PacifiCorp estimates the forward requirements for each separately. The contingency reserve requirements are derived from stochastic simulations run using the Planning and Risk (PaR) model. The regulating reserve requirements are part of the inputs to the PaR model, and are calculated by applying the methods developed in the Portfolio Regulation Reserve Requirements section. The contingency and regulation reserve requirements include three distinct components and are modeled separately in the 2019 IRP: 10-minute spinning reserve requirements, 10-minute non-spinning reserve requirements, and 30-minute regulation reserve requirements. The reserve requirements for PacifiCorp’s two balancing authority areas are shown in Table F.12 below.

**Table F.12 - Reserve Requirements (MW)**

| Year | East Requirement    |                         |                           | West Requirement    |                         |                           |
|------|---------------------|-------------------------|---------------------------|---------------------|-------------------------|---------------------------|
|      | Spin<br>(10-minute) | Non-spin<br>(10-minute) | Regulation<br>(30-minute) | Spin<br>(10-minute) | Non-spin<br>(10-minute) | Regulation<br>(30-minute) |
| 2019 | 193                 | 193                     | 359                       | 93                  | 93                      | 196                       |
| 2020 | 194                 | 194                     | 377                       | 94                  | 94                      | 207                       |
| 2021 | 194                 | 194                     | 491                       | 96                  | 96                      | 211                       |
| 2022 | 196                 | 196                     | 493                       | 97                  | 97                      | 198                       |
| 2023 | 199                 | 199                     | 502                       | 97                  | 97                      | 196                       |
| 2024 | 202                 | 202                     | 593                       | 98                  | 98                      | 283                       |
| 2025 | 203                 | 203                     | 601                       | 99                  | 99                      | 282                       |
| 2026 | 203                 | 203                     | 592                       | 99                  | 99                      | 280                       |
| 2027 | 205                 | 205                     | 591                       | 100                 | 100                     | 278                       |
| 2028 | 207                 | 207                     | 597                       | 101                 | 101                     | 275                       |
| 2029 | 208                 | 208                     | 539                       | 101                 | 101                     | 288                       |
| 2030 | 210                 | 210                     | 651                       | 102                 | 102                     | 286                       |
| 2031 | 212                 | 212                     | 642                       | 102                 | 102                     | 286                       |
| 2032 | 214                 | 214                     | 644                       | 102                 | 102                     | 282                       |
| 2033 | 215                 | 215                     | 626                       | 102                 | 102                     | 296                       |
| 2034 | 216                 | 216                     | 620                       | 102                 | 102                     | 296                       |
| 2035 | 217                 | 217                     | 604                       | 101                 | 101                     | 299                       |
| 2036 | 219                 | 219                     | 601                       | 101                 | 101                     | 308                       |
| 2037 | 220                 | 220                     | 600                       | 101                 | 101                     | 307                       |
| 2038 | 221                 | 221                     | 560                       | 101                 | 101                     | 301                       |

## Flexible Resource Supply Forecast

Requirements by NERC and the WECC dictate the types of resources that can be used to serve the reserve requirements.

- **10-minute spinning reserve** can only be provided by resources currently online and synchronized to the transmission grid;
- **10-minute non-spinning reserve** may be served by fast-start resources that are capable of being online and synchronized to the transmission grid within ten minutes. Interruptible load can only provide non-spinning reserve. Non-spinning reserve may be provided by resources that are capable of providing spinning reserve.
- **30-minute regulation reserve** can be provided by unused spinning or non-spinning reserve. Incremental 30-minute ramping capability beyond the 10-minute capability captured in the categories above also counts toward this requirement.

The resources that PacifiCorp employs to serve its reserve requirements include owned hydro resources that have storage, owned thermal resources, and purchased power contracts that provide reserve capability.

Hydro resources are generally deployed first to meet the spinning reserve requirements because of their flexibility and their ability to respond quickly. The amount of reserve that these resources can provide depends upon the difference between their expected capacities and their generation level at the time. The hydro resources that PacifiCorp may use to cover reserve requirements in the PacifiCorp West balancing authority area include its facilities on the Lewis River and the Klamath



River as well as contracted generation from the Mid-Columbia projects. In the PacifiCorp East balancing authority area, PacifiCorp may use facilities on the Bear River to provide spinning reserve.

Thermal resources are also used to meet the spinning reserve requirements when they are online. The amount of reserve provided by these resources is determined by their ability to ramp up within a 10-minute interval. For natural gas-fired thermal resources, the amount of reserve can be close to the differences between their nameplate capacities and their minimum generation levels. In the current IRP, PacifiCorp's reserve are served not only from existing coal- and gas-fired resources, but also from new gas-fired resources selected in the preferred portfolio.

Table F.13 lists the annual reserve capability from resources in PacifiCorp's East and West balancing authority areas.<sup>20</sup> All the resources included in the calculation are capable of providing all types of reserve. The non-spinning reserve resources under third party contracts are excluded in the calculations. The changes in the flexible resource supply reflect retirement of existing resources, addition of new preferred portfolio resources, and variation in hydro capability due to forecasted streamflow conditions, and expiration of contracts from the Mid-Columbia projects that are reflected in the preferred portfolio.

**Table F.13 - Flexible Resource Supply Forecast (MW)**

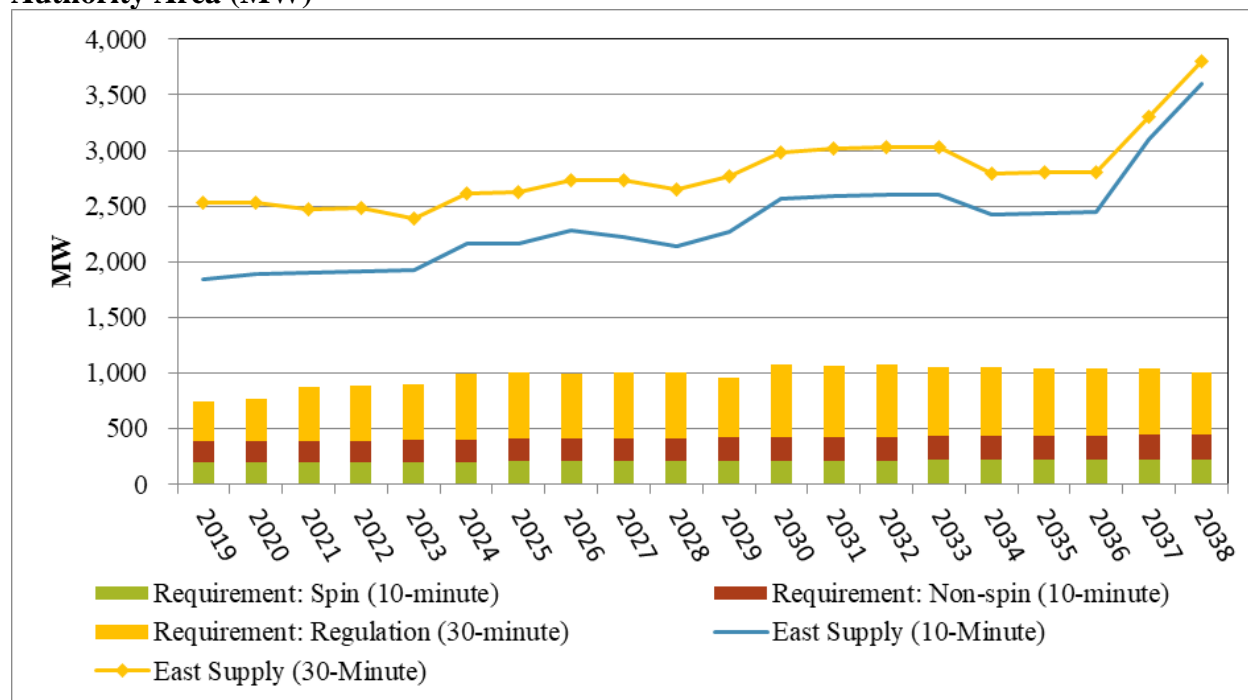
| Year | East Supply<br>(10-Minute) | West Supply<br>(10-Minute) | East Supply<br>(30-Minute) | West Supply<br>(30-Minute) |
|------|----------------------------|----------------------------|----------------------------|----------------------------|
| 2019 | 1,843                      | 701                        | 2528                       | 965                        |
| 2020 | 1,893                      | 703                        | 2528                       | 967                        |
| 2021 | 1,897                      | 684                        | 2472                       | 948                        |
| 2022 | 1,913                      | 671                        | 2488                       | 935                        |
| 2023 | 1,931                      | 683                        | 2387                       | 947                        |
| 2024 | 2,158                      | 965                        | 2613                       | 1262                       |
| 2025 | 2,166                      | 963                        | 2621                       | 1260                       |
| 2026 | 2,278                      | 963                        | 2734                       | 1260                       |
| 2027 | 2,228                      | 964                        | 2734                       | 1261                       |
| 2028 | 2,144                      | 1,143                      | 2650                       | 1440                       |
| 2029 | 2,268                      | 1,645                      | 2773                       | 1876                       |
| 2030 | 2,562                      | 1,645                      | 2987                       | 1876                       |
| 2031 | 2,592                      | 1,645                      | 3017                       | 1876                       |
| 2032 | 2,604                      | 1,765                      | 3029                       | 1996                       |
| 2033 | 2,604                      | 1,884                      | 3029                       | 2016                       |
| 2034 | 2,426                      | 1,884                      | 2789                       | 2016                       |
| 2035 | 2,441                      | 1,884                      | 2804                       | 2016                       |
| 2036 | 2,445                      | 1,988                      | 2808                       | 2120                       |
| 2037 | 3,104                      | 2,240                      | 3308                       | 2372                       |
| 2038 | 3,601                      | 2,622                      | 3804                       | 2622                       |

Figure F.16 and Figure F.17 graphically display the balances of reserve requirements and capability of spinning reserve resources in PacifiCorp's East and West balancing authority areas

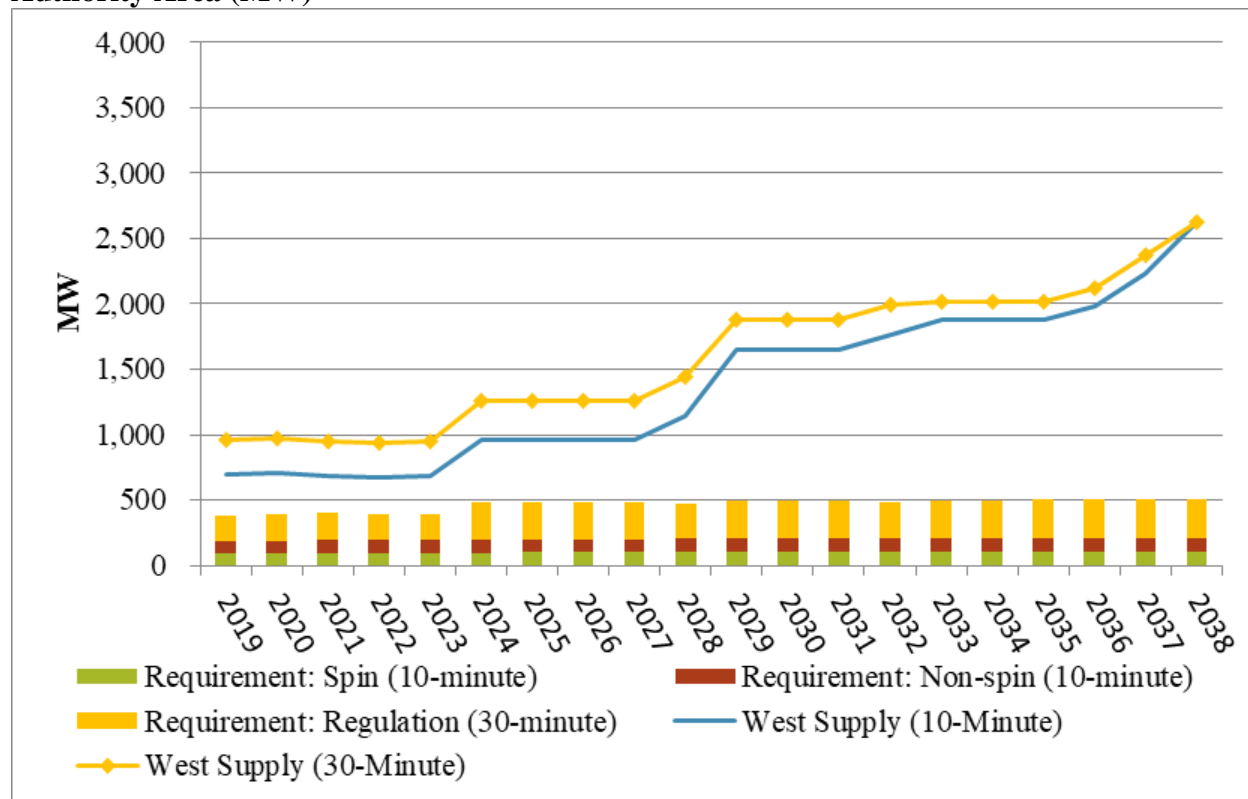
<sup>20</sup> Frequency response capability is a subset of the 10-minute capability shown. Battery resources are capable of responding with their maximum output during a frequency event, and can provide an even greater response if they were charging at the start of an event. PacifiCorp has sufficient frequency response capability at present and by 2024 the battery capacity added in the preferred portfolio will exceed of PacifiCorp's current 202.8 MW frequency response obligation for a 0.3 Hz event. As a result, compliance with the frequency response obligation is not anticipated to require incremental supply.

respectively. The graphs demonstrate that PacifiCorp's system has sufficient resources to serve its reserve requirements throughout the IRP planning period.

**Figure F.16 - Comparison of Reserve Requirements and Resources, East Balancing Authority Area (MW)**



**Figure F.17 - Comparison of Reserve Requirements and Resources, West Balancing Authority Area (MW)**



## Flexible Resource Supply Planning

In actual operations, PacifiCorp has been able to serve its reserve requirements and has not experienced any incidents where it was short of reserve. PacifiCorp manages its resources to meet its reserve obligation in the same manner as meeting its load obligation – through long term planning, market transactions, utilization of the transmission capability between the two balancing authority areas, and operational activities that are performed on an economic basis.

PacifiCorp and the California Independent System Operator Corporation implemented the energy imbalance market (EIM) on November 1, 2014, and participation by other utilities has expanded significantly with more participants scheduled for entry through 2022. By pooling variability in load and resource output, EIM entities reduce the quantity of reserve required to meet flexibility needs. Because variability across different BAAs may happen in opposite directions, the uncertainty requirement for the entire EIM footprint can be less than the sum of individual BAAs' requirements. This difference is known as the “diversity benefit” in the EIM. This diversity benefit reflects offsetting variability and lower combined uncertainty. PacifiCorp's regulation reserve forecast includes a credit to account for the diversity benefits associated with its participation in EIM.

As indicated in the OPUC order, electric vehicle technologies may be able to meet flexible resource needs at some point in the future. However, the electric vehicle technology and market have not developed sufficiently to provide data for the current study. Since this analysis shows no gap between forecasted demand and supply of flexible resources over the IRP planning horizon, this IRP does not evaluate whether electric vehicles could be used to meet future flexible resource needs.

## APPENDIX G – PLANT WATER CONSUMPTION

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The information provide in this appendix is for PacifiCorp owned plants. Total water consumption and generation includes all owners for jointly-owned facilities.

**Table G.1 – Plant Water Consumption with Acre-Feet per Year**

| Plant Name    | Zero Discharge | Cooling Media | Acre-Feet Per Year |               |               |               |                | MWhs Per Year     |                   |                   |                   | 4-year Average |            |
|---------------|----------------|---------------|--------------------|---------------|---------------|---------------|----------------|-------------------|-------------------|-------------------|-------------------|----------------|------------|
|               |                |               | 2014               | 2015          | 2016          | 2017          | 4-year Average | 2014              | 2015              | 2016              | 2017              | Gals/ MWH      | GPM/ MW    |
| Chehalis      | Yes            | Air           | 150                | 52            | 48            | 54            | 76             | 2,543,785         | 1,090,728         | 1,395,513         | 1,748,295         | 15             | 0.2        |
| Currant Creek | Yes            | Air           | 92                 | 78            | 124           | 116           | 102            | 2,498,058         | 2,257,106         | 1,474,686         | 1,193,242         | 18             | 0.3        |
| Dave Johnston | No             | Water         | 9,474              | 9,736         | 8,864         | 8,231         | 9,076          | 5,183,347         | 5,140,970         | 5,088,504         | 4,519,908         | 594            | 9.9        |
| Gadsby        | No             | Water         | 367                | 259           | 262           | 100           | 247            | 325,677           | 123,796           | 120,903           | 92,814            | 485            | 8.1        |
| Hunter        | Yes            | Water         | 16,662             | 16,386        | 14,225        | 15,383        | 15,664         | 9,098,918         | 5,988,318         | 5,503,890         | 5,399,777         | 786            | 13.1       |
| Huntington    | Yes            | Water         | 10,240             | 9,888         | 9,189         | 9,653         | 9,743          | 6,300,558         | 9,630,419         | 8,161,219         | 8,582,142         | 389            | 6.5        |
| Jim Bridger   | Yes            | Water         | 23,936             | 22,493        | 18,000        | 19,047        | 20,869         | 14,016,315        | 13,439,341        | 11,688,747        | 11,642,810        | 536            | 8.9        |
| Lake Side     | No             | Water         | 2,960              | 3,369         | 3,619         | 2,698         | 3,161          | 4,351,182         | 4,549,274         | 5,726,042         | 3,340,561         | 229            | 3.8        |
| Naughton      | No             | Water         | 7,484              | 7,215         | 6,896         | 6,927         | 7,130          | 4,958,589         | 4,899,321         | 4,871,839         | 4,740,158         | 477            | 8.0        |
| Wyodak        | Yes            | Air           | 332                | 228           | 329           | 332           | 305            | 2,625,183         | 2,565,603         | 2,056,439         | 2,565,053         | 41             | 0.7        |
| <b>TOTAL</b>  |                |               | <b>71,695</b>      | <b>69,704</b> | <b>61,556</b> | <b>62,541</b> | <b>66,374</b>  | <b>51,901,612</b> | <b>49,684,876</b> | <b>46,087,782</b> | <b>43,824,760</b> | <b>452</b>     | <b>7.5</b> |

\* Gadsby includes a mix of both Rankine steam units and peaking gas turbines.

\*\* Naughton Unit 3 was rerated in September 2015 from 330 megawatts (MW) to 280 MW. The averages remain as 4-year averages.

1 acre-foot of water is equivalent to 325,851 Gallons or 43,560 Cubic Feet.

**Table G.2 – Plant Water Consumption by State (acre-feet)**

| UTAH PLANTS   |               |               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Plant Name    | 2012          | 2013          | 2014          | 2015          | 2016          | 2017          |
| Currant Creek | 90            | 84            | 92            | 78            | 124           | 116           |
| Gadsby        | 1,059         | 610           | 367           | 259           | 262           | 100           |
| Hunter        | 18,266        | 17,001        | 16,662        | 16,386        | 14,225        | 15,383        |
| Huntington    | 10,423        | 10,643        | 10,240        | 9,888         | 9,189         | 9,653         |
| Lake Side     | 1,693         | 1,361         | 2,960         | 3,369         | 3,619         | 2,698         |
| <b>TOTAL</b>  | <b>31,531</b> | <b>29,699</b> | <b>30,320</b> | <b>29,980</b> | <b>27,419</b> | <b>27,950</b> |

Percent of total water consumption = 42.3

| WYOMING PLANTS |               |               |               |               |               |               |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Plant Name     | 2012          | 2013          | 2014          | 2015          | 2016          | 2017          |
| Dave Johnston  | 7,721         | 8,941         | 9,474         | 9,736         | 8,864         | 8,231         |
| Jim Bridger    | 23,977        | 25,059        | 23,936        | 22,493        | 18,000        | 19,047        |
| Naughton       | 8,745         | 9,622         | 7,484         | 7,215         | 6,896         | 6,927         |
| Wyodak         | 322           | 319           | 332           | 228           | 329           | 332           |
| <b>TOTAL</b>   | <b>40,765</b> | <b>43,941</b> | <b>41,225</b> | <b>39,672</b> | <b>34,089</b> | <b>34,537</b> |

Percent of total water consumption = 55.9

**Table G.3 – Plant Water Consumption by Fuel Type (acre-feet)**

| COAL FIRED PLANTS |               |               |               |               |               |               |
|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Plant Name        | 2012          | 2013          | 2014          | 2015          | 2016          | 2017          |
| Dave Johnston     | 7,721         | 8,941         | 9,474         | 9,736         | 8,864         | 8,231         |
| Hunter            | 18,266        | 17,001        | 16,662        | 16,386        | 14,225        | 15,383        |
| Huntington        | 10,423        | 10,643        | 10,240        | 9,888         | 9,189         | 9,653         |
| Jim Bridger       | 23,977        | 25,059        | 23,936        | 22,493        | 18,000        | 19,047        |
| Naughton          | 8,745         | 9,622         | 7,484         | 7,215         | 6,896         | 6,927         |
| Wyodak            | 322           | 319           | 332           | 228           | 329           | 332           |
| <b>TOTAL</b>      | <b>69,454</b> | <b>71,585</b> | <b>68,127</b> | <b>65,946</b> | <b>57,503</b> | <b>59,573</b> |

Percent of total water consumption = 93.7

| NATURAL GAS FIRED PLANTS |              |              |              |              |              |              |
|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Plant Name               | 2012         | 2013         | 2014         | 2015         | 2016         | 2017         |
| Currant Creek            | 90           | 84           | 92           | 78           | 124          | 116          |
| Chehalis                 | 55           | 86           | 150          | 52           | 48           | 54           |
| Gadsby                   | 1,059        | 610          | 367          | 259          | 262          | 100          |
| Lake Side                | 1,693        | 1,361        | 2,960        | 3,369        | 3,619        | 2,698        |
| <b>TOTAL</b>             | <b>2,897</b> | <b>2,141</b> | <b>3,568</b> | <b>3,758</b> | <b>4,053</b> | <b>2,968</b> |

Percent of total water consumption = 4.6

**Table G.4 – Plant Water Consumption for Plants Located in the Upper Colorado River Basin (acre-feet)**

| <b>Plant Name</b> | <b>2012</b>   | <b>2013</b>   | <b>2014</b>   | <b>2015</b>   | <b>2016</b>   | <b>2017</b>   |
|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Hunter            | 18,266        | 17,001        | 16,662        | 16,386        | 14,225        | 15,383        |
| Huntington        | 10,423        | 10,643        | 10,240        | 9,888         | 9,189         | 9,653         |
| Naughton          | 8,745         | 9,622         | 7,484         | 7,215         | 6,896         | 6,927         |
| Jim Bridger       | 23,977        | 25,059        | 23,936        | 22,493        | 18,000        | 19,047        |
| <b>TOTAL</b>      | <b>61,411</b> | <b>62,325</b> | <b>58,322</b> | <b>55,982</b> | <b>48,310</b> | <b>51,010</b> |

Percent of total water consumption = 82.0



## APPENDIX H – STOCHASTIC PARAMETERS

### Introduction

For this IRP, PacifiCorp updated and re-estimated the stochastic parameters provided in the 2017 IRP for use in the Planning and Risk (PaR) model runs.

PaR, as used by PacifiCorp, develops portfolio cost scenarios via computational finance in concert with production simulation. The model stochastically shocks the case-specific underlying electricity price forecast as well as the corresponding case-specific key drivers (e.g., natural gas, loads, and hydro) and dispatches accordingly. Using exogenously calculated parameters (i.e., volatilities, mean reversions, and correlations), PaR develops scenarios that bracket the uncertainty surrounding a driver; statistical sampling techniques are then employed to limit the number of representative scenarios to 50. The stochastic model used in PaR is a two-factor (short- and long-run) mean reverting model.

PacifiCorp used short-run stochastic parameters for this Integrated Resource Plan (IRP); long-run parameters were set to zero since PaR cannot re-optimize its capacity expansion plan. This inability to re-optimize or add capacity can create a problem when dispatching to meet extreme load and/or fuel price excursions, as often seen in long-term stochastic modeling. Such extreme out-year price and load excursions can influence portfolio costs disproportionately while not reflecting plausible outcome. Thus, since long-term volatility is the year-on-year growth rate, only the expected yearly price and/or load growth is simulated over the forecast horizon<sup>1</sup>.

Key drivers that significantly affect the determination of prices tend to fall into two categories: loads and fuels. Targeting only key variables from each category simplifies the analysis while effectively capturing sensitivities on a larger number of individual variables. For instance, load uncertainty can encompass the sensitivities of weather, transmission availability, unit outages, and evolving end-uses. Depending on the region, fuel price uncertainty (especially natural gas) can encompass the sensitivities of weather, load growth, emissions, and hydro availability. The following sections summarize the development of stochastic process parameters and describe how these uncertain variables evolve over time.

### Overview

Long-term planning demands specification of how important variables behave over time. For the case of PacifiCorp's long-term planning, important variables include natural gas and electricity prices, regional loads, and regional hydro generation. Modeling these variables involves not only a description of their expected value over time as with a traditional forecast, but also a description of the spread of possible future values. The following sections summarize the development of stochastic process parameters to describe how these uncertain variables evolve over time<sup>2</sup>.

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<sup>1</sup> Mean reversion is assumed to be zero in the long run.

<sup>2</sup> A stochastic or random process is the counterpart to a deterministic process. Instead of dealing with only one possible reality of how the variables might evolve over time, there is some indeterminacy in the future evolution described by probability distributions.

## Volatility

The standard deviation<sup>3</sup>( $\sigma$ ) is a measure of how widely values are dispersed from the average value:

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \mu)^2}{(n - 1)}}$$

where  $\mu$  is the average value of the observations  $\{x_1, x_2, \dots, x_n\}$ , and  $n$  is the number of observations.

Volatility ( $\sigma_T$ ) incorporates a time component so a variable with constant volatility has a larger spread of possible outcomes two years in the future than one year in the future:

$$\sigma_T = \sigma\sqrt{T}$$

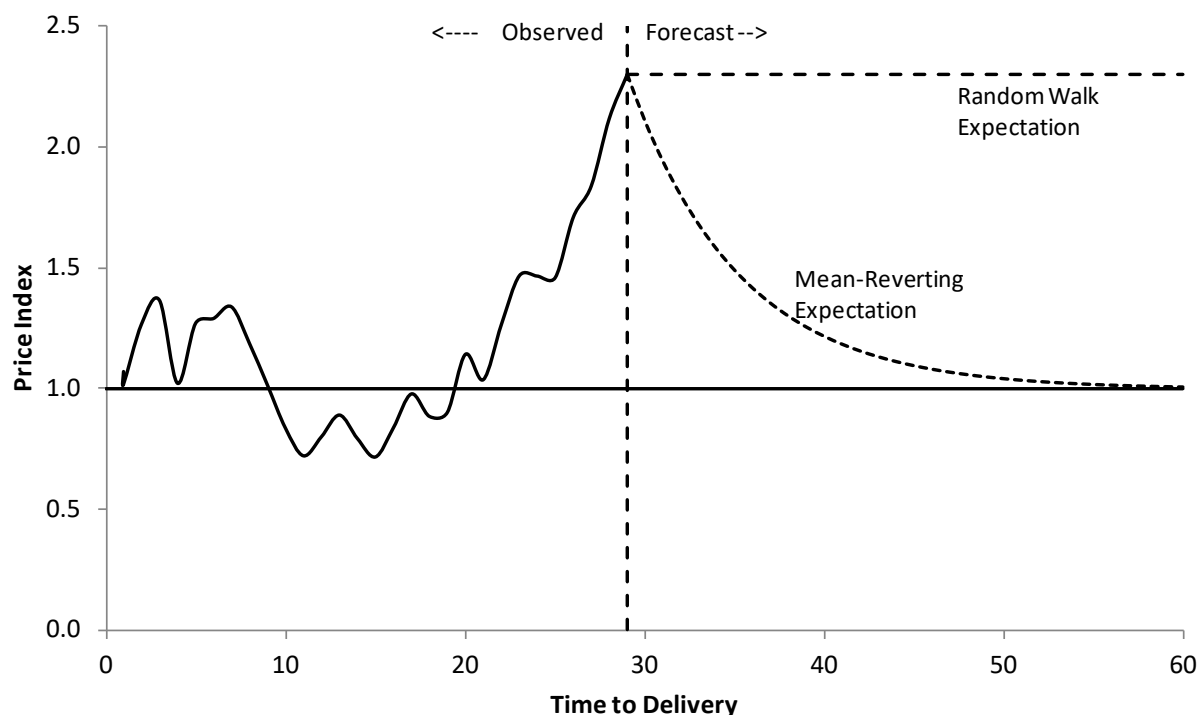
Volatilities are typically quoted on an annual basis but can be specified for any desired time period ( $T$ ). Suppose the annual volatility of load is two percent. This implies that the standard deviation of the range of possible loads a year from now is two percent, while the standard deviation four years from now is four percent.

## Mean Reversion

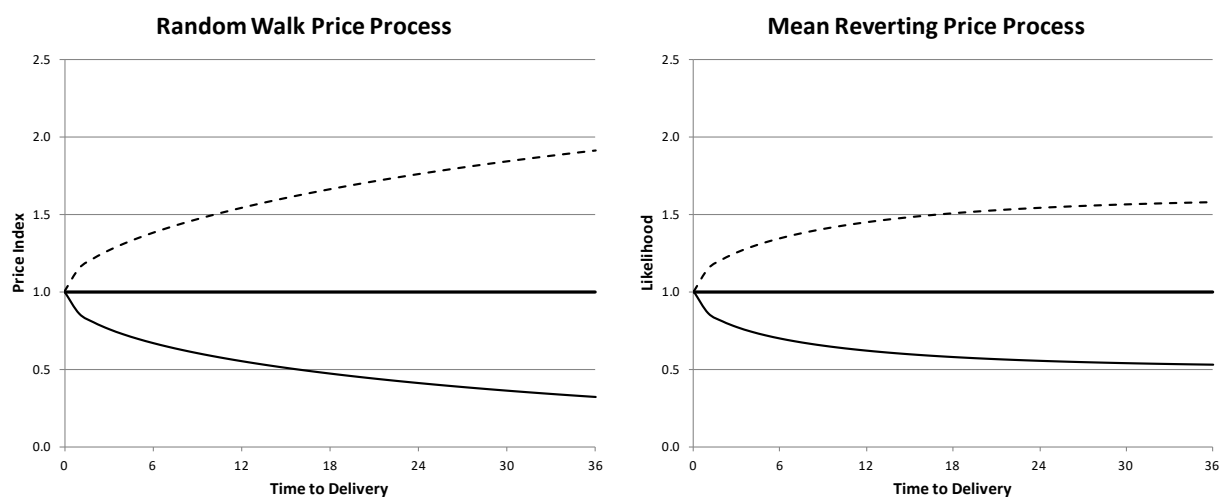
If volatility was constant over the forecast period, then the standard deviation would increase linearly with the square root of time. This is described as a "Random Walk" process and often provides a reasonable assumption for long-term uncertainty. However, for energy commodities as well as many other variables in the short-term, this is not typically the case. Excepting seasonal effects, the standard deviation increases less quickly with longer forecast time. This is called a mean reverting process - variable outcomes tend to revert back towards a long-term mean after experiencing a shock.

---

<sup>3</sup> "Standard Deviation" and "Variance" are standard statistical terms describing the spread of possible outcomes. The Variance equals the Standard Deviation squared.

**Figure H.1 – Stochastic Processes**

For a random walk process, the distribution of possible future outcomes continues to increase indefinitely, while for a mean reverting process, the distribution of possible outcomes reaches a steady-state. Actual observed outcomes will continue to vary within the distribution, but the distribution across all possible outcomes does not increase:

**Figure H.2 – Random Walk Price Process and Mean Reverting Process**

The volatility and mean reversion rate parameters combine to provide a compact description of the distribution of possible variable outcomes over time. The volatility describes the size of a typical shock or deviation for a particular variable and the mean reversion rate describes how quickly the variable moves back toward the long-run mean after experiencing a shock.

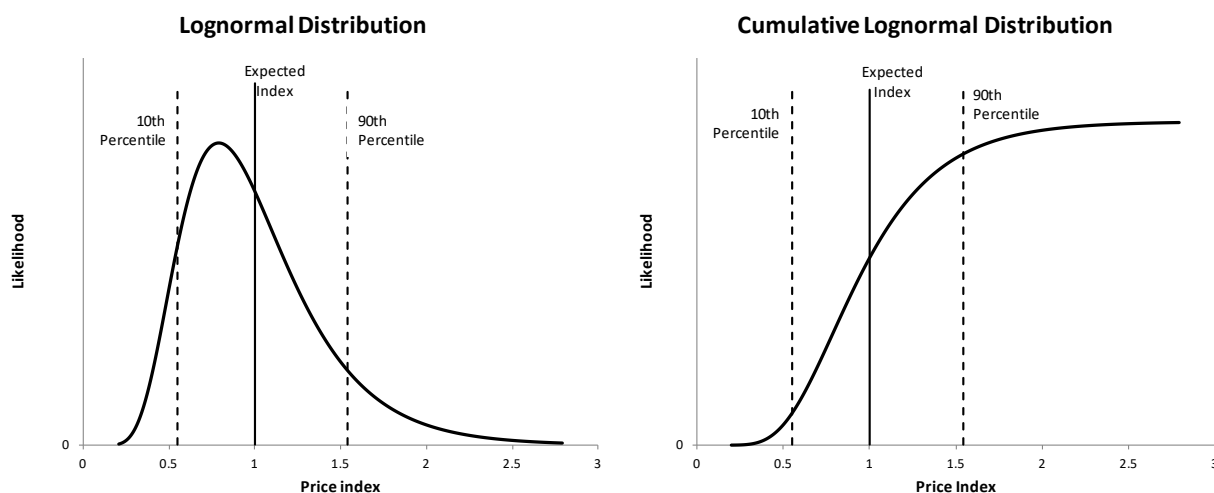
## Estimating Short-term Process Parameters

Short-term uncertainty can best be described as a mean reverting process. The factors that drive uncertainty in the short-term are generally short-lived, decaying back to long-run average levels. Short-term uncertainty is mainly driven by weather (temperature, windiness, rainfall) but can also be driven by short-term economic factors, congestion, outages, etc. The process for estimating short-term uncertainty parameters is similar for most variables of interest. However, each of PacifiCorp's variables have characteristics that make their processes slightly different. The process for estimating short-term uncertainty parameters is described in detail below for the most straightforward variable – natural gas prices. Each of the other variables is then discussed in terms of how they differ from the standard natural gas price parameter estimation process.

## Stochastic Process Description

The first step in developing process parameter estimates for any uncertain variable is to determine the form of the distribution and time step for uncertainty. In the case of natural gas, and for prices in general, the lognormal distribution is a good representation of possible future outcomes. A lognormal distribution is a continuous probability distribution of a random variable whose logarithm is normally distributed<sup>4</sup>. The lognormal distribution is often used to describe prices because it is bounded on the bottom by zero and has a long, asymmetric "tail" reflecting the possibility that prices could be significantly higher than the average:

**Figure H.3 – Lognormal Distribution and Cumulative Lognormal Distribution**



The time step for calculating uncertainty parameters depends on how quickly a variable can experience a significant change. Natural gas prices can change substantially from day-to-day and are reported on a daily basis, so the time step for analysis will be one day.

<sup>4</sup> A normal distribution is the most common continuous distribution represented by a bell-shaped curve that is symmetrical about the mean, or average, value.

All short-term parameters were calculated on a seasonal basis to reflect the different dynamics present during different seasons of the year. For instance, the volatility of gas prices is higher in the winter and lower in the spring and summer. Seasons were defined as follows:

**Table H.1 - Seasonal Definitions**

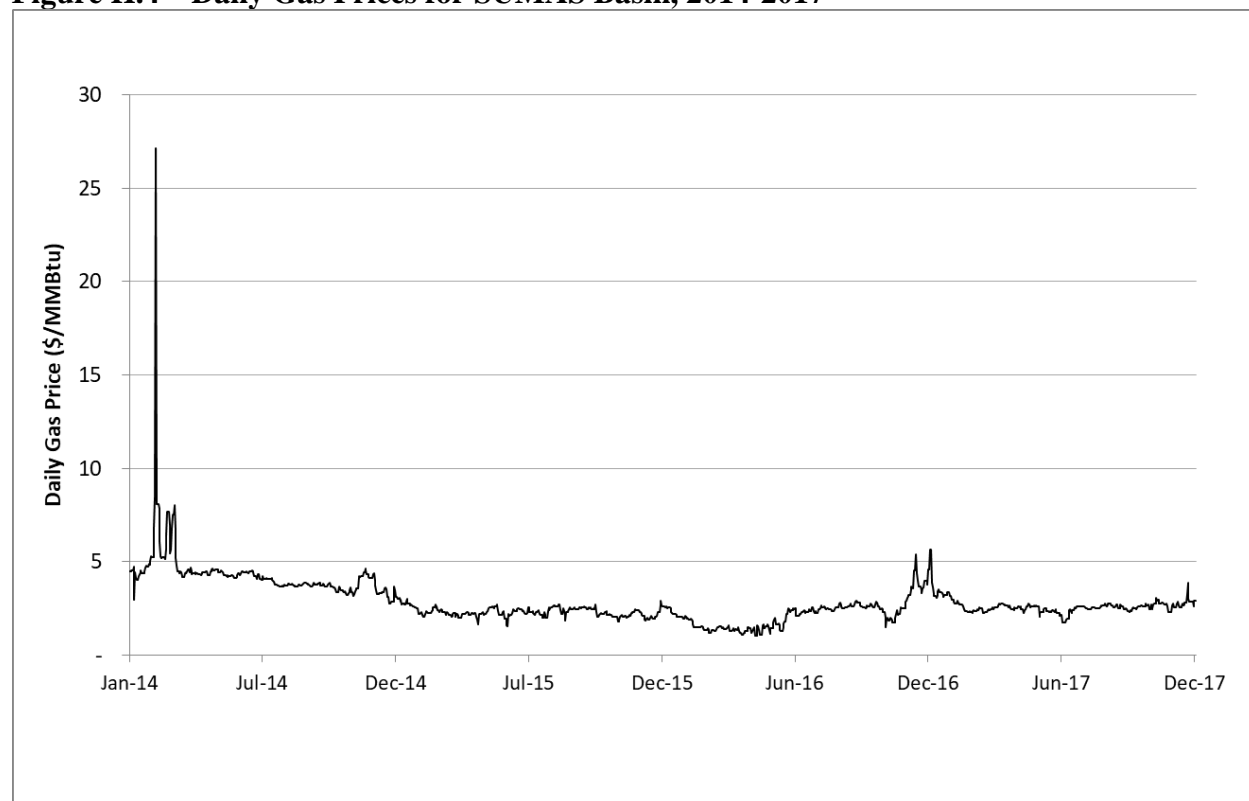
|        |                                  |
|--------|----------------------------------|
| Winter | December, January, and February  |
| Spring | March, April, and May            |
| Summer | June, July, and August           |
| Fall   | September, October, and November |

## Data Development

### *Basic Data Set:*

The natural gas price data was organized into a consistent dataset with one natural gas price for each gas delivery point reported for each delivery day. The data was checked to make sure that there were no missing or duplicate dates. If no price is reported for a particular date, the date is included but left blank to maintain a consistent 24-hour time step between all observed prices. Four years of daily data from 2014 to 2017 was used for this short-term parameter analysis. The following chart shows the resulting data set for the Sumas gas basin:

**Figure H.4 – Daily Gas Prices for SUMAS Basin, 2014-2017**



### *Development of Price Index:*

Uncertainty parameters are estimated by looking at the movement, or deviation, in prices from one day to the next. However, some of this movement is due to expected factors, not uncertainty. For instance, gas prices are expected to be higher during winter or as we move toward winter. This

expectation is already included in the gas price forecast and should not be considered a shock, or random event. In order to capture only the random or uncertain portion of price movements, a price index is developed that takes into account the expected portion of price movements. Three categories of price expectations are calculated:

Seasonal Average: The level of gas prices may be different from one year to the next. While this can be attributed to random movements or shocks in the gas markets, it is not a short-term event and should not be included in the short-term uncertainty process. In order to account for this possible difference in the level of gas prices, the average gas price for each season and year is calculated. For example, Sumas prices in the winter of 2014 average \$4.92/MMBtu.

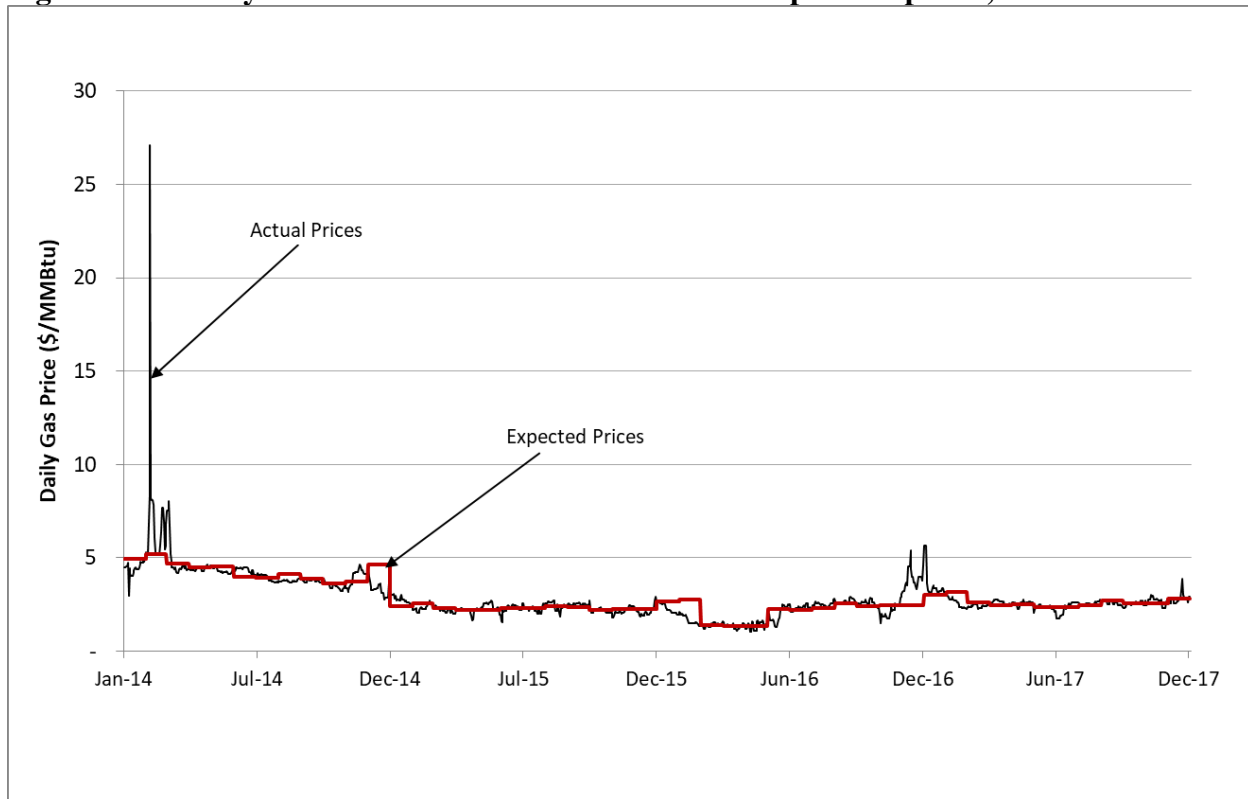
Monthly Average: Within a season, there are different expected prices by month. For instance, within the fall season, November gas prices are expected to be much higher than September and October prices as winter is just around the corner. A monthly factor representing the ratio of monthly prices to the seasonal average price is calculated. For example, February prices in Sumas are 106 percent of the winter average price.

Weekly Shape: Many variables exhibit a distinct shape across the week. For instance, loads and electricity prices are higher during the middle of the week and lower on the weekends. The expected shape of gas prices across the week was calculated and found to be insignificant (expected variation by weekday did not exceed two percent of the weekly average).

These three components – seasonal average, monthly shape, and weekly shape – combine to form an expected price for each day. For example, the expected price of gas in Sumas in February of 2014 was \$5.22/MMBtu, the product of the seasonal average and the monthly shape factor

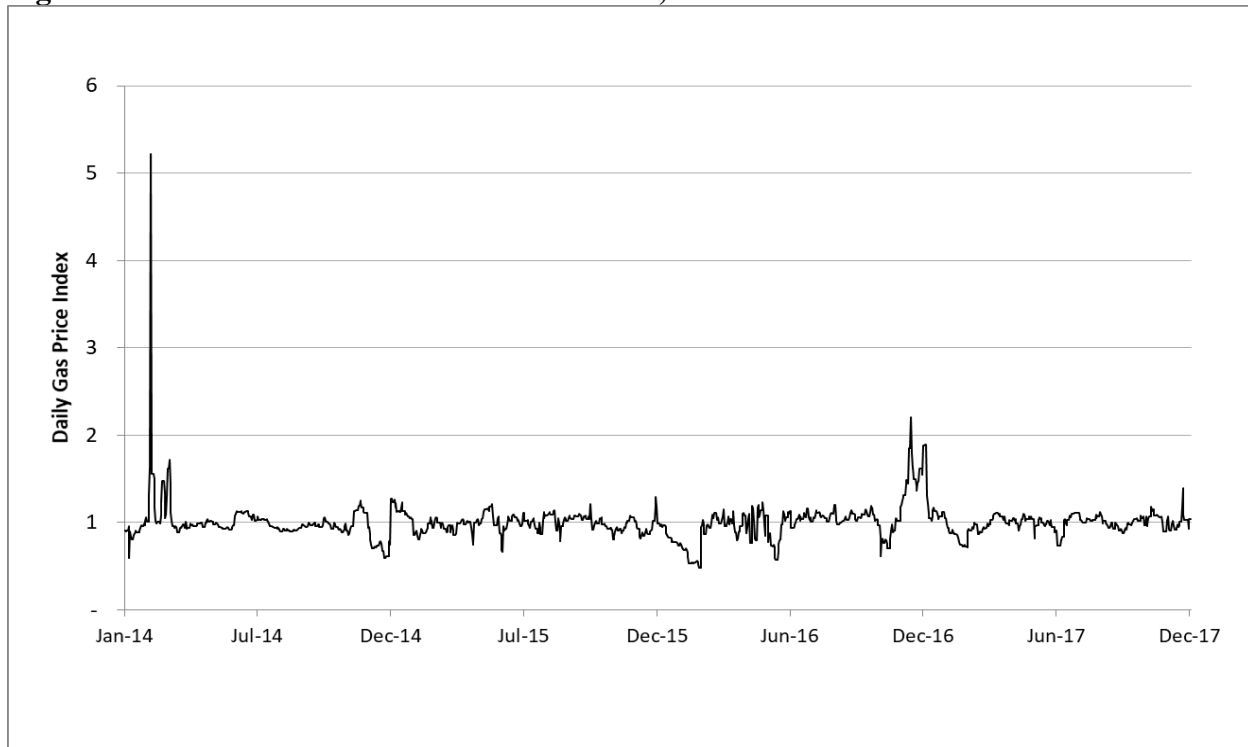
$$\text{Expected Gas Price} = \text{Seasonal Avg. Price} * \text{Monthly Shape within the Season}$$

The following chart shows the comparison of the actual Sumas prices with the "expected" prices:

**Figure H.5 – Daily Gas Prices for SUMAS Basin with "expected" prices, 2014-2017**

Dividing the actual gas prices by the expected prices forms a price index that averages one. This index, illustrated by the chart below, captures only the random component of price movements—the portion not explained by expected seasonal, monthly, and weekly shape.



**Figure H.6 – Gas Price Index for SUMAS Basin, 2014-2017**

### Parameter Estimation – Autoregressive Model

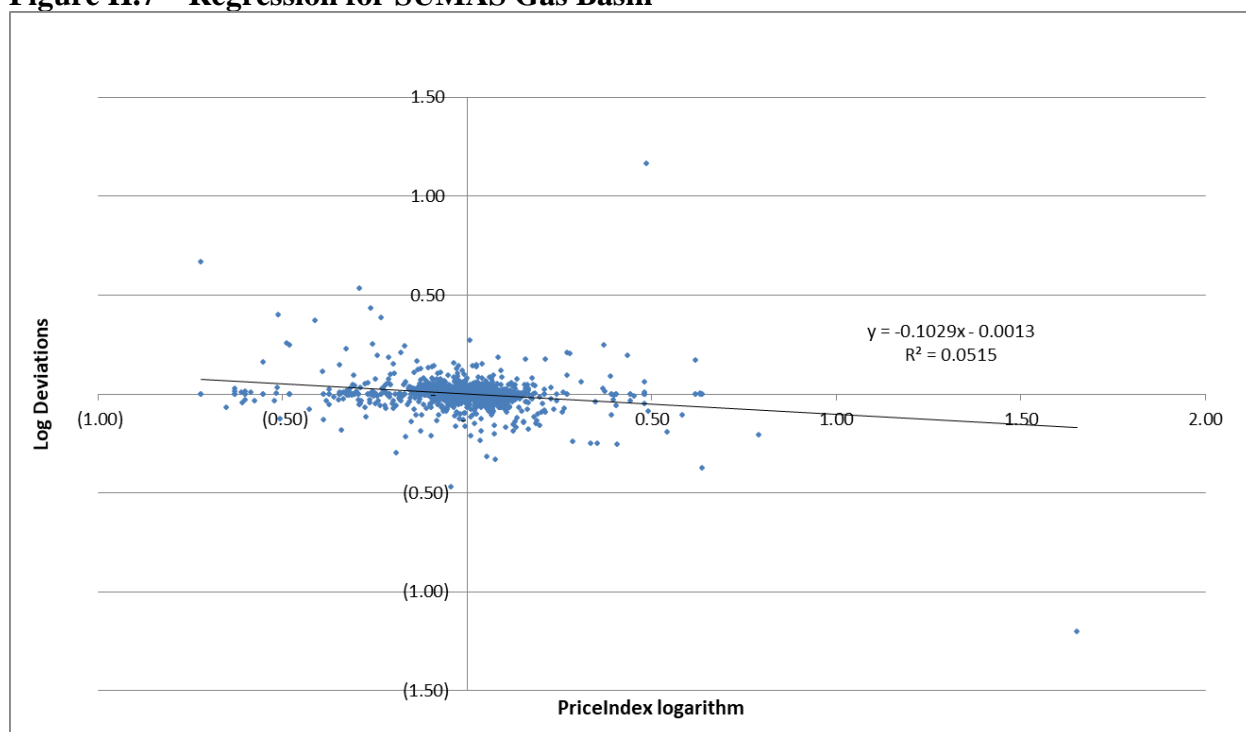
Uncertainty parameters are calculated for each variable by regressing the movement of each region's price index compared to the previous day's index.

#### Step 1 - Calculate Log Deviation of Price Index

Since gas prices are lognormally distributed, the regression analysis is performed on the natural log of prices and their log deviations. The log deviations are simply the differences between the natural log of one day's price index and the natural log of the previous day's price index.

#### Step 2 - Perform Regression

The log deviations of price index are regressed against the previous day's logarithm of price index for each season as well as for the entire data set. The following chart shows the log of the price index versus the log deviations for Sumas gas for all seasons and the resulting regression equation:

**Figure H.7 – Regression for SUMAS Gas Basin****Step 3 - Interpret the Results**

The *INTERCEPT* of the regression represents the log of the long-run mean. So in this case, the intercept is approximately zero, implying that the long-run mean is equal to one. This is consistent with the way in which the price index is formulated.

The *SLOPE* of the regression is related to the auto correlation and mean reversion rate:

$$\begin{aligned} \text{auto correlation} &= \emptyset = 1 + \text{slope} \\ \text{Mean Reversion Rate } \alpha &= -\ln(\emptyset) \end{aligned}$$

The autocorrelation measures how much of the price shock from the previous time period remains in the next time period. For instance, if the autocorrelation is 0.4 and gas prices yesterday experienced a 10 percent jump over the norm, today's expected price would be 4 percent higher than normal. In addition, today's gas price will experience a shock today that may result in prices higher or lower than this expectation. The mean reversion rate expresses the same thing in a different manner. The higher the mean reversion rate, the faster prices revert to the long-run mean.

The last component of the regression analysis is the *STANDARD ERROR* or *STEYX*. This measures the portion of the price movements not explained by mean reversion and is the estimate of the variable's volatility.

Both the mean reversion rate and volatility calculated with this process are daily parameters and can be applied directly to daily movements in gas prices.

**Step 4 - Results**

The natural gas price parameters derived through this process are reported in the table below.

**Table H.2 - Uncertainty Parameters for Natural Gas**

|                           | Winter | Spring | Summer | Fall  |
|---------------------------|--------|--------|--------|-------|
| <b>KERN OPAL</b>          |        |        |        |       |
| Daily Volatility          | 11.14% | 3.90%  | 2.46%  | 3.62% |
| Daily Mean Reversion Rate | 0.110  | 0.152  | 0.102  | 0.071 |
| <b>SUMAS</b>              |        |        |        |       |
| Daily Volatility          | 12.00% | 6.07%  | 4.87%  | 4.38% |
| Daily Mean Reversion Rate | 0.092  | 0.265  | 0.105  | 0.107 |

## Electricity Price Process

For the most part, electricity prices behave very similarly to natural gas prices. The lognormal distribution is generally a good assumption for electricity. While electricity prices do occasionally go below zero, this is not common enough to be worth using the Normal distribution assumption, and the distribution of electricity prices is often skewed upwards. In fact, even the lognormal assumption is sometimes inadequate for capturing the tail of the electricity price distribution. Similar to gas prices, electricity price can experience substantial change from one day to the next, so a daily time step should be used.

### *Basic Data Set:*

The electricity price data was organized into a consistent dataset with one price for each region reported for each delivery day, similar to gas prices. The data covers the 2014 through 2017 time period. However, electricity prices are reported for "High Load Level" periods (16 hours for six days a week) and "Low Load Level" periods (eight hours for six days a week and 24 hours on Sunday & NERC holidays). In order to have a consistent price definition, a composite price, calculated based on 16 hours of peak and eight hours of off-peak prices, is used for Monday through Saturday. The Low Load Level price was used for Sundays since that already reflects the 24 hour price. Missing and duplicate data is handled in a fashion similar to gas prices. Illiquid delivery point prices are filled using liquid hub prices as reference. Mid-C is the most liquid market in PACW, so missing prices for COB are filled using the latest available spread between COB and Mid-C markets. Similarly, Four Corner prices are filled using Palo Verde prices.

### *Development of Price Index:*

As with gas prices, an electricity price index was developed which accounts for the expected components of price movements. The "expected" electricity price incorporates all three possible adjustments: seasonal average, monthly shape and weekly shape. For instance, the expected price for January 2, 2014 in the Four Corners region was \$43.12/megawatt hours (MWh). This price incorporates the 2014 winter average price of \$39.14/MWh times the monthly shape factor for January of 102 percent and the weekday index for Thursday of 108 percent. The following chart shows the Four Corners actual and expected electricity prices over the analysis time period.

**Figure H.8 – Daily Electricity Prices for Four Corners, 2014-2017**

### *Electricity Price Uncertainty Parameters*

Uncertainty parameters are calculated for each electric region, similar to the process for gas prices. The electricity price parameters derived through this process are reported in the table below.

**Table H.3 - Uncertainty Parameters for Electricity Regions**

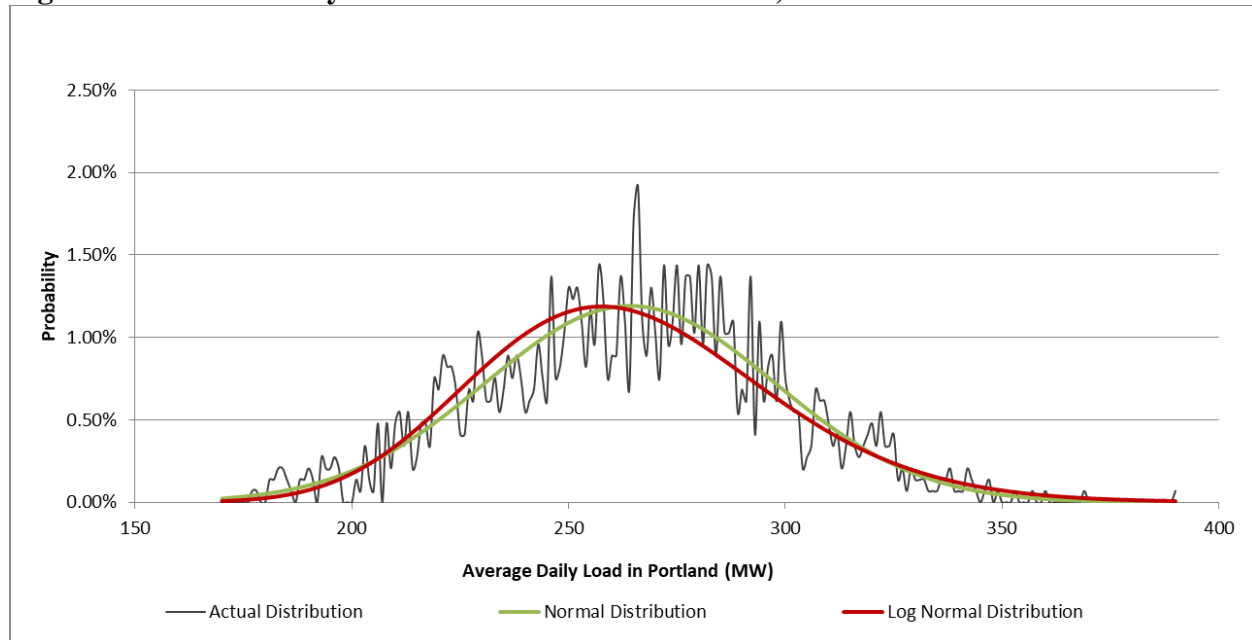
|                           | Winter | Spring | Summer | Fall   |
|---------------------------|--------|--------|--------|--------|
| <b>Four Corners</b>       |        |        |        |        |
| Daily Volatility          | 9.84%  | 10.41% | 15.47% | 10.13% |
| Daily Mean Reversion Rate | 0.125  | 0.434  | 0.338  | 0.370  |
| <b>CA-OR Border</b>       |        |        |        |        |
| Daily Volatility          | 13.44% | 26.13% | 29.97% | 10.19% |
| Daily Mean Reversion Rate | 0.119  | 0.551  | 0.463  | 0.257  |
| <b>Mid-Columbia</b>       |        |        |        |        |
| Daily Volatility          | 16.55% | 47.46% | 21.28% | 10.34% |
| Daily Mean Reversion Rate | 0.140  | 0.551  | 0.271  | 0.279  |
| <b>Palo Verde</b>         |        |        |        |        |
| Daily Volatility          | 9.22%  | 7.46%  | 14.08% | 9.83%  |
| Daily Mean Reversion Rate | 0.110  | 0.211  | 0.220  | 0.415  |

### **Regional Load Process**

There are only two significant differences between the uncertainty analysis for regional loads and natural gas prices. The distribution of daily loads is somewhat better represented by a normal distribution rather than a lognormal distribution, and, similar to electricity prices, loads have a significant expected shape across the week. The chart below shows the distribution of historical

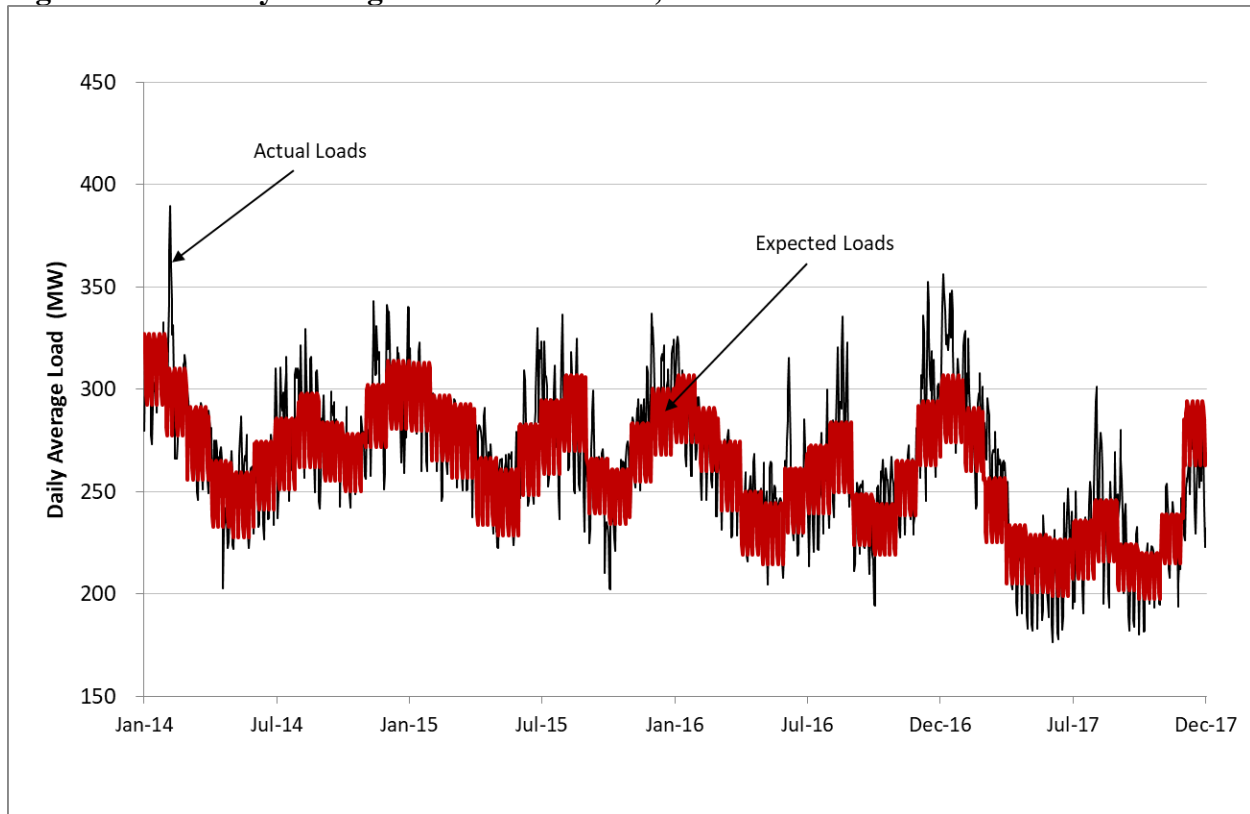
load outcomes for the Portland area as well as normal and lognormal distribution functions representing load possibilities. Both distributions do a reasonable job of representing the spread of possible load outcomes, but the tail of the lognormal distribution implies the possibility of higher loads than is supported by the historical data.

**Figure H.9 – Probability Distribution for Portland Load, 2014-2017**



*Development of Load Index:*

As with electricity prices, a load index was developed which accounts for the expected components of load movements, incorporating all three possible adjustments. For instance, the expected load for January 2, 2014 in Portland was 324 megawatts (MW). This load incorporates the 2014 winter average load of 305 MW times the monthly shape factor for January of 103 percent and the weekday index for Thursday also of 103 percent. The following chart shows the Portland actual and expected loads over the analysis time period.

**Figure H.10 – Daily Average Load for Portland, 2014-2017***Load Uncertainty Parameters:*

Uncertainty parameters are calculated for each load region, similar to the process for gas and electricity prices. Since loads are modeled as normally, rather than log-normally distributed, deviations are simply calculated as the difference between the load index and the previous day's index.

The uncertainty parameters for regional loads derived through this process are reported in the table below.

**Table H.4 - Uncertainty Parameters for Load Regions**

|                           | Winter | Spring | Summer | Fall  |
|---------------------------|--------|--------|--------|-------|
| <b>California</b>         |        |        |        |       |
| Daily Volatility          | 4.7%   | 4.2%   | 3.8%   | 4.9%  |
| Daily Mean Reversion Rate | 0.268  | 0.218  | 0.185  | 0.311 |
| <b>Idaho</b>              |        |        |        |       |
| Daily Volatility          | 3.5%   | 6.5%   | 5.1%   | 4.2%  |
| Daily Mean Reversion Rate | 0.153  | 0.204  | 0.095  | 0.218 |
| <b>Portland</b>           |        |        |        |       |
| Daily Volatility          | 3.9%   | 3.3%   | 5.0%   | 3.9%  |
| Daily Mean Reversion Rate | 0.177  | 0.241  | 0.280  | 0.242 |
| <b>Oregon Other</b>       |        |        |        |       |
| Daily Volatility          | 4.2%   | 3.4%   | 4.2%   | 4.2%  |
| Daily Mean Reversion Rate | 0.182  | 0.379  | 0.195  | 0.253 |
| <b>Utah</b>               |        |        |        |       |
| Daily Volatility          | 2.1%   | 2.8%   | 4.5%   | 3.5%  |
| Daily Mean Reversion Rate | 0.363  | 0.595  | 0.213  | 0.249 |
| <b>Washington</b>         |        |        |        |       |
| Daily Volatility          | 5.3%   | 3.7%   | 5.0%   | 4.3%  |
| Daily Mean Reversion Rate | 0.181  | 0.341  | 0.157  | 0.203 |
| <b>Wyoming</b>            |        |        |        |       |
| Daily Volatility          | 1.6%   | 1.8%   | 1.6%   | 1.7%  |
| Daily Mean Reversion Rate | 0.273  | 0.254  | 0.235  | 0.267 |

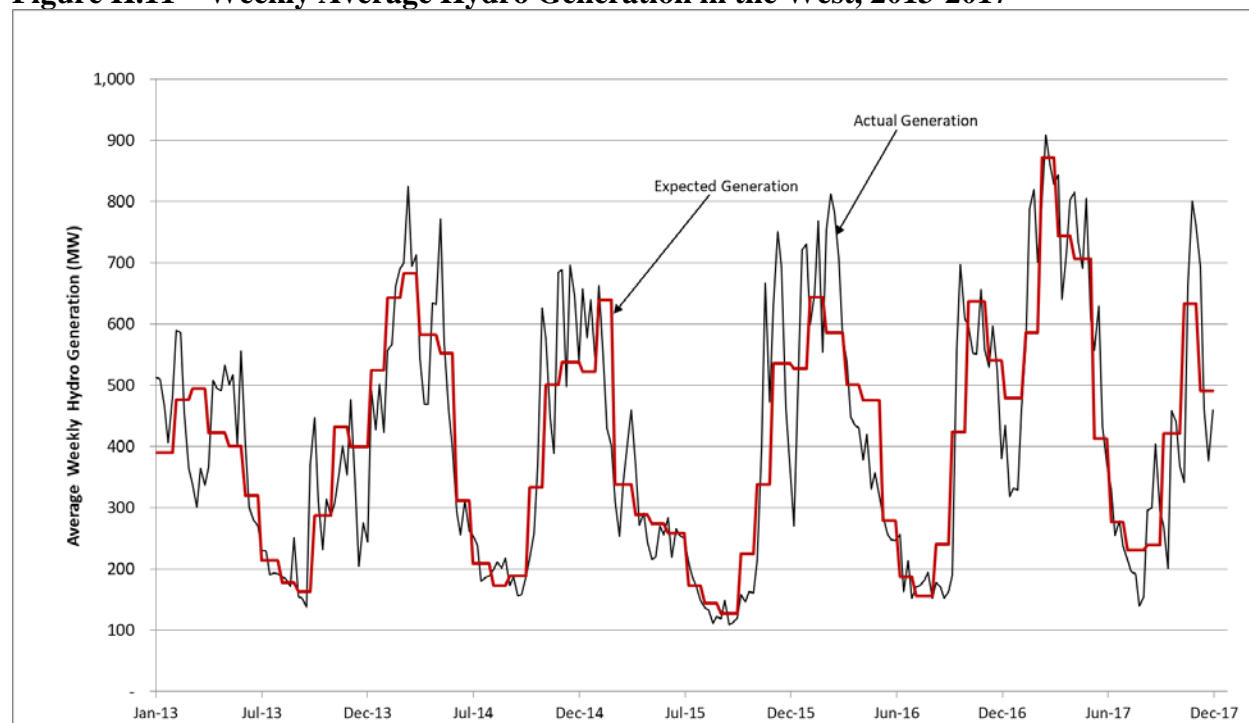
## Hydro Generation Process

There are two differences between the uncertainty analysis for hydro generation and natural gas prices. Hydro generation varies on a slower time frame than other variables analyzed. As such, average hydro generation is calculated and analyzed on a weekly, rather than daily, basis. Generation is calculated as the average hourly generation across the 168 hours in a week. The hydro analysis covers the 2013 through 2017 time period.

### *Development of Hydro Index:*

A hydro generation index was developed which accounts for the expected components of hydro movements, incorporating seasonal and monthly adjustments. For instance, the expected hydro generation for the week of January 1, 2013 through January 7, 2013 in the Western Region was 388 MW. This generation incorporates the 2013 winter average generation of 422 MW times the monthly shape factor for January of 92 percent. The following chart shows the western hydro actual and expected generation over the analysis time period.



**Figure H.11 – Weekly Average Hydro Generation in the West, 2013-2017**

*Hydro Generation Uncertainty Parameters:*

Uncertainty parameters are calculated for each hydro region, similar to the process for gas and electricity prices. The uncertainty parameters for hydro generation derived through this process are reported in the table below.

**Table H.5 - Uncertainty Parameters for Hydro Generation**

|                            | Winter | Spring | Summer | Fall   |
|----------------------------|--------|--------|--------|--------|
| Weekly Volatility          | 21.15% | 16.17% | 16.78% | 30.08% |
| Weekly Mean Reversion Rate | 0.63   | 0.50   | 1.51   | 0.86   |

### Short-term Correlation Estimation

Correlation is a measure of how much the random component of variables tend to move together. After the uncertainty analysis has been performed, the process for estimating correlations is relatively straight-forward.

#### Step 1 - Calculate Residual Errors

Calculate the residual errors of the regression analysis for all of the variables. The residual error represents the random portion of the deviation not explained by mean reversion. It is calculated for each time period as the difference between the actual value and the value predicted by the linear regression equation:

$$\text{Error} = \text{Actual Deviation} - (\text{Slope} * \text{Previous Deviation} + \text{Intercept})$$

All of the residual errors are compiled by delivery date.

## Step 2 - Calculate Correlations

Correlate the residual errors of each pair of variables:

$$\text{Correlation}(X, Y) = \frac{\sum_i^n [(x_i - x_{avg.}) * (y_i - y_{avg.})]}{\sqrt{\sum_i^n (x_i - x_{avg.})^2 * \sum_i^n (y_i - y_{avg.})^2}}$$

There are a few things to note about the correlation calculations. First, correlation data must always be organized so that the same time period is being compared for both variables. For instance, weekly hydro deviations cannot be compared to daily gas price deviations. Thus, a daily regression analysis was performed for the hydro variables.

Also, note that what is being correlated are the residual errors of the regression – only the uncertain portion of the variable movements. Variables may exhibit similar expected shapes – both loads and electricity prices are higher during the week than on the weekend. This coincidence is captured in the expected weekly shapes input into the planning model. The correlation calculated here captures the extent to which the shocks experienced by two different variables tend to have similar direction and magnitude. The resulting short-term correlations by season are reported below.

**Table H.6 - Short-term Winter Correlations**

### SHORT-TERM WINTER CORRELATIONS

|          | K-O  | SUMAS | 4C   | COB  | Mid-C | PV   | CA   | ID   | Portland | OR Other | UT   | WA   | WY   | Hydro |
|----------|------|-------|------|------|-------|------|------|------|----------|----------|------|------|------|-------|
| K-O      | 100% | 89%   | 63%  | 35%  | 38%   | 66%  | 3%   | 14%  | 20%      | 13%      | 10%  | 24%  | 10%  | 5%    |
| SUMAS    | 89%  | 100%  | 57%  | 40%  | 42%   | 61%  | 5%   | 17%  | 17%      | 14%      | 8%   | 22%  | 12%  | 6%    |
| 4C       | 63%  | 57%   | 100% | 58%  | 57%   | 83%  | 10%  | 15%  | 27%      | 27%      | 20%  | 29%  | 12%  | 3%    |
| COB      | 35%  | 40%   | 58%  | 100% | 94%   | 61%  | 14%  | 19%  | 30%      | 37%      | 21%  | 43%  | 19%  | 6%    |
| Mid-C    | 38%  | 42%   | 57%  | 94%  | 100%  | 59%  | 14%  | 21%  | 36%      | 40%      | 25%  | 46%  | 24%  | 2%    |
| PV       | 66%  | 61%   | 83%  | 61%  | 59%   | 100% | 10%  | 10%  | 24%      | 23%      | 17%  | 29%  | 12%  | 3%    |
| CA       | 3%   | 5%    | 10%  | 14%  | 14%   | 10%  | 100% | 24%  | 27%      | 66%      | 35%  | 32%  | 21%  | -4%   |
| ID       | 14%  | 17%   | 15%  | 19%  | 21%   | 10%  | 24%  | 100% | 23%      | 30%      | 32%  | 31%  | 34%  | -11%  |
| Portland | 20%  | 17%   | 27%  | 30%  | 36%   | 24%  | 27%  | 23%  | 100%     | 67%      | 48%  | 65%  | 30%  | -4%   |
| OR Other | 13%  | 14%   | 27%  | 37%  | 40%   | 23%  | 66%  | 30%  | 67%      | 100%     | 49%  | 65%  | 29%  | 3%    |
| UT       | 10%  | 8%    | 20%  | 21%  | 25%   | 17%  | 35%  | 32%  | 48%      | 49%      | 100% | 49%  | 38%  | -8%   |
| WA       | 24%  | 22%   | 29%  | 43%  | 46%   | 29%  | 32%  | 31%  | 65%      | 65%      | 49%  | 100% | 34%  | 15%   |
| WY       | 10%  | 12%   | 12%  | 19%  | 24%   | 12%  | 21%  | 34%  | 30%      | 29%      | 38%  | 34%  | 100% | -2%   |
| Hydro    | 5%   | 6%    | 3%   | 6%   | 2%    | 3%   | -4%  | -11% | -4%      | 3%       | -8%  | 15%  | -2%  | 100%  |

Deviation events that impact one part of PacifiCorp's system do not necessarily affect other parts of the system, due to its geographic diversity and transmission constraints. The correlation between these different deviations can be low if the deviations are caused by different drivers. An example from the winter season is the -11 percent correlation between the Southeast Idaho load area, which is driven by weather events in PacifiCorp's PACE balancing area, and Hydro, which is predominantly driven by weather events in PacifiCorp's PACW balancing area, the unit commitment stack and unplanned unit outages.

**Table H.7 - Short-term Spring Correlations****SHORT-TERM SPRING CORRELATIONS**

|          | K-O  | SUMAS | 4C   | COB  | Mid-C | PV   | CA   | ID   | Portland | OR Other | UT   | WA   | WY   | Hydro |
|----------|------|-------|------|------|-------|------|------|------|----------|----------|------|------|------|-------|
| K-O      | 100% | 55%   | 20%  | 10%  | 7%    | 33%  | 7%   | 7%   | 2%       | 0%       | 7%   | 5%   | 1%   | 3%    |
| SUMAS    | 55%  | 100%  | 6%   | 8%   | 7%    | 13%  | 10%  | 2%   | 4%       | 3%       | -5%  | 8%   | 3%   | 2%    |
| 4C       | 20%  | 6%    | 100% | 34%  | 36%   | 62%  | 0%   | 7%   | 7%       | 6%       | 15%  | 12%  | 11%  | -9%   |
| COB      | 10%  | 8%    | 34%  | 100% | 86%   | 39%  | 13%  | -3%  | 24%      | 21%      | 8%   | 31%  | 13%  | 0%    |
| Mid-C    | 7%   | 7%    | 36%  | 86%  | 100%  | 31%  | 13%  | 1%   | 26%      | 21%      | 11%  | 29%  | 15%  | 0%    |
| PV       | 33%  | 13%   | 62%  | 39%  | 31%   | 100% | 3%   | 16%  | 17%      | 14%      | 24%  | 24%  | 15%  | -3%   |
| CA       | 7%   | 10%   | 0%   | 13%  | 13%   | 3%   | 100% | 18%  | 20%      | 55%      | 17%  | 33%  | 9%   | -1%   |
| ID       | 7%   | 2%    | 7%   | -3%  | 1%    | 16%  | 18%  | 100% | 6%       | 20%      | 43%  | 20%  | 17%  | -17%  |
| Portland | 2%   | 4%    | 7%   | 24%  | 26%   | 17%  | 20%  | 6%   | 100%     | 63%      | 22%  | 57%  | 27%  | 11%   |
| OR Other | 0%   | 3%    | 6%   | 21%  | 21%   | 14%  | 55%  | 20%  | 63%      | 100%     | 31%  | 65%  | 23%  | 10%   |
| UT       | 7%   | -5%   | 15%  | 8%   | 11%   | 24%  | 17%  | 43%  | 22%      | 31%      | 100% | 25%  | 30%  | -11%  |
| WA       | 5%   | 8%    | 12%  | 31%  | 29%   | 24%  | 33%  | 20%  | 57%      | 65%      | 25%  | 100% | 24%  | 18%   |
| WY       | 1%   | 3%    | 11%  | 13%  | 15%   | 15%  | 9%   | 17%  | 27%      | 23%      | 30%  | 24%  | 100% | -1%   |
| Hydro    | 3%   | 2%    | -9%  | 0%   | 0%    | -3%  | -1%  | -17% | 11%      | 10%      | -11% | 18%  | -1%  | 100%  |

Similarly, the spring season shows a very low correlation of nine percent between the Northern California and Wyoming loads, which are driven by different local weather deviations and different customer types. Wyoming loads are mostly driven by large industrial customers, whose loads are relatively flat across the year.

**Table H.8 - Short-term Summer Correlations****SHORT-TERM SUMMER CORRELATIONS**

|          | K-O  | SUMAS | 4C   | COB  | Mid-C | PV   | CA   | ID   | Portland | OR Other | UT   | WA   | WY   | Hydro |
|----------|------|-------|------|------|-------|------|------|------|----------|----------|------|------|------|-------|
| K-O      | 100% | 45%   | 5%   | 0%   | 2%    | 0%   | 0%   | 5%   | -3%      | -3%      | 8%   | 4%   | -4%  | -1%   |
| SUMAS    | 45%  | 100%  | 5%   | 5%   | 10%   | 1%   | -1%  | -5%  | 3%       | 0%       | -4%  | 5%   | -7%  | 0%    |
| 4C       | 5%   | 5%    | 100% | 27%  | 29%   | 52%  | 21%  | 11%  | 17%      | 17%      | 21%  | 18%  | 13%  | -4%   |
| COB      | 0%   | 5%    | 27%  | 100% | 85%   | 44%  | 15%  | 16%  | 32%      | 28%      | 9%   | 28%  | 8%   | 7%    |
| Mid-C    | 2%   | 10%   | 29%  | 85%  | 100%  | 51%  | 22%  | 16%  | 48%      | 45%      | 15%  | 38%  | 4%   | 4%    |
| PV       | 0%   | 1%    | 52%  | 44%  | 51%   | 100% | 22%  | 16%  | 28%      | 25%      | 25%  | 20%  | 16%  | 5%    |
| CA       | 0%   | -1%   | 21%  | 15%  | 22%   | 22%  | 100% | 39%  | 33%      | 55%      | 30%  | 47%  | 14%  | -3%   |
| ID       | 5%   | -5%   | 11%  | 16%  | 16%   | 16%  | 39%  | 100% | 18%      | 27%      | 47%  | 26%  | 22%  | 5%    |
| Portland | -3%  | 3%    | 17%  | 32%  | 48%   | 28%  | 33%  | 18%  | 100%     | 80%      | 11%  | 68%  | -5%  | 16%   |
| OR Other | -3%  | 0%    | 17%  | 28%  | 45%   | 25%  | 55%  | 27%  | 80%      | 100%     | 20%  | 78%  | 1%   | 9%    |
| UT       | 8%   | -4%   | 21%  | 9%   | 15%   | 25%  | 30%  | 47%  | 11%      | 20%      | 100% | 24%  | 48%  | -7%   |
| WA       | 4%   | 5%    | 18%  | 28%  | 38%   | 20%  | 47%  | 26%  | 68%      | 78%      | 24%  | 100% | 4%   | 9%    |
| WY       | -4%  | -7%   | 13%  | 8%   | 4%    | 16%  | 14%  | 22%  | -5%      | 1%       | 48%  | 4%   | 100% | -11%  |
| Hydro    | -1%  | 0%    | -4%  | 7%   | 4%    | 5%   | -3%  | 5%   | 16%      | 9%       | -7%  | 9%   | -11% | 100%  |

In the summer season, zero correlation has been observed between the deviations of Kern-Opal gas prices and Palo Verde power prices. Palo Verde prices are driven by a resource mix of southwest nuclear operations and gas unit dispatch based off SoCal gas prices. The operations of gas storage facilities and physical planned and unplanned maintenance of Kern-Opal and SoCal pipelines are independent of each other.

**Table H.9 - Short-term Fall Correlations****SHORT-TERM FALL CORRELATIONS**

|          | K-O  | SUMAS | 4C   | COB  | Mid-C | PV   | CA   | ID   | Portland | OR Other | UT   | WA   | WY   | Hydro |
|----------|------|-------|------|------|-------|------|------|------|----------|----------|------|------|------|-------|
| K-O      | 100% | 73%   | 14%  | 15%  | 12%   | 13%  | 15%  | 6%   | 11%      | 19%      | 11%  | 17%  | 7%   | 2%    |
| SUMAS    | 73%  | 100%  | 10%  | 13%  | 13%   | 7%   | 28%  | 10%  | 25%      | 33%      | 24%  | 32%  | 22%  | 4%    |
| 4C       | 14%  | 10%   | 100% | 36%  | 22%   | 53%  | 19%  | 10%  | 23%      | 20%      | 21%  | 21%  | 4%   | -4%   |
| COB      | 15%  | 13%   | 36%  | 100% | 78%   | 63%  | 9%   | 2%   | 24%      | 16%      | 24%  | 19%  | 3%   | -2%   |
| Mid-C    | 12%  | 13%   | 22%  | 78%  | 100%  | 44%  | 10%  | 8%   | 22%      | 18%      | 19%  | 22%  | 3%   | -4%   |
| PV       | 13%  | 7%    | 53%  | 63%  | 44%   | 100% | 9%   | 9%   | 16%      | 7%       | 20%  | 9%   | -5%  | 1%    |
| CA       | 15%  | 28%   | 19%  | 9%   | 10%   | 9%   | 100% | 29%  | 47%      | 70%      | 34%  | 54%  | 38%  | -5%   |
| ID       | 6%   | 10%   | 10%  | 2%   | 8%    | 9%   | 29%  | 100% | 19%      | 25%      | 41%  | 25%  | 24%  | -12%  |
| Portland | 11%  | 25%   | 23%  | 24%  | 22%   | 16%  | 47%  | 19%  | 100%     | 78%      | 45%  | 73%  | 39%  | 12%   |
| OR Other | 19%  | 33%   | 20%  | 16%  | 18%   | 7%   | 70%  | 25%  | 78%      | 100%     | 45%  | 83%  | 47%  | 7%    |
| UT       | 11%  | 24%   | 21%  | 24%  | 19%   | 20%  | 34%  | 41%  | 45%      | 45%      | 100% | 44%  | 44%  | -1%   |
| WA       | 17%  | 32%   | 21%  | 19%  | 22%   | 9%   | 54%  | 25%  | 73%      | 83%      | 44%  | 100% | 42%  | 9%    |
| WY       | 7%   | 22%   | 4%   | 3%   | 3%    | -5%  | 38%  | 24%  | 39%      | 47%      | 44%  | 42%  | 100% | 4%    |
| Hydro    | 2%   | 4%    | -4%  | -2%  | -4%   | 1%   | -5%  | -12% | 12%      | 7%       | -1%  | 9%   | 4%   | 100%  |

In the fall, a very low correlation of three percent has been observed between Mid-C market price deviations and Wyoming load deviations. Market deviations are due to deviations in northwest weather patterns and resource mix while Wyoming loads are mostly dictated by planned or unplanned outages of industrial customer class.

# APPENDIX I - PLANNING RESERVE MARGIN STUDY

## Introduction

The planning reserve margin (PRM), measured as a percentage of coincident system peak load, is a parameter used in resource planning to ensure there are adequate resources to meet forecasted load over time. PacifiCorp selects a PRM for use in its resource planning by studying the relationship between cost and reliability among eight different PRM levels, accounting for variability and uncertainty in load and generation resources.<sup>1</sup> Costs include capital and run-rate fixed costs for new resources required to achieve eight different PRM levels, ranging from 11 to 18 percent, along with system production costs (fuel and non-fuel variable operating costs, contract costs, and market purchases). In analyzing reliability, PacifiCorp performed a stochastic loss of load study using the Planning and Risk (PaR) production cost simulation model to calculate the following reliability metrics for each PRM level:

- **Expected Unserved Energy (EUE):** Measured in gigawatt-hours (GWh), EUE reports the expected (mean) amount of load that exceeds available resources over the course of a given year. EUE measures the magnitude of reliability events, but does not measure frequency or duration.
- **Loss of Load Hours (LOLH):** LOLH is a count of the expected (mean) number of hours in which load exceeds available resources over the course of a given year. A LOLH of 2.4 hours per year equates to one day in 10 years, a common reliability target in the industry. LOLH measures the duration of reliability events, but does not measure frequency or magnitude.
- **Loss of Load Events (LOLE):** LOLE is a count of the expected (mean) number of reliability events over the course of a given year. An LOLE of 0.1 events per year equates to one event in 10 years, a common reliability target in the industry. LOLE measures the frequency of reliability events, but does not measure magnitude or duration.

PacifiCorp's loss of load study results reflect its participation in the Northwest Power Pool (NWPP) reserve sharing agreement. This agreement allows a participant to receive energy from other participants within the first hour of a contingency event, defined as an event when there is an unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch, or other electrical element. PacifiCorp's participation in the NWPP reserve sharing agreement improves reliability at a given PRM level. Upon evaluating the relationship between cost and reliability in its PRM study, PacifiCorp will continue to use a 13 percent target PRM in its resource planning.

## Objective

The purpose of the PRM is to ensure that Integrated Resource Plan (IRP) portfolios a) meet customer load b) while maintaining operating reserves, c) meeting a one day in ten year reliability target, d) at a low reasonable cost. The 2019 IRP PRM selection is made by analyzing:

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<sup>1</sup> Costs and reliability metrics are calculated for eight different PRM levels, ranging from 11 to 18 percent. Comparative analysis among each PRM is performed for seven different PRM levels by comparing the cost and reliability results from PRM levels ranging between 11 and 18 percent to those from the 10 percent PRM.

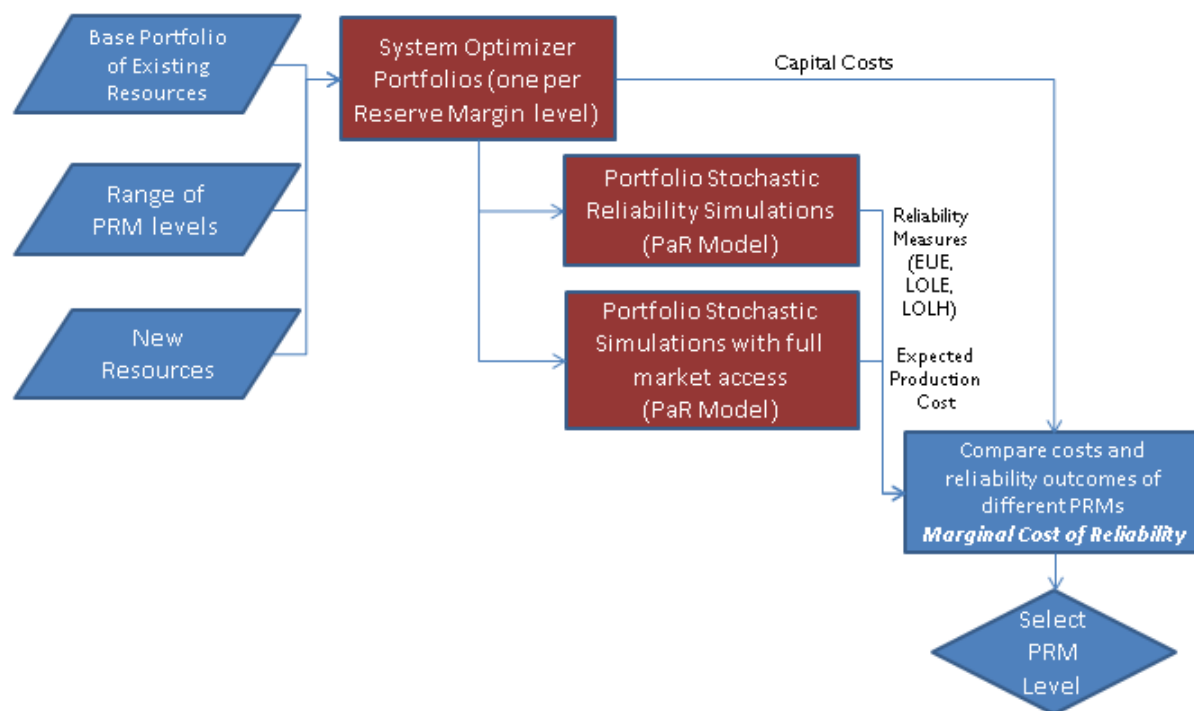
- Relationships between reliability modeling and production cost modeling results
- PRM cases range from 11 to 18 percent in the target year (2030)
- Bookend cases will be run for years 2022 and 2036

The target year of 2030 is selected based on a preliminary assessment aligned with significant assumed retirements; bookend years were developed as a check on this assumption.

## Methodology

Figure I.1 shows the workflow used in PacifiCorp’s PRM study. The four basic modeling steps in the workflow include: (1) using the System Optimizer (SO) model, produce resource portfolios among seven different PRM levels ranging between 11 and 18 percent; (2) using PaR, produce reliability metrics for each resource portfolio; (3) using PaR, produce system stochastic variable production costs with full market access for each resource portfolio; (4) produce the marginal cost of reliability using outcomes of different PRM levels, (5) select PRM level.

**Figure I.1 - Workflow for Planning Reserve Margin Study**



## Development of Resource Portfolios

The SO model is used to produce resource portfolios assuming PRM levels ranging between 11 and 18 percent. The SO model optimizes expansion resources over a 20-year planning horizon to meet peak load inclusive of the PRM applicable to each case.

Consistent with the 2017 IRP, as the PRM level increases additional resources are added to the portfolio. Resource options used in this step of the workflow include demand-side management (DSM), gas-fired combined cycle combustion turbines (CCCT), gas-fired simple cycle combustion turbines (SCCT), renewable resources and front office transactions (FOTs).

## Updated Assumptions

### Front Office Transactions (FOT)

FOTs are considered as a resource expansion option in this phase of the workflow. FOTs are proxy resources used in the IRP portfolio development process that represent firm forward short-term market purchases for summer and winter on-peak delivery, which coincides with the time of year and time of day in which PacifiCorp observes its coincident system peak load.

These proxy resources are a reasonable representation of firm market purchases when performing comparative analysis of different resource portfolios to arrive at a preferred portfolio in the IRP.

The front office transaction reserve credit, previously calculated at six percent of load, has been lowered to three percent, reflecting the three percent of load/three percent of generation requirement which is new this IRP cycle.

### Market Purchases

The SO model planning limit for FOT selection as a capacity resource in the 2019 IRP is 1,425 megawatt (MW) in both summer and winter. In past IRPs, PaR has allowed for market balancing purchases up to transmission limits for the purpose of valuing portfolios in all months of the year. As a consequence, in the 2017 IRP, all PRM levels met PaR loss of load hour (LOLH) requirements, relying on market purchases.

In the 2019 IRP, PaR market purchases are restricted to FOT limits in all months of the PRM models. This change makes PaR reliability measures consistent with market reliance assumptions, and allows the impact of market purchase reliance to be assessed in reliability analysis.

### Planning Capacity Factor (PCF)

The planning capacity factor for DSM, solar and natural gas resources has been updated for the 2019 IRP Planning Reserve Margin Study, based on updated analysis and the latest information.

#### Demand Response (Class 1 DSM)

Demand Response contracts define limits on the number of interruptible hours per day and hours per year reduce capacity contribution. In order to represent these limitations accurately, the capacity factor (CF) approximation method has been applied to each demand response program. PCF is consequently reduced by a weighted average of 11 percent, ranging from -2 to -22 percent by program. Also, in alignment with actual practice, summer demand response availability has been expanded to June through September and winter, and winter demand response has been expanded to October through December.

#### Energy Efficiency (Class 2 DSM)

Similar to demand response, energy efficiency has limitations on hours per day and hours per year, restricting capacity contribution. Taking these limitations into account reduces energy efficiency PCF by a weighted average of 15 percent, ranging from -24 to +13 percent by bundle.

#### Solar

In response to rapid increases in solar penetration, PacifiCorp assessed a 2030 solar resource PCF, measured relative to a case with no solar. East solar has an overall effective capacity contribution of 29.3 percent, down from 37.9 percent for fixed and 59.7 percent for tracking. West solar has an



overall effective capacity contribution of 35.6 percent, down from 53.9 percent for fixed and 64.8 percent for tracking.

### Natural Gas

Past IRPs have relied on monthly average temperature impacts. The 2019 IRP uses a summer peak temperature to improve PCF consistency with peak capacity needs.

Upfront capital and run-rate fixed costs from each portfolio are recorded and used later in the workflow where the relationship between cost and reliability is analyzed. Resources from each portfolio are used in the subsequent workflow steps where reliability metrics and production costs are produced in PaR.

## **Development of Reliability Metrics**

The PaR model is used to produce reliability metrics for each of the resource portfolios developed assuming PRM levels ranging between 11 and 18 percent. PaR is a production cost simulation model, configured to represent PacifiCorp's integrated system that uses Monte Carlo random sampling of stochastic variables to produce a distribution of system operation. For this step in the workflow, reliability metrics are produced from a 500-iteration PaR simulation with Monte Carlo draws of stochastic variables that affect system reliability—load, hydro generation, and thermal unit outages. As discussed above, system balancing hourly purchases are enabled to capture the contribution of firm market purchases to system reliability. The PaR reliability studies are used to report instances where load exceeds available resources, including system balancing hourly purchases. Reported EUE measures the stochastic mean volume of instances where load exceeds available resources, and is measured in GWh. EUE measures the magnitude of reliability events. Reported LOLH is a count of the stochastic mean hours in which load exceeds available resources. LOLH measures the duration of reliability events. Reported LOLE is a count of the stochastic mean events in which load exceeds available resources. LOLE is a measure of the frequency of reliability events.

Each of the reliability metrics described above is adjusted to account for PacifiCorp's participation in the NWPP reserve sharing agreement, which allows a participant to receive energy from other participants within the first hour of a contingency event. PacifiCorp accounts for the NWPP reserve sharing agreement by assuming the first hour of any event is covered and removed in the tabulation of EUE, LOLH and LOLE measures. NWPP participation reduces each of these measures by roughly half.

For PaR, the contribution of firm market purchases are removed and instead include system balancing hourly purchases that cover the firm market purchases, limited by transmission and market depth limits, for the reliability metrics.

## **Development of System Variable Production Costs**

In addition to using PaR to develop reliability metrics, PaR is also used to produce system variable production operating costs for each of the resource portfolios developed assuming PRM levels ranging between 11 and 18 percent. For PaR's system variable production cost runs, its Monte Carlo sampling of stochastic variables is expanded to include natural gas and wholesale market prices in addition to load, hydro generation, and thermal unit outages. At this step, the stochastic treatment of market prices is key given its influence on the economic dispatch of system resources,



cost of system balancing purchases, and revenues from system balancing sales. In this step, full market access is included for the simulation. The stochastic mean of system variable costs is added to the upfront capital and run-rate fixed costs from each portfolio so that total portfolio costs are captured for each PRM level.

## Selection of the Planning Reserve Margin

Using the incremental cost of reliability analysis, guided by additional measures detailed below, the PRM level is selected for use in the 2019 IRP.

## Results

### Resource Portfolios

Table I.1 shows new resources added to the portfolio for the summer at PRM levels ranging between 11 and 18 percent. Each portfolio includes FOTs ranging from 1,312 MW to 1,416 MW. In the summer, FOTs don't vary much as all PRMs are relying on most of the FOT limit during the peak. Natural gas resource additions escalate from 1,264 MW of resource to 1,865 MW across the PRM studies as the margin increases. DSM resource additions range between 218 MW and 891 MW.

In the summer, each 1 percent PRM increases system capacity by roughly 100MW. At each odd-numbered PRM increase, the model adds an additional single-cycle gas resource, partially offset by a reduction in FOTs and interruptible load selections. This trade-off occurs because new gas resources are added in blocks indicative of a typical plant size (i.e. the model cannot add a two MW SCCT plant), and thus the additions in each separate resource category do not move uniformly with an increase in the PRM.

**Table I.1 – Summer Expansion Resource Additions by PRM**

| PRM (%) | Capacity at Summer Peak (MW) |                 |       |             |                   |       |
|---------|------------------------------|-----------------|-------|-------------|-------------------|-------|
|         | DSM                          |                 | FOT   | Natural Gas | Geo-Thermal/Other | Total |
|         | Energy Efficiency            | Demand Response |       |             |                   |       |
| 11      | 824                          | 240             | 1,313 | 1,264       | 31                | 3,672 |
| 12      | 821                          | 219             | 1,416 | 1,287       | 31                | 3,775 |
| 13      | 830                          | 244             | 1,313 | 1,459       | 31                | 3,877 |
| 14      | 844                          | 218             | 1,416 | 1,468       | 31                | 3,977 |
| 15      | 854                          | 241             | 1,313 | 1,639       | 31                | 4,078 |
| 16      | 870                          | 271             | 1,312 | 1,694       | 31                | 4,177 |
| 17      | 853                          | 273             | 1,315 | 1,810       | 31                | 4,282 |
| 18      | 891                          | 323             | 1,313 | 1,865       | 31                | 4,423 |

Table I.2 shows new resources added to the portfolio for the winter at PRM levels ranging between 11 and 18 percent. Winter additions are led by summer additions where summer DSM selection may contribute to winter depending on the attributes of bundle selections; while winter additions follow a general trend, variations are observed at the 16 and 18 percent PRM levels in particular.

In aggregate, the summer and winter additions result in a smooth progression of reliability measures (e.g., loss of load hours, loss of load events, and incremental cost of reliability) reported in the next section of this appendix.

**Table I.2 – Winter Expansion Resource Additions by PRM**

| PRM (%) | Capacity at Winter Peak (MW) |                 |     |          |                   |       |
|---------|------------------------------|-----------------|-----|----------|-------------------|-------|
|         | DSM                          |                 | FOT | Nat. Gas | Geo-Thermal/Other | Total |
|         | Energy Efficiency            | Demand Response |     |          |                   |       |
| 11      | 729                          | 0               | 306 | 1,458    | 31                | 2,524 |
| 12      | 727                          | 0               | 314 | 1,484    | 31                | 2,556 |
| 13      | 736                          | 0               | 321 | 1,682    | 31                | 2,769 |
| 14      | 749                          | 0               | 328 | 1,692    | 31                | 2,801 |
| 15      | 759                          | 0               | 336 | 1,889    | 31                | 3,015 |
| 16      | 775                          | 0               | 0   | 1,915    | 31                | 2,721 |
| 17      | 759                          | 0               | 350 | 2,087    | 31                | 3,227 |
| 18      | 796                          | 0               | 0   | 2,113    | 31                | 2,940 |

## Reliability Metrics

Table I.3 shows EUE, LOLH, and LOLE reliability results before and after adjusting these reliability metrics for PacifiCorp's participation in the NWPP reserve sharing agreement. Each of the reliability metrics generally improve as the PRM increases and after accounting for benefits associated with PacifiCorp's participation in the NWPP reserve sharing agreement. After accounting for its participation in the NWPP reserve sharing agreement, all PRM levels meet a one day in ten year planning criteria (LOLH at or below 2.4), and PRM levels of between 17 and 18 percent meet a one event in ten year planning criteria (LOLE at or below 0.1).

**Table I.3 - Simulated Reliability Metrics by PRM**

| Table 1.5 - Simulated Reliability Metrics by PRM |         |                                   |                                |                       |                       |             |                               |
|--|---------|-----------------------------------|--------------------------------|-----------------------|-----------------------|-------------|-------------------------------|
| Year   | PRM (%) | Before NWPP Adjustment            |                                |                       | After NWPP Adjustment |             |                               |
|  |         | Simulated Energy Not Served (GWh) | LOLH (<2.4 target year) (Hour) | Loss of Load Episodes | EUE (GWh)             | LOLH (Hour) | Modeled Loss of Load Episodes |
| 2019 IRP   |         |                                   |                                |                       |                       |             |                               |
| 2030   | 11      | 602                               | 2.46                           | 1.12                  | 327                   | 1.34        | 0.54                          |
|  | 12      | 1,038                             | 3.75                           | 1.45                  | 637                   | 2.30        | 0.78                          |
|  | 13      | 514                               | 1.97                           | 0.90                  | 279                   | 1.07        | 0.45                          |
|  | 14      | 377                               | 1.64                           | 0.79                  | 196                   | 0.85        | 0.37                          |
|  | 15      | 193                               | 0.98                           | 0.44                  | 106                   | 0.54        | 0.23                          |
|  | 16      | 157                               | 0.87                           | 0.38                  | 88                    | 0.49        | 0.18                          |
|  | 17      | 71                                | 0.54                           | 0.27                  | 35                    | 0.27        | 0.09                          |
|  | 18      | 107                               | 0.41                           | 0.19                  | 56                    | 0.21        | 0.08                          |

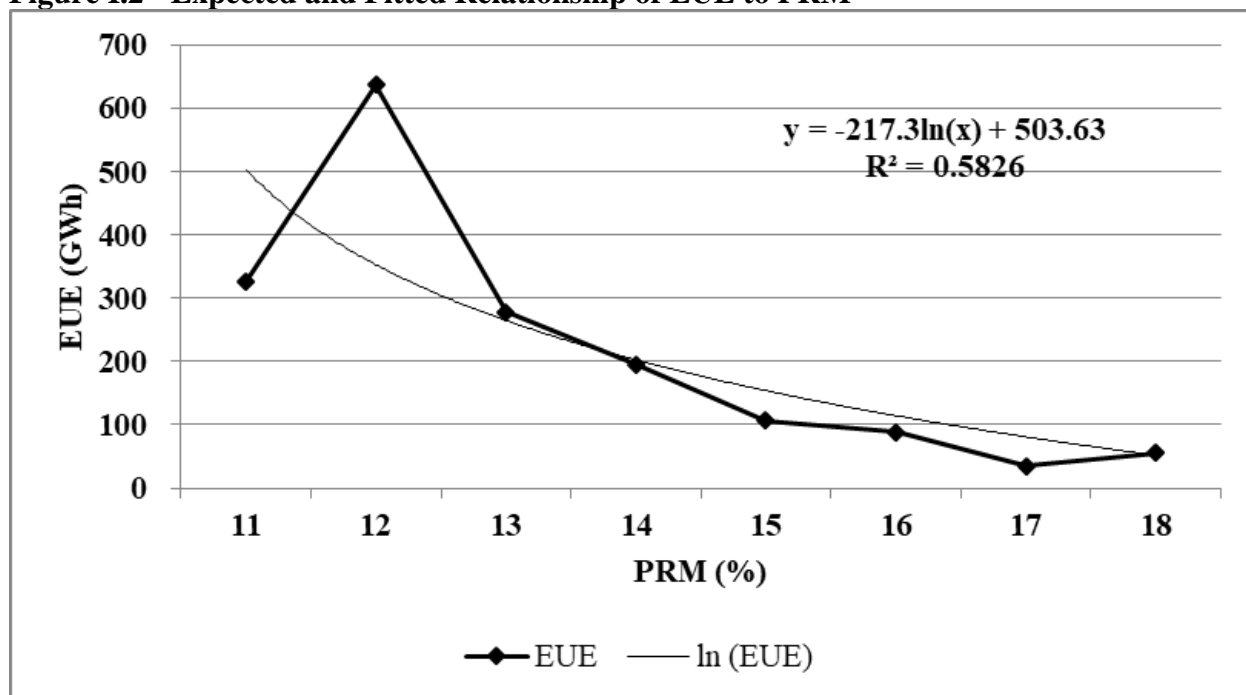
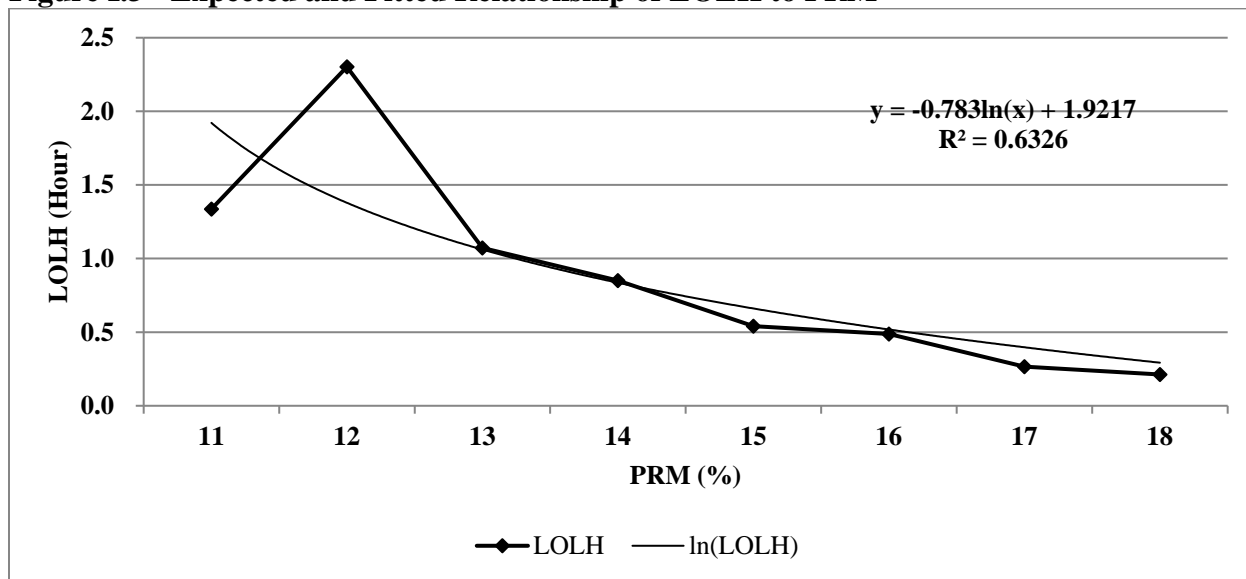
The reliability metrics do not monotonically improve with each incremental increase in the PRM. This is influenced by the physical location of new resources within PacifiCorp's system at varying PRM levels and the ability of these resources to serve load in all load pockets when Monte Carlo sampling is applied to load, hydro generation, and thermal unit outages.

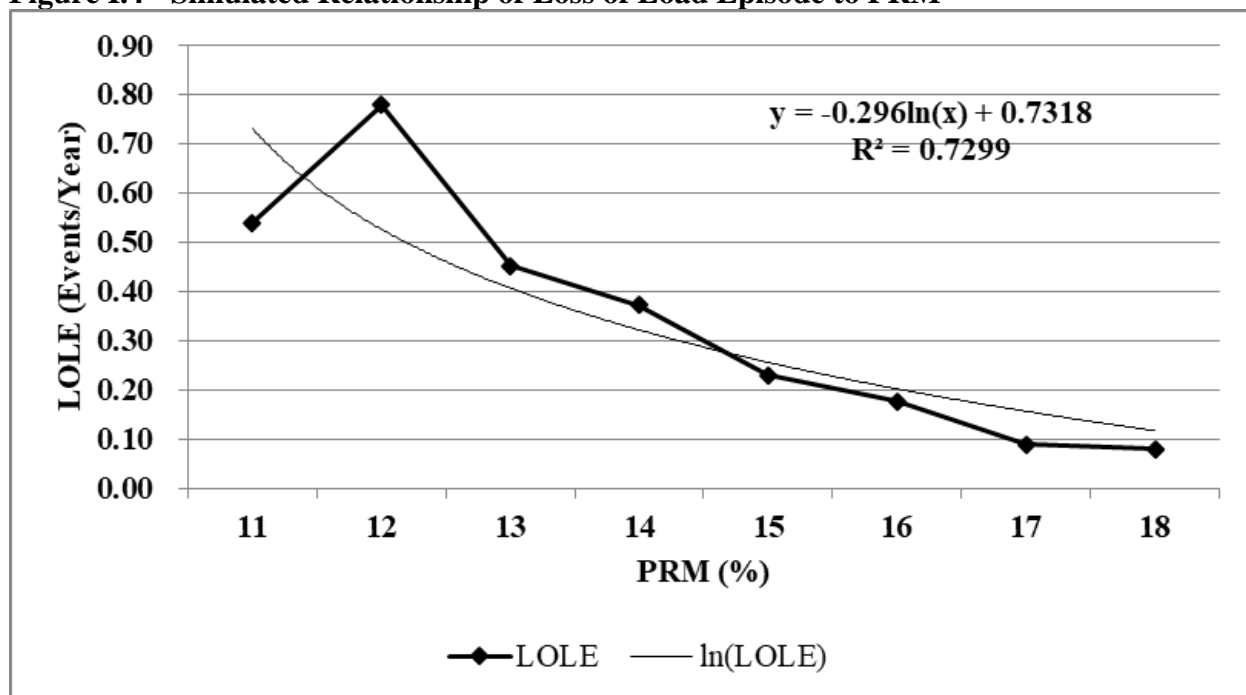
The 12 percent reports higher EUE, but is able to meet the 12 percent PRM with an efficiency that keeps the incremental cost of EUE in line with the rest of the PRM levels (refer to Table I.5 under System Costs, below). Absent the NWPP adjustment, the PRM 13 percent is the cross over point where the LOLH is below the 2.4 hour per year limit.

Considering that the reliability metrics are measuring very small magnitudes of change among the different PRM levels, the PaR outputs are fit to a logarithmic function to report the overall trend in reliability improvements as the PRM level increases. Table I.4 shows the fitted EUE LOLH, and LOLE results. Figure I.2, Figure I.3 and Figure I.4 show a plot of the fitted trend for EUE, LOLH, and LOLE, respectively, after accounting for PacifiCorp's participation in the NWPP reserve sharing agreement.

**Table I.4 - Fitted Reliability Metrics by PRM**

| PRM (%) | Before NWPP Adjustment |                                |                               | After NWPP Adjustment |             |                               |
|---------|------------------------|--------------------------------|-------------------------------|-----------------------|-------------|-------------------------------|
|         | EUE (GWh)              | LOLH (<2.4 target year) (Hour) | Modeled Loss of Load Episodes | EUE (GWh)             | LOLH (Hour) | Modeled Loss of Load Episodes |
| 11      | 504                    | 1.92                           | 0.78                          | 878                   | 3.36        | 1.44                          |
| 12      | 353                    | 1.38                           | 0.58                          | 619                   | 2.43        | 1.05                          |
| 13      | 265                    | 1.06                           | 0.46                          | 467                   | 1.88        | 0.82                          |
| 14      | 202                    | 0.84                           | 0.37                          | 360                   | 1.50        | 0.66                          |
| 15      | 154                    | 0.66                           | 0.31                          | 276                   | 1.20        | 0.53                          |
| 16      | 114                    | 0.52                           | 0.25                          | 208                   | 0.95        | 0.43                          |
| 17      | 81                     | 0.40                           | 0.21                          | 151                   | 0.74        | 0.35                          |
| 18      | 52                     | 0.29                           | 0.17                          | 101                   | 0.56        | 0.27                          |

**Figure I.2 - Expected and Fitted Relationship of EUE to PRM****Figure I.3 - Expected and Fitted Relationship of LOLH to PRM**

**Figure I.4 - Simulated Relationship of Loss of Load Episode to PRM**

## System Costs

For the 2020 reference year, Table I.5 shows the stochastic mean of system variable production costs and the upfront capital and run-rate fixed costs, including the cost of new DSM resources, for each portfolio developed at PRM levels ranging between 11 and 18 percent. The fixed costs associated with these new resource additions drive total costs higher as PRM levels increase. DSM run-rate costs vary depending on resource additions for demand response and new resources where gas was added.

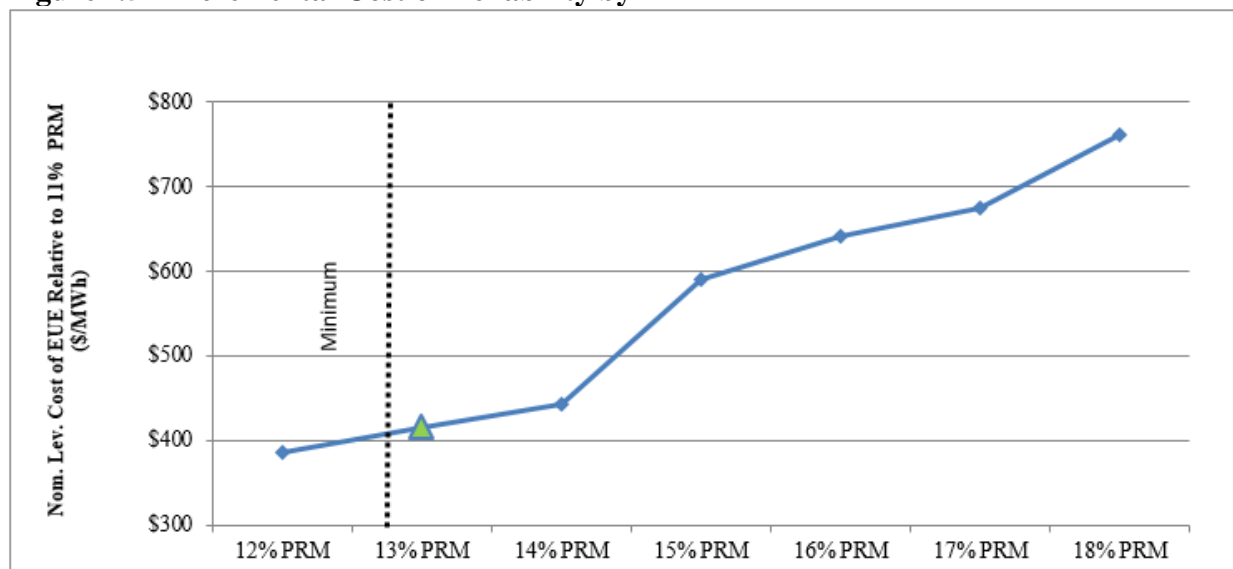
**Table I.5 – System Variable, Up-front Capital, and Run-rate Fixed Costs by PRM**

| PRM (%) | System Production Costs (\$m) | Energy Efficiency (\$m) | Demand Response (\$m) | Existing Resource Fixed Costs (\$m) | New Resource Fixed Cost (\$m) | Total (\$m) |
|---------|-------------------------------|-------------------------|-----------------------|-------------------------------------|-------------------------------|-------------|
| 11      | 11,368                        | 818                     | 120                   | 2,823                               | 3,398                         | 18,527      |
| 12      | 11,383                        | 802                     | 131                   | 2,823                               | 3,472                         | 18,611      |
| 13      | 11,352                        | 833                     | 122                   | 2,823                               | 3,540                         | 18,670      |
| 14      | 11,302                        | 855                     | 130                   | 2,823                               | 3,609                         | 18,719      |
| 15      | 11,313                        | 886                     | 120                   | 2,823                               | 3,684                         | 18,825      |
| 16      | 11,134                        | 936                     | 132                   | 2,823                               | 3,862                         | 18,887      |
| 17      | 11,289                        | 863                     | 134                   | 2,823                               | 3,830                         | 18,939      |
| 18      | 11,149                        | 983                     | 137                   | 2,823                               | 3,931                         | 19,023      |

## Incremental Cost of Reliability

Figure I.5 depicts the incremental cost of reliability, stated as the nominal levelized cost of EUE relative to 11 percent PRM, at PRM levels ranging between 12 and 18 percent. The incremental cost of reliability rises intuitively as PRM levels increase, and illustrates a significant step-change noted when the PRM hits 15 percent and onward.

**Figure I.5 - Incremental Cost of Reliability by PRM**



## Conclusion

PacifiCorp will continue to use a 13 percent target PRM in its resource planning after evaluating the relationship between cost and reliability in the PRM study. A PRM below 13 percent would not sufficiently cover the need to carry short-term operating reserve needs (contingency and regulating margin) and longer-term uncertainties such as extended outages and changes in customer load.<sup>2</sup> A PRM above 15 percent improves reliability above a one event in ten year planning level, although with a 300 to 700 percent increase in the incremental cost per megawatt-hour of reduced EUE when compared to a 13 percent PRM. With these considerations, the selected 13 percent PRM level ensures PacifiCorp can reliably meet customer loads while maintaining operating reserves, with a planning criteria that meets one day in 10 year planning targets, at the lowest reasonable cost.

<sup>2</sup> PacifiCorp must hold approximately six percent of its resources in reserve to meet contingency reserve requirements and an estimated additional 4.5 percent to 5.5 percent of its resources in reserve, depending upon system conditions at the time of peak load, as regulating margin. This sums to 10.5 percent to 11.5 percent of operating reserves before even considering longer-term uncertainties such as extended outages (transmission or generation) and customer load growth.

## APPENDIX J – WESTERN RESOURCE ADEQUACY EVALUATION

### Introduction

The Public Service Commission of Utah, in its 2008 Integrated Resource Plan (IRP) Order, directed PacifiCorp to conduct two analyses pertaining to the company's ability to support reliance on market purchases:

*Additionally, we direct the Company to include an analysis of the adequacy of the western power market to support the volumes of purchases on which the Company expects to rely. We concur with the Office [of Consumer Services], the WECC is a reasonable source for this evaluation. We direct the Company to identify whether customers or shareholders will be expected to bear the risks associated with its reliance on the wholesale market. Finally, we direct the Company to discuss methods to augment the Company's stochastic analysis of this issue in an IRP public input meeting for inclusion in the next IRP or IRP update.<sup>1</sup>*

In the past, PacifiCorp has fulfilled this requirement by evaluating the Western Electricity Coordinating Council (WECC) Power Supply Assessment (PSA) to glean trends and conclusions from the supporting analysis. While an updated PSA has not been published in time for this IRP, there is a published update available for the North American Electric Reliability Corporation (NERC) Long Term Reliability Assessment (LTRA). Past PSA reports were based on data publicly available in the NERC LTRA, and the latest available LTRA report<sup>2</sup> is used in lieu of the WECC PSA in this appendix. This evaluation, along with a discussion on risk allocation associated with reliance on market purchases, is provided below. As part of this evaluation, PacifiCorp also reviewed the status of resource adequacy assessments prepared for the Pacific Northwest by the Pacific Northwest Resource Adequacy Forum.

### NERC 2018 Long Term Reliability Assessment

The NERC LTRA, issued December 20, 2018, was developed based on data collected from seven regional entities, including WECC. NERC staff independently assesses collected data to develop the LTRA for the North American Bulk-Power System. The NERC LTRA assessment identifies trends and risks over a 10-year (2019-2028) study period. The 2018 LTRA concludes that the WECC, inclusive of four U.S. and two Canadian subregions, are expected to have sufficient generation capacity to exceed reserve requirements during the assessment period.

<sup>1</sup> Public Service Commission of Utah, PacifiCorp 2008 Integrated Resource Plan, Report and Order, Docket No. 09-2035-01, p. 30.

<sup>2</sup> North American Electric Reliability Corporation 2018 Long Term Reliability Assessment, [www.nerc.com/pa/RAPA/ra/Pages/default.aspx](http://www.nerc.com/pa/RAPA/ra/Pages/default.aspx)

## Resources

The NERC LTRA organizes resources into two broad categories its 10 year WECC region reliability assessment:

### Anticipated Resources:

- Existing generating capacity able to serve peak hour load with firm transmission)
- Capacity that is either under construction or has received approved planning requirements
- Firm net capacity transfers with firm contracts
- Less confirmed retirements

### Prospective Resources:

- Existing capacity that may be available to serve peak hour load, but lacks certainty associated with firm transmission, peak availability, etc.
- Capacity additions that have been requested but not received approval
- Nonfirm net capacity transfers and transfers without firm contracts, but assessed to have a high probability of future implementation
- Less unconfirmed retirements

### Planning Reserve Margin

The LTRA defines “planning reserve margin” as Resources less Demand, divided by Demand, shown as a percentile.

$$\left( \frac{\text{Resources} - \text{Demand}}{\text{Demand}} \right) \%$$

Resources in this calculation are reduced by expected operating limits due to fuel availability, transmission and environmental limitations. Comparing the *anticipated* resource-based reserve margin to the reference planning margin yields one of three risk determinations:

- Adequate: Anticipated Reserve Margin exceeds the Reference Margin Level
- Marginal: Anticipated Reserve Margin exceeds the Reference Margin Level but there are low expectations in meeting all forecast parameters; alternately, Anticipated Reserve Margin is below the Reference Margin Level but sufficient Tier 2 resources are projected to cover the shortfall.
- Inadequate: Anticipated Reserve Margin is significantly less than Reference Margin Level and load interruption is likely.

## WECC Subregions

**Table J.1** presents the WECC subregions used for the NERC LTRA. In the data that follows, the two subregions in Canada are not considered.



**Table J.1 – WECC Subregion Descriptions**

| Designation | Subregion                       | Country       | Peaking Assumption |
|-------------|---------------------------------|---------------|--------------------|
| CAMX        | California to Mexico            | United States | Summer             |
| NWPP        | Northwest Power Pool            | United States | Summer             |
| RMRG        | Rocky Mountain Reserve Group    | United States | Summer             |
| SRSR        | Southwest Reserve Sharing Group | United States | Summer             |
| AB          | Alberta                         | Canada        | Winter             |
| BC          | British Columbia                | Canada        | Winter             |

**LTRA WECC Assessment**

Table J.2 through J.4 represent the three types of reserve margins relevant to the WECC planning reserve margin calculation. In each table, the figures do not include WECC subregions outside of the United States.

**Table J.2 – NERC LTRA Anticipated Reserve Margin**

| Anticipated Reserve Margin |                    |       |       |       |       |       |       |       |       |       |       |
|----------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| U.S. WECC Subregion        | Peaking Assumption | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  | 2028  |
| NWPP                       | Summer             | 27.6% | 25.9% | 24.6% | 22.8% | 23.8% | 23.6% | 23.7% | 23.7% | 26.5% | 22.0% |
| RMRG                       | Summer             | 33.7% | 26.6% | 24.9% | 23.5% | 21.1% | 19.6% | 18.0% | 16.8% | 15.5% | 14.0% |
| SRSR                       | Summer             | 30.8% | 29.4% | 27.5% | 24.0% | 20.9% | 18.8% | 16.6% | 15.0% | 12.0% | 10.5% |
| CAMX                       | Summer             | 23.3% | 30.6% | 24.3% | 23.6% | 24.5% | 20.7% | 20.4% | 20.9% | 20.7% | 20.3% |

**Table J.3 – NERC LTRA Prospective Reserve Margin**

| Prospective Reserve Margin |                    |       |       |       |       |       |       |       |       |       |       |
|----------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| U.S. WECC Subregion        | Peaking Assumption | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  | 2028  |
| NWPP                       | Summer             | 27.8% | 26.1% | 24.8% | 22.9% | 24.0% | 23.8% | 23.8% | 23.9% | 26.6% | 22.2% |
| RMRG                       | Summer             | 33.7% | 26.6% | 24.9% | 23.5% | 21.5% | 20.0% | 18.4% | 17.1% | 15.8% | 14.4% |
| SRSR                       | Summer             | 33.6% | 32.4% | 30.9% | 27.5% | 24.3% | 22.1% | 19.9% | 18.2% | 15.1% | 13.6% |
| CA/MX                      | Summer             | 32.5% | 43.3% | 42.1% | 42.9% | 43.9% | 40.2% | 39.8% | 40.4% | 40.2% | 39.7% |

**Table J.4 – NERC LTRA Reference Reserve Margin**

| Reference Planning Reserve Margin |                    |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| U.S. WECC Subregion               | Peaking Assumption | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  | 2028  |
| NWPP                              | Summer             | 19.7% | 19.7% | 19.5% | 19.6% | 19.6% | 19.5% | 19.4% | 19.4% | 19.3% | 19.1% |
| RMRG                              | Summer             | 16.8% | 16.8% | 16.5% | 16.4% | 16.1% | 15.9% | 15.7% | 15.6% | 15.4% | 15.3% |
| SRSR                              | Summer             | 15.1% | 15.1% | 14.9% | 14.6% | 14.5% | 14.3% | 14.2% | 14.0% | 13.9% | 13.8% |
| CAMX                              | Summer             | 12.4% | 12.3% | 12.1% | 12.1% | 12.0% | 12.1% | 12.0% | 12.0% | 12.0% | 12.0% |

Using this data, a reserve margin position can be calculated to show project shortfalls, both with and without the inclusion of prospective resource additions. Table J.5 reports the reserve margin differential based on Anticipated resources, whereas Table J.6 reports the reserve margin differential assuming Prospective resources are achieved during the study period. In either table, a

positive percentage represents a margin of overage where WECC is expected to have resources above the Reference Margin target; a negative number (highlighted for emphasis) represents a year where a given subregion is at risk of falling below the Reference Margin.

Based on this evaluation, potential shortfalls in Planning Reserve Margin are small and 8-9 years distant.

**Table J.5 –Planning Reserve Margin Shortfalls by Subregion with Anticipated Resources**

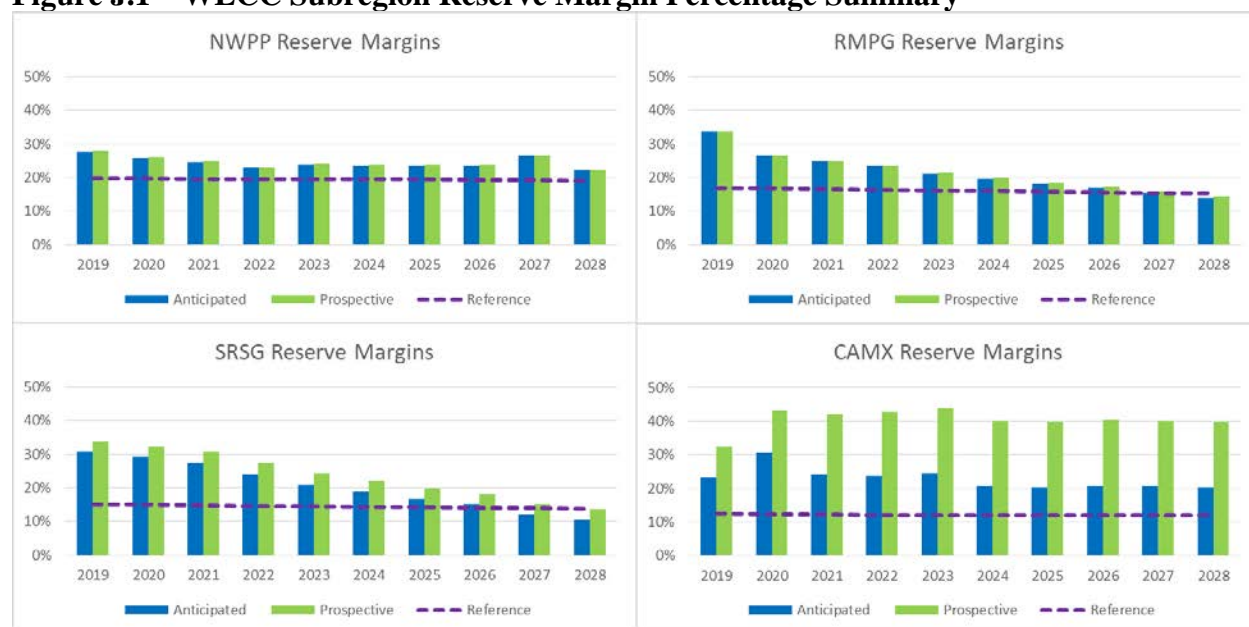
| Shortfalls Assuming Anticipated Reserve Margin |                    |       |       |       |       |       |      |      |      |       |       |
|--|--------------------|-------|-------|-------|-------|-------|------|------|------|-------|-------|
| U.S. WECC Subregion                            | Peaking Assumption | 2019  | 2020  | 2021  | 2022  | 2023  | 2024 | 2025 | 2026 | 2027  | 2028  |
| NWPP   | Summer             | 7.9%  | 6.2%  | 5.1%  | 3.2%  | 4.3%  | 4.2% | 4.3% | 4.3% | 7.2%  | 2.9%  |
| RMRG   | Summer             | 16.9% | 9.8%  | 8.4%  | 7.1%  | 5.1%  | 3.7% | 2.3% | 1.2% | 0.1%  | -1.2% |
| SMSG   | Summer             | 15.7% | 14.3% | 12.6% | 9.4%  | 6.4%  | 4.5% | 2.5% | 1.0% | -2.0% | -3.3% |
| CA/MX  | Summer             | 10.9% | 18.3% | 12.2% | 11.6% | 12.5% | 8.6% | 8.4% | 8.9% | 8.7%  | 8.2%  |

**Table J.6 -- Planning Reserve Margin Shortfalls by Subregion with Prospective Resources**

| Shortfalls Assuming Prospective Reserve Margin |                    |       |       |       |       |       |       |       |       |       |       |
|--|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| U.S. WECC Subregion                            | Peaking Assumption | 2019  | 2020  | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  | 2028  |
| NWPP   | Summer             | 8.1%  | 6.4%  | 5.3%  | 3.3%  | 4.5%  | 4.3%  | 4.4%  | 4.5%  | 7.4%  | 3.1%  |
| RMRG   | Summer             | 16.9% | 9.8%  | 8.4%  | 7.1%  | 5.4%  | 4.0%  | 2.6%  | 1.5%  | 0.4%  | -0.9% |
| SMSG   | Summer             | 18.5% | 17.3% | 16.0% | 12.8% | 9.8%  | 7.8%  | 5.7%  | 4.2%  | 1.2%  | -0.2% |
| CA/MX  | Summer             | 20.2% | 31.0% | 30.0% | 30.8% | 31.9% | 28.1% | 27.8% | 28.4% | 28.2% | 27.7% |

Figure J.1 graphically illustrates the relative margins for each subregion.

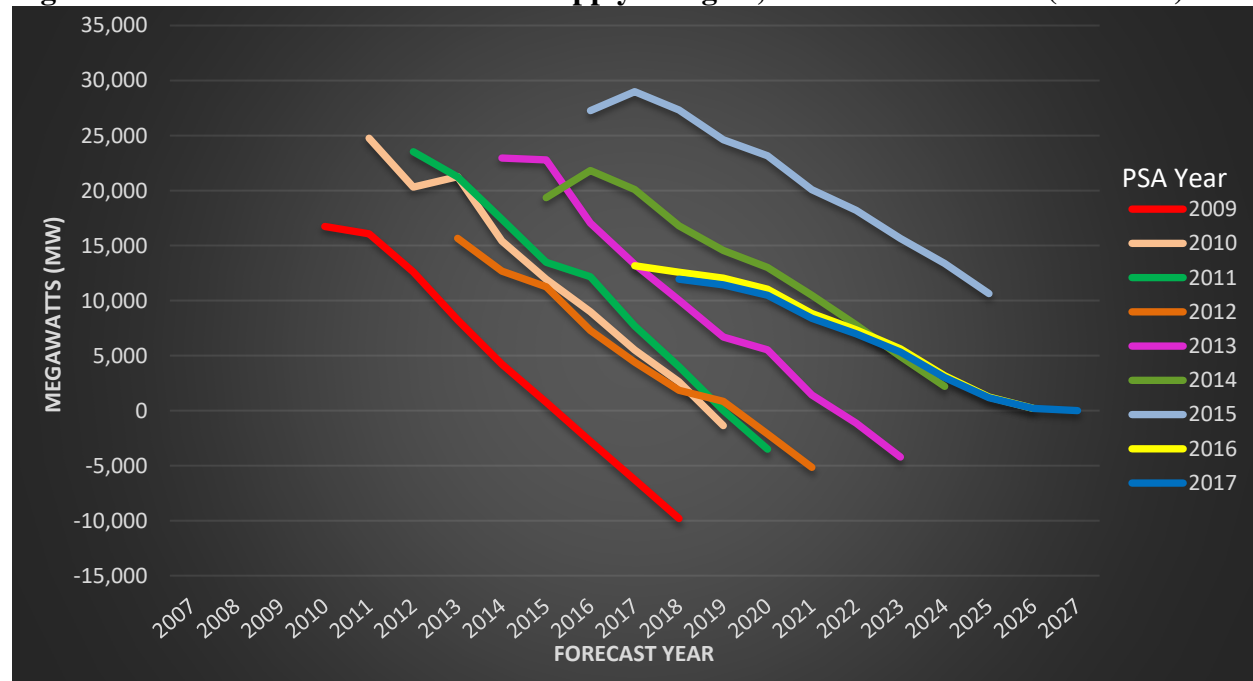
**Figure J.1 – WECC Subregion Reserve Margin Percentage Summary**



### Prior Measures

PacifiCorp's past assessments, relying on calculations incorporated into the WECC PSA, have reporting a rolling succession of power supply margins, where each year there is a downward trend in reserve margins extending into the future. Figure J.2 presents this trend based on past WECC PSA reports. The rolling nature of each year's outcome tells us that while declining reserve margins are important, in reality the trend line is rarely followed from one year to the next – rather the trend line tends to be pushed forward like a wave, where the future shortage is not allowed to materialize because of cumulative actions taken within the WECC in recognition of future need.

**Figure J.2 - WECC Forecasted Power Supply Margins, Issued 2009 to 2016 (Summer)**



*Note: WECC Power Supply Assessments include Class 1 Planned Resources Only*

### Pacific Northwest Resource Adequacy Forum's Adequacy Assessment

As in the 2017 IRP, the Pacific Northwest Resource Adequacy Forum (later replaced by the Resource Adequacy Advisory Committee) issued resource adequacy standards in April 2008, which were subsequently adopted by the Northwest Power and Conservation Council. The standard calls for assessments three and five years out, conducted every year, and including only existing resources and planned resources that are already sited and licensed. The Resource Adequacy Advisory Committee issued a Pacific Northwest Power Supply Adequacy Assessment for 2021 on August 10, 2016<sup>3</sup>. This assessment concluded that power supply is expected to be adequate through 2021 primarily focused on winter season. Consistent with the prior year filing, the updated forecasts indicate Pacific Northwest energy and capacity surplus will become a deficit around years 2021 and 2022, primarily focused on winter and spring season.

<sup>3</sup> Pacific Northwest Power Supply Adequacy Assessment for 2021, at: [www.nwcouncil.org/media/7150504/2021-adequacy-assessment-final-aug\\_9\\_2016.pdf](http://www.nwcouncil.org/media/7150504/2021-adequacy-assessment-final-aug_9_2016.pdf)

## Customer versus Shareholder Risk Allocation

Market purchase costs are reflected in rates. Consequently, customers bear the price risk of PacifiCorp's reliance on a given level of market purchases. However, customers also bear the cost impact of the company's decision to build or acquire resources if those resources exceed market alternatives and result in an increase in rates. These offsetting risks stress the need for robust IRP analysis, efficient RFPs and ability to capture opportunistic procurement opportunities when they arise.

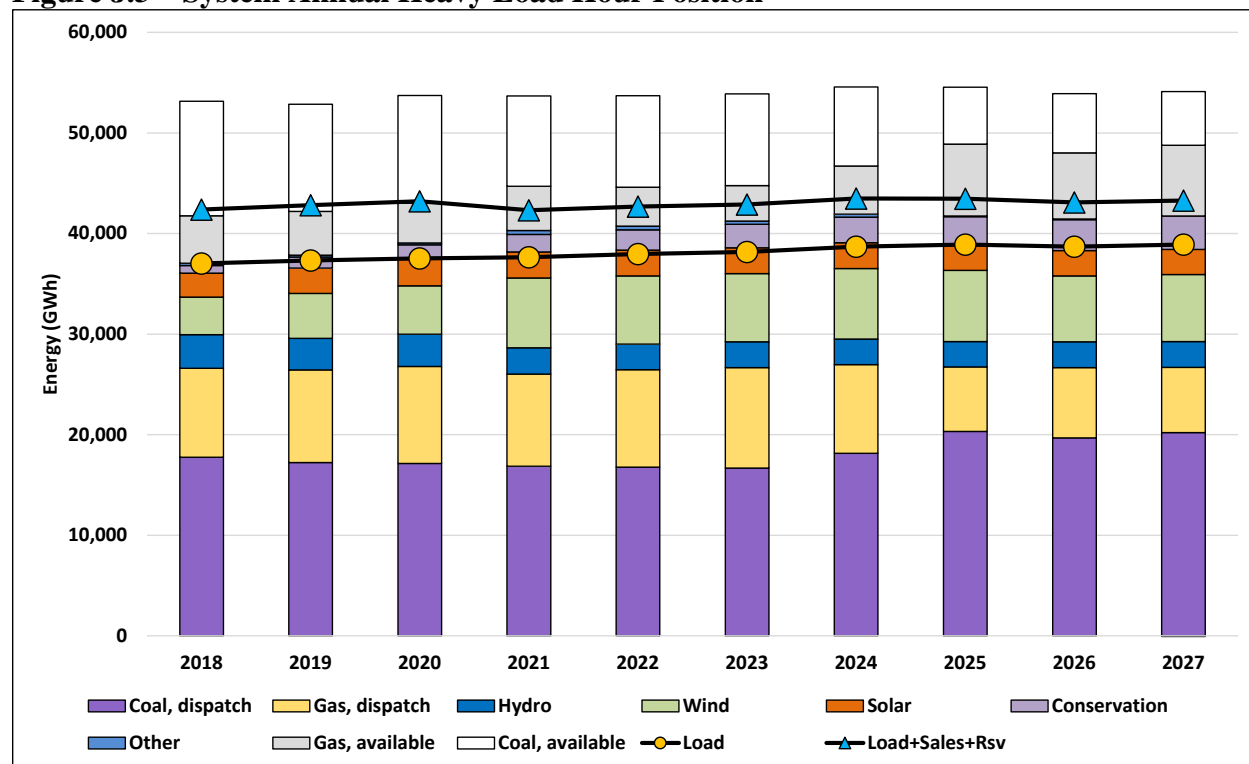
## PacifiCorp's Energy Position

Figure J.3 to Figure J.5 illustrates PacifiCorp's energy position developed from the 2017 IRP Update, progress from annual to hourly views of system position:

- System Annual Heavy Load Hour (HLH) position
- July Monthly Heavy Load Hour position
- Sample July Peak Day Position

The energy position is compared to a load target, where load includes projected sales and reserve requirement. The gap between energy and load are met by market energy, however in many cases could have been met by other system resources.

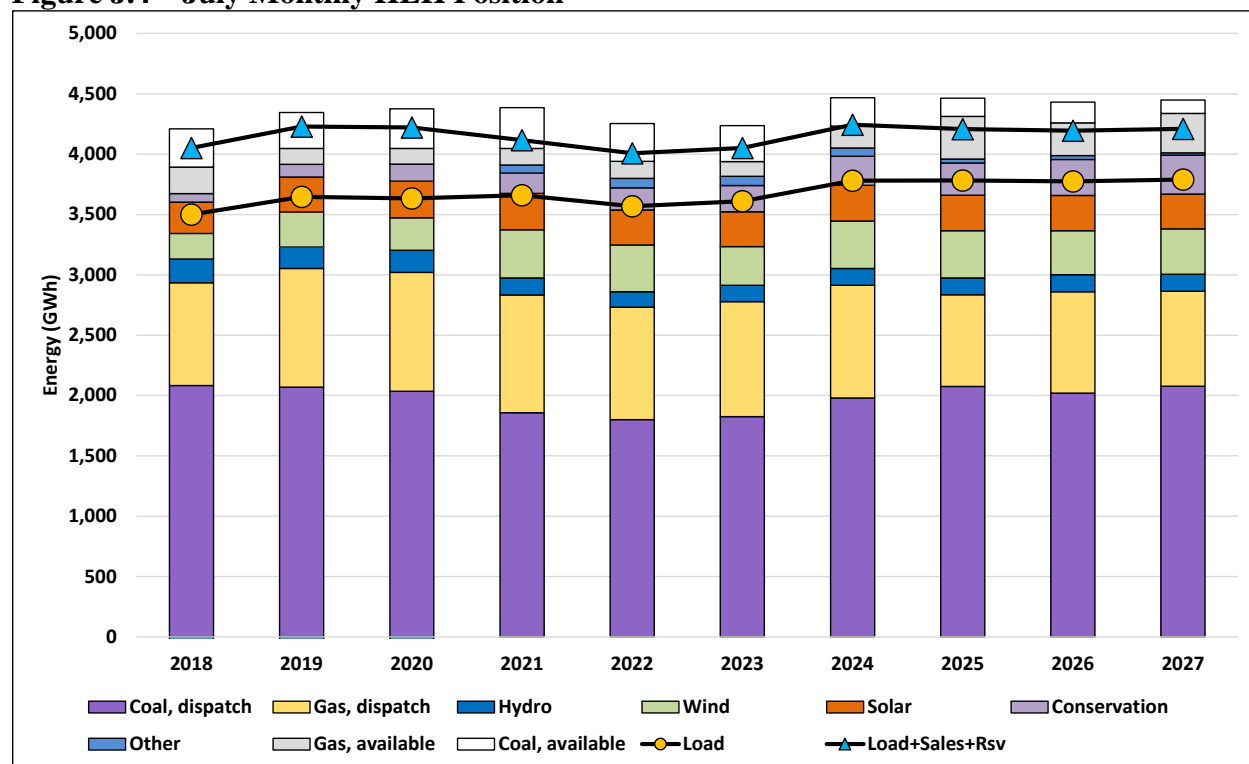
**Figure J.3 – System Annual Heavy Load Hour Position**



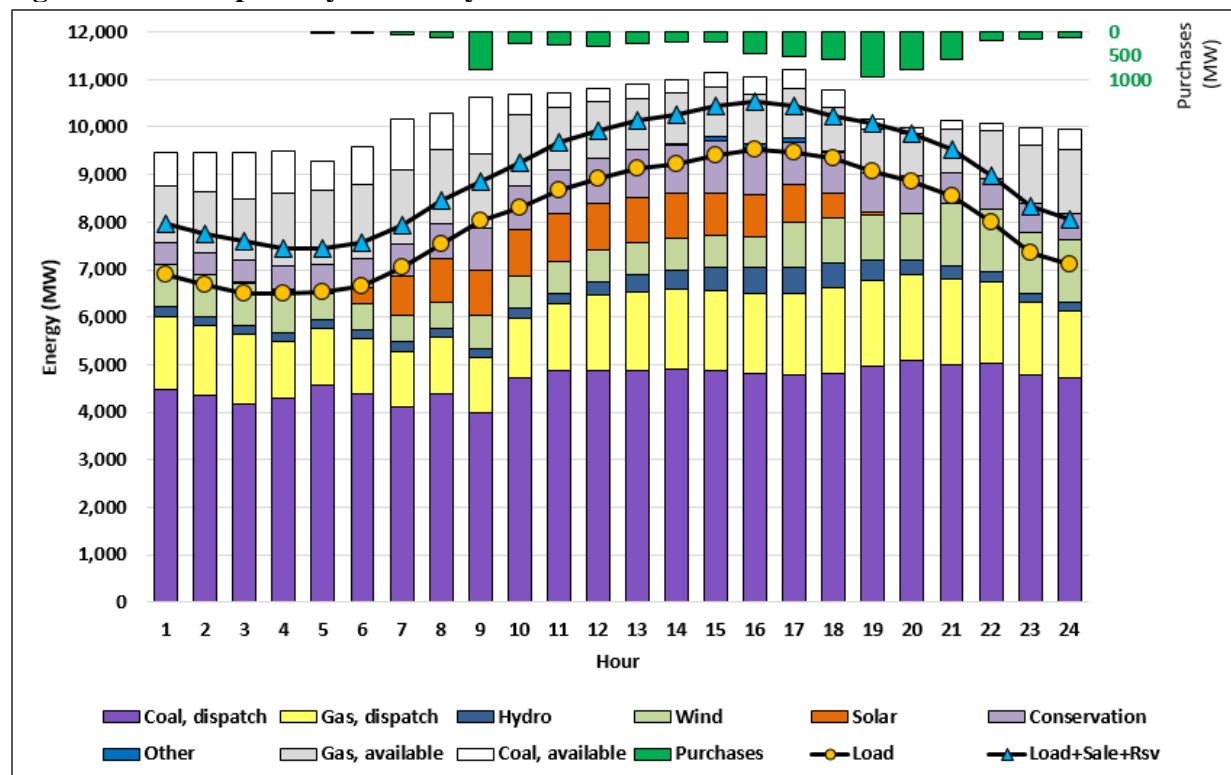
The annual position during heavy load hour with existing and planned resources, demonstrated system position without market purchases. The top blocks on each bar represents available

undispatched capacity. The gap between energy position and load-plus-sales-plus-reserves could be met by market purchases, increased dispatch, reduction in sales, or a combination actions.

**Figure J.4 – July Monthly HLH Position**



The peak heavy load hour is the month of July, the system runs tighter compared to the annual basis. There is less undispatched thermal capacity available to meet load-plus-sales-plus-reserves than in the system annual HLH view. However, undispatched capacity still exceeds requirements on a monthly level. The gap between energy position and load-plus-sales-plus-reserves could be met by market purchases, increased dispatch, reduction in sales, or a combination of the three. The model makes this decision on the basis of economics and prevailing transmission constraints in a given hour.

**Figure J.5 – Sample July Peak Day Position**

The peak heavy load hour day runs tighter again compared to both annual and month view. The hourly variations and purchase drivers are captured in the sample day that cannot be seen in either annual or month peak HLH in Figure J.4 and Figure J.5. On an energy basis, the gap between energy and load-plus-sales is highest in hour 19 and 20. This is generally consistent with the highest solar shoulder hour, or twilight peak, where solar is fading and other generation is ramping up to meet the gap.

## Market Purchases

As described in Volume I, Chapter 6 (Resource Options), PacifiCorp, other utilities, and power marketers who own and operate generation engage in market purchases and sales of electricity on an ongoing basis to balance the system and maximize the economic efficiency of power system operations. In addition to reflecting spot market purchase activity and existing long-term purchase contracts in the IRP portfolio analysis, PacifiCorp models front office transactions (FOT). FOTs are proxy resources, assumed to be firm, that represent procurement activity made on an on-going forward basis to help PacifiCorp cover short positions.

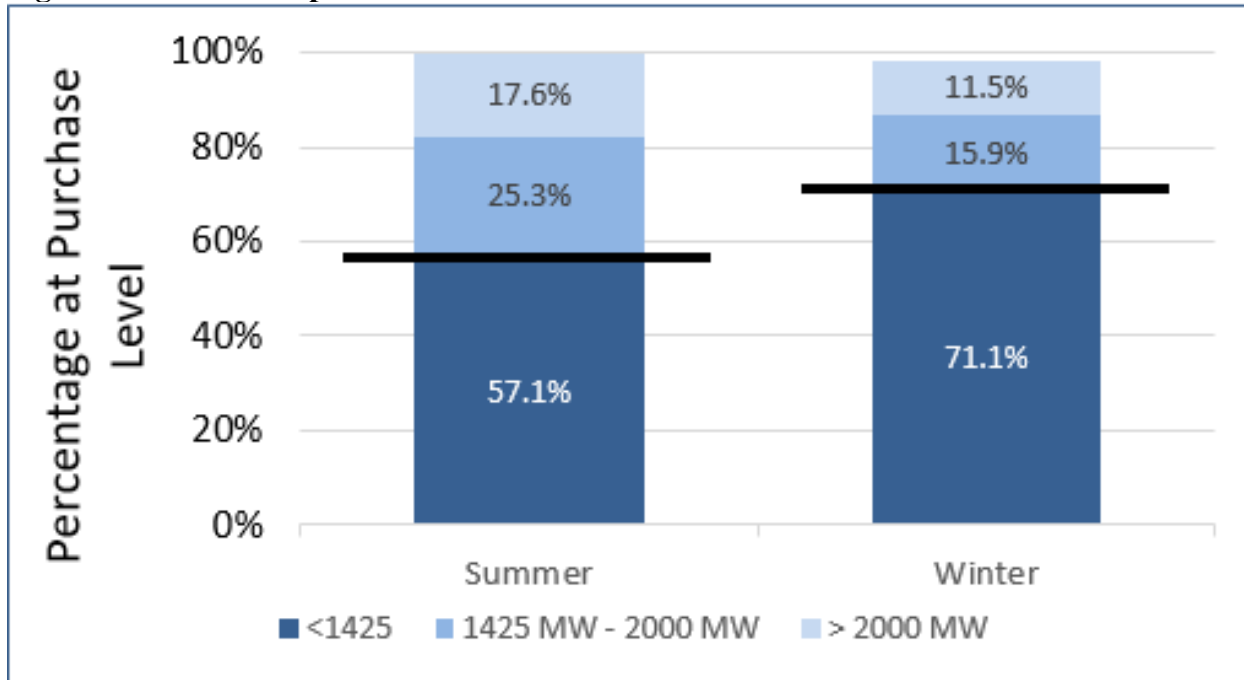
Solicitations for FOTs can be made years, quarters or months in advance, however, most transactions made to balance PacifiCorp's system are made on a balance of month, day-ahead, hour-ahead, or intra-hour basis. Annual transactions can be available three or more years in advance. Seasonal transactions are typically delivered during quarters and can be available from one to three years or more in advance. The terms, points of delivery, and products will all vary by individual market point.

In developing FOT limits for the 2019 IRP, PacifiCorp reviewed the studies described in the sections above as part of its assessment of market reliance in addition to consideration of its active participation in wholesale power markets, its view of physical delivery constraints, and market liquidity and market depth. The 2019 IRP FOT limits is 1,425 MW, reduced from 1,575 MW in the 2017 IRP, due to a COB decrease of 150 MW, reflecting expired reservation and review of historical derates as shown in Table J.7.

**Table J.7 – Maximum Available Front Office Transactions by Market Hub**

| Market Hub/Proxy FOT Product Type     | Availability Limit (MW) |              |                         |              |
|---------------------------------------|-------------------------|--------------|-------------------------|--------------|
|                                       | 2019                    |              | 2017                    |              |
|                                       | Summer                  | Winter       | Summer                  | Winter       |
|                                       | (July)                  | (December)   | (July)                  | (December)   |
| <i>Mid-Columbia (Mid-C)</i>           |                         |              |                         |              |
| Flat Annual or Heavy Load Hour        | 400                     | 400          | No Change               |              |
| Heavy Load Hour                       | 375                     | 375          | No Change               |              |
| <i>California Oregon Border (COB)</i> |                         |              |                         |              |
| Flat Annual or Heavy Load Hour        | 250                     | 250          | Reduced to 250 from 400 |              |
| <i>Nevada Oregon Border (NOB)</i>     |                         |              |                         |              |
| Heavy Load Hour                       | 100                     | 100          | No Change               |              |
| <i>Mona</i>                           |                         |              |                         |              |
| Heavy Load Hour                       | 300                     | 300          | No Change               |              |
| <b>Total</b>                          | <b>1,425</b>            | <b>1,425</b> | <b>1,575</b>            | <b>1,575</b> |

Figure J.6 shows PacifiCorp historical market purchases at three volume thresholds. The majority of actual purchases conform to IRP FOT planning limits. As PacifiCorp is a summer-peaking system higher volume purchases occurred more frequently in the summer than in the winter. This assessment showed that from 2009 to 2017, 27 percent of winter peak load hour purchases and 43 percent of summer peak load hour purchases were higher than the assumed IRP FOT planning limit of 1,425 MW.

**Figure J.6 – PacifiCorp Market Purchases**

Aligned with review of the regional studies discussed above, and the historical market purchases and transactions, PacifiCorp has selected a peak-season FOT limit of 1,425MW for the 2019 IRP. The company will continue to refine its assessments of market depth and liquidity for transactions, informed by actual operations, to quantify the risk associated with the level of market reliance. Several FOT studies are discussed and evaluated in Volume I, Chapter 7 (Modeling and Portfolio Evaluation Approach) and Chapter 8 (Modeling and Portfolio Selection Results).



# APPENDIX K – CAPACITY EXPANSION RESULTS DETAIL

## Portfolio Case Build Tables

This section provides the System Optimizer portfolio build tables for each of the case scenarios as described in the portfolio development section of Chapter 7. There are thirty Initial Development cases, ten C-cases, seven CP-cases, six front office transactions (FOT) risk assessment cases, six Gateway & No Gas cases, eight sensitivity cases, three re-bundled demand-side management (DSM) cases, and five P-70 cases.

**Table K.1 – Initial Development Study Reference Guide**

| Case | Description  | Parent Case | SO PVRR (\$/M) | Load | Private Gen | CO <sub>2</sub> Policy        | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|------|--|-------------|----------------|------|-------------|-------------------------------|------|-----------|-------------------------------------|
| P-01 | Coal Study Benchmark   | -           | 24,407         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2033                                |
| P-02 | Regional Haze References/<br>Regional Haze Base                  | -           | 23,191         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2031                                |
| P-03 | Regional Haze Intertemporal/<br>Regional Haze Base Intertemporal | -           | 21,951         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2030                                |
| P-04 | Coal Study C-42/ Coal Study Base                                 | -           | 21,720         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2028                                |
| P-06 | Transition Case C-44a/Alternative Base                           | -           | 21,980         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2030                                |
| P-07 | Transition Case C-44b  | P-06        | 21,905         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2029                                |
| P-08 | Naughton 3 Small GC (P-03 basis)                                 | P-03        | 21,979         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2030                                |
| P-09 | Naughton 3 Large GC (P-03 basis)                                 | P-03        | 21,885         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2030                                |
| P-10 | Economic Retirement 1*   | P-04        | 21,723         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2029                                |
| P-11 | Cholla 4 Retirement 2020   | P-09        | 21,873         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2030                                |
| P-12 | Economic Retirement 2*   | P-06        | 21,854         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2029                                |
| P-13 | Bridger 1&2 SCR  | P-11        | 22,346         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2032                                |
| P-14 | Naughton and Jim Bridger Retirement 2022 (P11 Basis)             | P-09        | 21,696         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2028                                |
| P-15 | Retire All Coal by 2030  | P28         | 22,132         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2027                                |
| P-16 | No CO <sub>2</sub>   | P04         | 18,634         | Base | Base        | Med Gas, No CO <sub>2</sub>   | Base | None      | 2028                                |
| P-17 | High CO <sub>2</sub>   | P-15        | 22,070         | Base | Base        | Med Gas, High CO <sub>2</sub> | Base | Segment F | 2028                                |
| P-18 | Social Cost of Carbon  | P-15        | 30,022         | Base | Base        | Low Gas, SCC CO <sub>2</sub>  | Base | Segment F | 2028                                |
| P-19 | Low Gas  | P-04        | 20,882         | Base | Base        | Low Gas, Med CO <sub>2</sub>  | Base | Segment F | 2023                                |
| P-20 | High Gas   | P-07        | 22,746         | Base | Base        | High Gas, Med CO <sub>2</sub> | Base | Segment F | 2029                                |
| P-28 | Early Coalstrip Retirement                                       | P-11        | 21,805         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2030                                |
| P-30 | Naughton 1 & 2 Retirement 2022 (P11 Basis)                       | P-11        | 21,708         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2029                                |
| P-31 | Naughton 1 & 2 Retirement 2025 (P11 Basis)                       | P-11        | 21,652         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2026                                |
| P-32 | Naughton 1 & 2 Retirement 2025 (P07 Basis-No Gadsby 2020)        | P-07        | 21,763         | Base | Base        | Med Gas, Med CO <sub>2</sub>  | Base | Segment F | 2026                                |

|      |   |      |        |      |      |                              |      |           |      |
|------|---|------|--------|------|------|------------------------------|------|-----------|------|
| P-33 | Oregon Study (P11 – JB1 & 2 Retire 2022)                                | P-11 | 21,895 | Base | Base | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2030 |
| P-34 | Oregon Study (P11 – JB1 & 2 Retire 2022, Gadsby Retire)                 | P-11 | 21,949 | Base | Base | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2028 |
| P-35 | Jim Bridger 3 & 4 Retiring 2022 (P11 with JB3 and 4 retiring 2022)      | P-11 | 21,732 | Base | Base | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2029 |
| P-45 | P31 with JB 1 & 2 Retirement  | P-31 | 21,593 | Base | Base | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026 |
| P-46 | P31 with JB 2 & 4 Retirement  | P-31 | 21,419 | Base | Base | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026 |
| P-53 | P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032 | P-31 | 21,438 | Base | Base | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026 |
| P-54 | P-31 with JB2 Retiring 2024   | P-31 | 21,708 | Base | Base | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026 |

**Table K.2 – C-Case Study Reference Guide**

| Case     | Description  | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|----------|--|-------------|---------------|------|-------------|------------------------------|------|-----------|-------------------------------------|
| P-31C    | P-11 with Naughton 1-2 Accelerated to 2025                                 | P-31        | 21,639        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-36C    | Economic Retirement 2* with Gateway Segment F (P12 with Gateway Segment F) | P-36        | 21,553        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-45C    | P31 with JB 1 & 2 Retirement   | P-45        | 21,431        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-46C    | P31 with JB 2 & 4 Retirement   | P-46        | 21,422        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-46J23C | Jim Bridger 3 & 4 Retirement 2023  | P-46        | 21,385        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-47C    | P45 GWS 2025-2028  | P-47        | 21,467        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-48C    | P45 and GWS 2023   | P-48        | 21,482        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-53C    | P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032    | P-53        | 21,450        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-53J23C | Jim Bridger 1 & 2 Retirement 2023  | P-53        | 21,394        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-54C    | P-31 with JB2 Retiring 2024  | P-54        | 21,591        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |

**Table K.3 – CP-Case Study Reference Guide**

| Case      | Description  | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|-----------|--|-------------|---------------|------|-------------|------------------------------|------|-----------|-------------------------------------|
| P-36CP    | Economic Retirement 2* with Gateway Segment F (P12 with Gateway Segment F) | P-36        | 21,553        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-45CP    | P31 with JB 1 & 2 Retirement   | P-45        | 21,480        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-46CP    | P31 with JB 2 & 4 Retirement   | P-46        | 21,460        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-46J23CP | P46C with JB3-4 Retiring 2023  | P-46        | 21,402        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-47CP    | P45 GWS 2025-2028  | P-47        | 21,469        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-48CP    | P45 and GWS 2023   | P-48        | 21,457        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-53CP    | P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032    | P-53        | 21,479        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |

**Table K.4 – Preferred Portfolio Reference Guide**

| Case    | Description      | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|---------|------------------|-------------|---------------|------|-------------|------------------------------|------|-----------|-------------------------------------|
| P-45CNW | P45CP No DJ Wind | P-45        | 21,624        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |

**Table K.5 – FOT Risk Assessment Case Study Reference Guide**

| Case        | Description   | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|-------------|---|-------------|---------------|------|-------------|------------------------------|------|-----------|-------------------------------------|
| P-45CP-FOT  | P31 with JB 1 & 2 Retirement  | P-45CP      | 21,977        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-46CP-FOT  | P31 with JB 2 & 4 Retirement  | P-46CP      | 21,960        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-47CP-FOT  | P45 GWS 2025-2028   | P-47CP      | 21,942        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-48CP-FOT  | P45 and GWS 2023  | P-48CP      | 21,936        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-53CP-FOT  | P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032 | P-53CP      | 21,979        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-45CNW-FOT | P45CP No DJ Wind  | P-45CP      | 22,154        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |

**Table K.6 – Gateway & No Gas Case Study Reference Guide**

| Case    | Description                | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|---------|----------------------------|-------------|---------------|------|-------------|------------------------------|------|-----------|-------------------------------------|
| P-29    | P-45CNW, No New Gas Option | P-45CNW     | 21,798        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | -                                   |
| P-29 PS | P-29 with Pumped Storage   | P-29        | 21,970        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | -                                   |

| Case | Description                                  | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway                       | 1 <sup>st</sup> Year of New Thermal |
|------|--|-------------|---------------|------|-------------|------------------------------|------|-------------------------------|-------------------------------------|
| P-22 | P-45CNW, Energy Gateway Segment D.3          | P-45CNW     | 21,886        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Add D.3                       | 2030                                |
| P-23 | P-45CNW, Energy Gateway Segment D.1 and F    | P-45CNW     | 22,151        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Add Seg. F and D.1            | 2026                                |
| P-25 | P-45CNW, Energy Gateway Segment D.3, E and H | P-45CNW     | 22,273        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Add Sub-seg. D.3 & Seg. E & H | 2028                                |
| P-26 | P-45CNW, Energy Gateway Segment H            | P-45CNW     | 21,579        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Add Seg. H                    | 2028                                |

**Table K.7 – Sensitivity Case Study Reference Guide**

| Case | Description             | Parent Case | SO PVRR (\$m) | Load    | Private Gen | CO <sub>2</sub> Policy | FOTs | Gateway | 1 <sup>st</sup> Year of New Thermal |
|------|-------------------------|-------------|---------------|---------|-------------|------------------------|------|---------|-------------------------------------|
| S-01 | Low Load                | P45CNW      | 20,617        | Low     | Base        | Base                   | Base | Base    | 2030                                |
| S-02 | High Load               | P45CNW      | 22,602        | High    | Base        | Base                   | Base | Base    | 2026                                |
| S-03 | 1 in 20 Load Growth     | P45CNW      | 21,634        | 1 in 20 | Base        | Base                   | Base | Base    | 2026                                |
| S-04 | Low Private Generation  | P45CNW      | 21,758        | Base    | Low         | Base                   | Base | Base    | 2029                                |
| S-05 | High Private Generation | P45CNW      | 21,371        | Base    | High        | Base                   | Base | Base    | 2030                                |
| S-06 | Business Plan           | P45CNW      | 21,695        | Base    | Base        | Base                   | Base | Base    | 2028                                |
| S-07 | No Customer Preference  | P45CNW      | 21,609        | Base    | Base        | Base                   | Base | Base    | 2030                                |
| S-08 | All Customer Preference | P45CNW      | 21,636        | Base    | Base        | Base                   | Base | Base    | 2030                                |

**Table K.8 – DSM Bundled Case Study Reference Guide**

| Case   | Description   | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|--------|---|-------------|---------------|------|-------------|------------------------------|------|-----------|-------------------------------------|
| P-45DP | P31 with JB 1 & 2 Retirement  | P-45        | 21,536        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-46DP | P31 with JB 2 & 4 Retirement  | P-46        | 21,458        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-53DP | P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032 | P-53        | 21,478        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |

**Table K.9 – P70 Case Study Reference Guide**

| Case | Description                 | Parent Case | SO PVRR (\$m) | Load | Private Gen | CO <sub>2</sub> Policy       | FOTs | Gateway   | 1 <sup>st</sup> Year of New Thermal |
|------|-----------------------------|-------------|---------------|------|-------------|------------------------------|------|-----------|-------------------------------------|
| P-70 | P-01 with JB 1 2022 RET     | P-01        | 22,326        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-71 | P-01 with NTN 1 2022 RET    | P-01        | 22,482        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-72 | P-01 with Hayden 1 2022 RET | P-01        | 22,432        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-73 | P-01 with Hunter 1 RET      | P-01        | 22,455        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |
| P-74 | P-01 with Craig 1 2022 RET  | P-01        | 22,447        | Base | Base        | Med Gas, Med CO <sub>2</sub> | Base | Segment F | 2026                                |

**Table K.10 – East Side Resource Name and Description**

| Resource List                           | Detailed Description   |
|---|--|
| CCCT - DJohns - J 1x1                   | Combine Cycle Combustion Turbine J-Machine 1x1 with Duct Firing - Dave Johnston Brownfield |
| CCCT - Utah-S - J 1x1                   | Combine Cycle Combustion Turbine J-Machine 1x1 with Duct Firing - Utah South               |
| CCCT - Utah-S - G 1x1                   | Combine Cycle Combustion Turbine G-Machine 1x1 with Duct Firing - Utah South               |
| IC Aero UN                              | Inter-cooled Simple Cycle Combustion Turbine Aero - Utah North                             |
| SCCT Aero UN                            | Simple Cycle Combustion Turbine Aero - Utah North  |
| SCCT Frame DJ                           | Simple Cycle Combustion Turbine Frame - Dave Johnston Brownfield                           |
| SCCT Frame UTN                          | Simple Cycle Combustion Turbine Frame - Utah North   |
| SCCT Frame UTS                          | Simple Cycle Combustion Turbine Frame - Utah North   |
| Battery Storage - Utah S                | Battery Storage - Utah South   |
| Battery Storage - WYSW                  | Battery Storage - Wyoming Southwest  |
| Battery Storage - Idaho                 | Battery Storage - Idaho  |
| CAES - East                             | Compressed Air Energy Storage  |
| Wind, DJohnston                         | Wind, Wyoming After DJ Retirement  |
| Wind, GO                                | Wind, Goshen Idaho   |
| Wind, UT                                | Wind, Utah   |
| Wind, WYAE                              | Wind, Wyoming Aeolus   |
| Wind+Storage, GO                        | Wind + Battery, Goshen Idaho   |
| Wind+Storage, UT                        | Wind + Battery, Utah   |
| Wind+Storage, WYAE                      | Wind + Battery, Wyoming Aeolus   |
| Utility Solar - PV - Utah-S             | Utility Solar - Photovoltaic - Utah South  |
| Utility Solar - PV - WYSW               | Utility Solar - Photovoltaic - Wyoming Southwest   |
| Utility Solar - PV - Utah-N             | Utility Solar - Photovoltaic - Utah North  |
| Utility Solar+Storage - PV - Utah-S     | Utility Solar + Battery - Photovoltaic - Utah South  |
| Utility Solar+Storage - PV - GO         | Utility Solar + Battery - Photovoltaic - Goshen Idaho                                      |
| Utility Solar+Storage - PV - Huntington | Utility Solar + Battery - Photovoltaic - Huntington Brownfield                             |
| Utility Solar+Storage - PV - Utah-N     | Utility Solar + Battery - Photovoltaic - Utah North  |
| Demand Response, ID-3rd Party Contracts | Curtailement - Idaho   |
| Demand Response, ID-Smart APPI          | Direct Load Control Smart Appliances - Idaho   |
| Demand Response, ID-Cool/WH             | Direct Load Control-Cooling & Water Heating-Residential, Commercial & Industrial - Idaho   |
| Demand Response, ID-Thermostat          | Direct Load Control-Smart Thermostat-Residential - Idaho                                   |
| Demand Response, ID-Space HT            | Direct Load Control-Space Heating-Residential, Commercial & Industrial - Idaho             |

|   |  |
|---|--|
| Demand Response, ID-Irrigate            | Direct Load Control-Irrigation -Idaho  |
| Demand Response, UT-Cool/WH             | Direct Load Control-Cooling & Water Heating-Residential, Commercial & Industrial - Utah    |
| Demand Response, UT-3rd Party Contracts | Curtailement - Utah  |
| Demand Response, UT-Elec Vehicle        | Direct Load Control-Electric Vehicle Charging -Utah  |
| Demand Response, UT-Smart APPI          | Direct Load Control-Cooling & Water Heating-Residential, Commercial & Industrial - Utah    |
| Demand Response, UT-Space HT            | Direct Load Control-Space Heating-Residential, Commercial & Industrial - Utah              |
| Demand Response, UT-Thermostat          | Direct Load Control-Smart Thermostat-Residential - Utah                                    |
| Demand Response, UT-ICE storage         | Ice Energy Storage - Utah  |
| Demand Response, UT-Irrigate            | Direct Load Control-Irrigation -Utah   |
| Demand Response, WY-Cool/WH             | Direct Load Control-Cooling & Water Heating-Residential, Commercial & Industrial - Wyoming |
| Demand Response, WY-Irrigate            | Direct Load Control-Irrigation -Wyoming  |
| Demand Response, WY-3rd Party Contracts | Curtailement - Wyoming   |
| Demand Response, WY-Ancillary Services  | Ancillary Services - Wyoming   |
| Demand Response, WY-ICE storage         | Ice Energy Storage - Wyoming   |
| Demand Response, WY-Room AC             | Direct Load Control-Air Conditioning - Wyoming   |
| Demand Response, WY-Smart APPI          | Direct Load Control Smart Appliances - Wyoming   |
| Demand Response, WY-Thermostat          | Direct Load Control-Smart Thermostat-Residential - Wyoming                                 |
| Demand Response, WY-Space HT            | Direct Load Control-Space Heating-Residential, Commercial & Industrial - Wyoming           |
| Energy Efficiency, ID                   | Energy Efficiency - Idaho  |
| Energy Efficiency, UT                   | Energy Efficiency - Utah   |
| Energy Efficiency, WY                   | Energy Efficiency - Wyoming  |
| FOT Mona - SMR                          | Front Office Transaction - Summer HLH Product - Mona                                       |

**Table K.11 – West-Side Resource Name and Description**

| Resource List                           | Detailed Description  |
|---|---|
| CCCT - SOregonCal - J 1x1               | Combine Cycle Combustion Turbine J-Machine 1x1 with Duct Firing - Southern Oregon             |
| CCCT - WillamValcc - G 1x1              | Combine Cycle Combustion Turbine G-Machine 1x1 with Duct Firing - Willamette Valley, Oregon   |
| CCCT - WillamValcc - J 1x1              | Combine Cycle Combustion Turbine J-Machine 1x1 with Duct Firing - Willamette Valley, Oregon   |
| CCCT - Yakima - G 1x1                   | Combine Cycle Combustion Turbine G-Machine 1x1 with Duct Firing - Yakima, Washington          |
| IC Aero PO                              | Inter-cooled Simple Cycle Combustion Turbine Aero - Portland-North Coast, Oregon              |
| IC Aero SO                              | Inter-cooled Simple Cycle Combustion Turbine Aero - Southern Oregon                           |
| IC Aero WV                              | Inter-cooled Simple Cycle Combustion Turbine Aero - Willamette Valley, Oregon                 |
| IC Aero WW                              | Inter-cooled Simple Cycle Combustion Turbine Aero - Walla Walla, Washington                   |
| SCCT Frame SO                           | Simple Cycle Combustion Turbine Frame - Southern Oregon                                       |
| Battery Storage - S Oregon              | Battery Storage – West  |
| Battery Storage - Wilamette Valley      | Battery Storage – West  |
| Battery Storage - Portland NC           | Battery Storage – West  |
| Battery Storage - Walla Walla           | Battery Storage – West  |
| Battery Storage - Yakima                | Battery Storage – West  |
| Wind, SO                                | Wind, Southern Oregon   |
| Wind, YK                                | Wind, Yakima, Washington  |
| Wind+Storage, SO                        | Wind + Battery, Southern Oregon   |
| Wind+Storage, YK                        | Wind + Battery, Yakima, Washington  |
| Utility Solar - PV - S-Oregon           | Utility Solar - Photovoltaic - Southern Oregon  |
| Utility Solar - PV - Yakima             | Utility Solar - Photovoltaic - Yakima, Washington   |
| Utility Solar+Storage - PV - Jbridger   | Utility Solar + Battery - Photovoltaic - Bridger Plant  |
| Utility Solar+Storage - PV - S-Oregon   | Utility Solar + Battery- Photovoltaic - Southern Oregon                                       |
| Utility Solar+Storage - PV - Yakima     | Utility Solar + Battery- Photovoltaic - Yakima, Washington                                    |
| Geothermal, Greenfield - West           | Geothermal, Greenfield - West   |
| Demand Response, CA-Cool/WH             | Direct Load Control-Cooling & Water Heating-Residential, Commercial & Industrial - California |
| Demand Response, CA-3rd Party Contracts | Curtailement - California   |
| Demand Response, CA-Irrigate            | Direct Load Control-Irrigation - California   |
| Demand Response, CA-ICE storage         | Ice Energy Storage - California   |
| Demand Response, CA-Thermostat          | Direct Load Control-Smart Thermostat-Residential - California                                 |
| Demand Response, CA-Space HT            | Direct Load Control-Space Heating-Residential, Commercial & Industrial - California           |
| Demand Response, OR-Cool/WH             | Direct Load Control-Cooling & Water Heating-Residential, Commercial & Industrial - Oregon     |



|   |   |
|---|---|
| Demand Response, OR-3rd Party Contracts | Curtailment - Oregon  |
| Demand Response, OR-Irrigate            | Direct Load Control-Irrigation -Oregon  |
| Demand Response, OR-Thermostat          | Direct Load Control-Smart Thermostat-Residential - Oregon                                     |
| Demand Response, OR-Ancillary Services  | Ancillary Services - Oregon   |
| Demand Response, OR-Elec Vehicle        | Direct Load Control-Electric Vehicle Charging - Oregon  |
| Demand Response, OR-ICE storage         | Ice Energy Storage - Oregon   |
| Demand Response, OR-Thermostat          | Direct Load Control-Smart Thermostat-Residential - Oregon                                     |
| Demand Response, OR-Room AC             | Direct Load Control-Air Conditioning - Oregon   |
| Demand Response, OR-Smart APPI          | Direct Load Control Smart Appliances - Oregon   |
| Demand Response, WA-Cool/WH             | Direct Load Control-Cooling & Water Heating-Residential, Commercial & Industrial - Washington |
| Demand Response, WA-3rd Party Contracts | Curtailment - Washington  |
| Demand Response, WA-Irrigate            | Direct Load Control-Irrigation -Washington  |
| Demand Response, WA-Thermostat          | Direct Load Control-Smart Thermostat-Residential - Washington                                 |
| Demand Response, WA-Ancillary Services  | Ancillary Services - Washington   |
| Demand Response, WA-ICE storage         | Ice Energy Storage - Washington   |
| Demand Response, WA-Room AC             | Direct Load Control-Air Conditioning - Washington   |
| Demand Response, WA-Smart APPI          | Direct Load Control Smart Appliances - Washington   |
| Energy Efficiency, CA                   | Energy Efficiency - California  |
| Energy Efficiency, OR                   | Energy Efficiency - Oregon  |
| Energy Efficiency, WA                   | Energy Efficiency - Washington  |
| FOT COB - SMR                           | Front Office Transaction - Summer HLH Product - California Oregon Border                      |
| FOT COB - WTR                           | Front Office Transaction - Winter HLH Product - California Oregon Border                      |
| FOT MidColumbia - SMR                   | Front Office Transaction - Summer HLH Product - Mid Columbia                                  |
| FOT MidColumbia - SMR - 2               | Front Office Transaction - Summer HLH Product - Mid Columbia                                  |
| FOT MidColumbia - WTR                   | Front Office Transaction - Winter HLH Product - Mid Columbia                                  |
| FOT MidColumbia - WTR2                  | Front Office Transaction - Winter HLH Product - Mid Columbia                                  |
| FOT NOB - SMR                           | Front Office Transaction - Summer HLH Product - Nevada Oregon Border                          |
| FOT NOB - WTR                           | Front Office Transaction - Winter HLH Product - Nevada Oregon Border                          |

Table K.12 - Initial Cases, Detailed Capacity Expansion Portfolios

| Portfolio | P-01   | Capacity (MW) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Resource Totals 1/- |      |      |         |         |
|-----------|--|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------|------|------|---------|---------|
|           |  | 2019          | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036                | 2037 | 2038 | 10-year | 20-year |
| East      | Existing Plant Retirements and PPA Termination | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | (82)    | (82)    |
|           | Unit 1 (Coal Early Retirement/Conversions)     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Unit 2   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Hayden 1                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Hayden 2                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Huntington 1                                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Huntington 2                                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | DaveJohnston 1                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | DaveJohnston 2                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | DaveJohnston 3                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | DaveJohnston 4                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Naughton 1                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Naughton 2                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Cadaby 1-6                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Retire - Hydro                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Retire - Wind                                  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Expire - Wind PPA                              | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Expire - Solar PPA                             | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Retire - Other                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Expansion Resources                            | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | SCCT Frame NTN                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | SCCT Frame WYSSW                               | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Total SCCT                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Wind, Dickinson                                | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Wind, CO                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Wind, WYAE                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Total Wind                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar - PV - Utah-S                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar - PV - WYSSW                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar/Storage - PV - Utah-S            | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar/Storage - PV - Huntington        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar - PV - Utah-N                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar/Storage - PV - Utah-N            | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Total Solar                                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, ID-Cool/WH                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, ID-3rd Party Contracts        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, ID-Irrigate                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, ID-Thermostat                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, UT-Cool/WH                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, UT-3rd Party Contracts        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, UT-Irrigate                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, UT-Thermostat                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, WY-Cool/WH                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, WY-3rd Party Contracts        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, WY-Irrigate                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, WY-Thermostat                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, UT-Ancillary Services         | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, WY-Ancillary Services         | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response Total                          | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Energy Efficiency, ID                          | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Energy Efficiency, UT                          | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Energy Efficiency, WY                          | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Energy Efficiency Total                        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Battery Storage - Utah-N                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Battery Storage - WYSSW                        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Battery Storage - Idaho                        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | FOI East - Summer                              | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | FOI East - Winter                              | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
| West      | Existing Plant Retirements and PPA Termination | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Jimbridge 1                                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Jimbridge 2                                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Jimbridge 3                                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Jimbridge 4                                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Idaho 1  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Retire - Hydro                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Expire - Wind PPA                              | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Expire - Solar PPA                             | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Expansion Resources                            | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | SCCT Frame WY                                  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Total SCCT                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar - PV - S-Oregon                  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar - PV - Yakima                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar/Storage - PV - Jbringer          | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar - PV - Walls Walls               | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Utility Solar/Storage - PV - Yakima            | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Total Solar                                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, OR-Ancillary Services         | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, WA-Ancillary Services         | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, CA-Cool/WH                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, CA-3rd Party Contracts        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, CA-Irrigate                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, CA-Thermostat                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, OR-Cool/WH                    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, OR-3rd Party Contracts        | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, OR-Irrigate                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                   | -    | -    | -       | -       |
|           | Demand Response, OR-Thermostat                 | -             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                     |      |      |         |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average

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| East | P-05 | Capacity (MW)                                     |      |       |       |       |       |       |      |      |       |      |       |       |      |       |      |      |       |       |       | Resource Totals 1/ |         |       |
|------|------|---|------|-------|-------|-------|-------|-------|------|------|-------|------|-------|-------|------|-------|------|------|-------|-------|-------|--------------------|---------|-------|
|      |      | 2019  | 2020 | 2021  | 2022  | 2023  | 2024  | 2025  | 2026 | 2027 | 2028  | 2029 | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |       |
|      |      | Existing Plant Retirements and PPA Termination    |      |       |       |       |       |       |      |      |       |      |       |       |      |       |      |      |       |       |       |                    |         |       |
|      |      | Craig 1 (Coal Early Retirement/Conversions)       | -    | -     | -     | -     | -     | -     | (82) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |       |
|      |      | Craig 2   | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | (82) | -     | -     | -     | -                  | (82)    |       |
|      |      | Havden 1  | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | (44)  | -    | -     | -    | -    | -     | -     | -     | -                  | (44)    |       |
|      |      | Havden 2  | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | (33)  | -    | -     | -    | -    | -     | -     | -     | -                  | (33)    |       |
|      |      | Huntington 1                                      | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | (459) | -     | -                  | (459)   |       |
|      |      | Huntington 2                                      | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | (450) | -     | -                  | (450)   |       |
|      |      | Cholla 4 (Coal Early Retirement/Conversions)      | -    | -     | (387) | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (387)              | (387)   |       |
|      |      | Dave Johnston 1                                   | -    | -     | -     | -     | -     | -     | -    | -    | (99)  | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (99)               | (99)    |       |
|      |      | Dave Johnston 2                                   | -    | -     | -     | -     | -     | -     | -    | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (106)              | (106)   |       |
|      |      | Dave Johnston 3                                   | -    | -     | -     | -     | -     | -     | -    | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (220)              | (220)   |       |
|      |      | Dave Johnston 4                                   | -    | -     | -     | -     | -     | -     | -    | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (330)              | (330)   |       |
|      |      | Naughton 1 (Coal Early Retirement/Conversions)    | -    | -     | -     | -     | (156) | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (156)              | (156)   |       |
|      |      | Naughton 2 (Coal Early Retirement/Conversions)    | -    | -     | -     | -     | (201) | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (201)              | (201)   |       |
|      |      | Naughton 3 (Coal Early Retirement/Conversions)    | -    | (280) | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (280)              | (280)   |       |
|      |      | Cadaby I-6  | -    | -     | (238) | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | (119) | -    | -    | -     | -     | -     | (238)              | (356)   |       |
|      |      | Retire - Hydro                                    | -    | -     | -     | -     | -     | (20)  | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (20)               | (20)    |       |
|      |      | Retire - Wind                                     | -    | -     | -     | -     | -     | -     | -    | -    | -     | (40) | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (40)    |       |
|      |      | Expire - Wind PPA                                 | -    | (27)  | (17)  | (49)  | (0)   | -     | (65) | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -     | (160)              | (924)   |       |
|      |      | Expire - Solar PPA                                | -    | -     | -     | -     | (1)   | (1)   | -    | -    | -     | -    | -     | -     | -    | -     | (35) | (94) | (849) | -     | -     | (1)                | (979)   |       |
|      |      | Retire - Other                                    | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | (1)  | -    | -     | -     | (32)  | -                  | (33)    |       |
|      |      | Expansion Resources                               |      |       |       |       |       |       |      |      |       |      |       |       |      |       |      |      |       |       |       |                    |         |       |
|      |      | SCCT Frame WYSW                                   | -    | -     | -     | -     | -     | -     | -    | -    | 370   | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 370                | 370     |       |
|      |      | Total SCCT  | -    | -     | -     | -     | -     | -     | -    | -    | 370   | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 370                | 370     |       |
|      |      | Wind, Dickinson                                   | -    | -     | -     | -     | -     | -     | -    | -    | 620   | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 620                | 620     |       |
|      |      | Wind, GE  | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | 1,100 | -    | -     | -    | -    | -     | -     | -     | -                  | 1,100   |       |
|      |      | Wind, WVAE  | -    | -     | -     | -     | -     | 1,920 | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 1,920              | 1,920   |       |
|      |      | Total Wind  | -    | -     | -     | -     | -     | 1,920 | -    | -    | 620   | -    | 1,100 | -     | -    | -     | -    | -    | -     | -     | -     | 2,540              | 3,640   |       |
|      |      | Utility Solar - PV - Utah-S                       | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | 29   | -     | -    | -    | 400   | -     | -     | -                  | 429     |       |
|      |      | Utility Solar - PV - WYSW                         | -    | -     | -     | -     | 100   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 100                | 100     |       |
|      |      | Utility Solar/Storage - PV - Utah-S               | -    | -     | -     | -     | 300   | -     | -    | -    | -     | -    | -     | -     | 471  | -     | -    | -    | -     | -     | -     | 300                | 771     |       |
|      |      | Utility Solar - PV - Naughton                     | -    | -     | -     | -     | 425   | 212   | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 637                | 637     |       |
|      |      | Utility Solar - PV - Huntington                   | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 19    | -     | 19                 | 19      |       |
|      |      | Utility Solar/Storage - PV - Huntington           | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 890   | -     | 890                | 890     |       |
|      |      | Utility Solar/Storage - PV - Utah-N               | -    | -     | 159   | 64    | 77    | 600   | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 900                | 900     |       |
|      |      | Total Solar                                       | -    | -     | 159   | 64    | 802   | 912   | -    | -    | -     | -    | -     | 500   | -    | -     | -    | 400  | 909   | -     | -     | 1,937              | 3,746   |       |
|      |      | Demand Response, ID-Cool/WH                       | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 2.6   | -     | -                  | 2.6     |       |
|      |      | Demand Response, ID-3rd Party Contracts           | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | 1.8   | -    | -    | -     | -     | -     | -                  | 1.8     |       |
|      |      | Demand Response, ID-Irrigate                      | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | 5.2   | -    | -    | -     | -     | -     | -                  | 5.2     |       |
|      |      | Demand Response, ID-Thermostat                    | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 3.7   | -                  | 3.7     |       |
|      |      | Demand Response, UT-Cool/WH                       | 4.1  | -     | 7.0   | -     | 9.9   | -     | -    | 7.2  | -     | -    | 6.7   | -     | -    | -     | -    | 7.0  | -     | -     | -     | 8.3                | 8.3     |       |
|      |      | Demand Response, UT-3rd Party Contracts           | -    | -     | -     | -     | 31.8  | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 42.3  | -                  | 42.3    |       |
|      |      | Demand Response, UT-Irrigate                      | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 1.9   | -                  | 1.9     |       |
|      |      | Demand Response, UT-Thermostat                    | -    | -     | -     | -     | 79.4  | -     | -    | -    | 37.3  | -    | -     | 8.2   | -    | -     | -    | 8.3  | -     | -     | -     | 5.1                | -       | 5.1   |
|      |      | Demand Response, WY-Cool/WH                       | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 3.4   | -     | 3.4                | 3.4     |       |
|      |      | Demand Response, WY-3rd Party Contracts           | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |       |
|      |      | Demand Response, WY-Irrigate                      | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | 1.8   | -    | -    | -     | -     | -     | -                  | 1.8     |       |
|      |      | Demand Response, WY-Thermostat                    | -    | -     | -     | -     | 12.9  | -     | -    | -    | -     | -    | -     | -     | -    | 5.8   | -    | -    | -     | -     | -     | 1.2                | -       | 1.2   |
|      |      | Demand Response, UT-Ancillary Services            | -    | -     | 8.3   | -     | -     | -     | 5.3  | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 3.2   | -     | -                  | 3.2     |       |
|      |      | Demand Response, WY-Ancillary Services            | -    | -     | -     | -     | -     | -     | 3.0  | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |       |
|      |      | Demand Response Total                             | 4.1  | -     | 15.3  | -     | 134.0 | -     | 8.2  | 7.2  | -     | 37.3 | 6.7   | -     | 8.2  | 6.8   | 14.6 | -    | 15.3  | -     | 103.0 | 21.6               | 205.9   | 382.2 |
|      |      | Energy Efficiency, ID                             | 6    | 6     | 6     | 7     | 7     | 7     | 7    | 7    | 7     | 7    | 6     | 6     | 6    | 6     | 6    | 4    | 4     | 3     | 3     | 3                  | 3       |       |
|      |      | Energy Efficiency, UT                             | 58   | 67    | 67    | 69    | 71    | 66    | 65   | 65   | 62    | 62   | 57    | 54    | 52   | 50    | 49   | 36   | 33    | 26    | 24    | 652                | 1,055   |       |
|      |      | Energy Efficiency, WY                             | 10   | 12    | 13    | 14    | 16    | 16    | 16   | 17   | 18    | 18   | 16    | 14    | 13   | 12    | 11   | 9    | 8     | 7     | 5     | 5                  | 149     | 250   |
|      |      | Energy Efficiency Total                           | 74   | 85    | 86    | 90    | 95    | 89    | 89   | 88   | 86    | 87   | 80    | 74    | 71   | 67    | 65   | 49   | 46    | 36    | 32    | 870                | 1,421   |       |
|      |      | Battery Storage - Utah-N                          | -    | -     | -     | -     | 240.0 | -     | -    | -    | -     | -    | 45.0  | -     | -    | -     | -    | -    | -     | 285   | 435   | 240                | 1,005   |       |
|      |      | Battery Storage - WYSW                            | -    | -     | -     | -     | 60.0  | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 60.0               | 435.0   |       |
|      |      | Battery Storage - Idaho                           | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 225.0              | 225.0   |       |
|      |      | POT East - Summer                                 | -    | -     | -     | -     | 295   | -     | -    | -    | 300   | 183  | 197   | 264   | 205  | 223   | 225  | 300  | 300   | 300   | 300   | 60                 | 155     |       |
| West | P-05 | Existing Plant Retirements and PPA Termination    |      |       |       |       |       |       |      |      |       |      |       |       |      |       |      |      |       |       |       |                    |         |       |
|      |      | Jim Bridger 1 (Coal Early Retirement/Conversions) | -    | -     | -     | (351) | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (351)              | (351)   |       |
|      |      | Jim Bridger 2 (Coal Early Retirement/Conversions) | -    | -     | -     | (356) | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | (356)              | (356)   |       |
|      |      | Jim Bridger 3                                     | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | (349) | -                  | (349)   |       |
|      |      | Jim Bridger 4                                     | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | (353) | -                  | (353)   |       |
|      |      | Hermiston   | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |       |
|      |      | Retire - Hydro                                    | -    | (1)   | (169) | -     | (1)   | -     | -    | (1)  | -     | (7)  | -     | -     | (6)  | -     | -    | (75) | -     | (1)   | (237) | -                  | (237)   |       |
|      |      | Expire - Wind PPA                                 | -    | -     | -     | (175) | -     | (41)  | -    | -    | -     | (75) | -     | (10)  | -    | (20)  | (20) | -    | (10)  | (10)  | -     | (179)              | (262)   |       |
|      |      | Expire - Solar PPA                                | -    | -     | -     | -     | -     | -     | -    | -    | (2)   | (75) | -     | (67)  | (49) | -     | -    | (1)  | (115) | (175) | (11)  | (2)                | (420)   |       |
|      |      | Expansion Resources                               |      |       |       |       |       |       |      |      |       |      |       |       |      |       |      |      |       |       |       |                    |         |       |
|      |      | SCCT Frame WY                                     | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 443   | -     | -                  | 443     |       |
|      |      | Total SCCT  | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 443   | -     | -                  | 443     |       |
|      |      | Utility Solar - PV - S-Oregon                     | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | 90    | -    | -    | -     | -     | -     | -                  | 90      |       |
|      |      | Utility Solar - PV - Yakima                       | -    | -     | -     | -     | 228   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -     | 228                | 228     |       |
|      |      | Utility Solar - PV - J Bridger                    | -    | -     | -     | -     | 275   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 13    | 275                | 288     |       |
|      |      | Utility Solar/Storage - PV - J Bridger            | -    | -     | -     | -     | 438   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 330   | 438                | 768     |       |
|      |      | Utility Solar - PV - Walls Walls                  | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | 100   | -    | -    | -     | -     | -     | -                  | 100     |       |
|      |      | Utility Solar/Storage - PV - S-Oregon             | -    | -     | -     | -     | 500   | -     | -    | -    | -     | -    | -     | -     | -    | 385   | -    | -    | -     | -     | -     | 500                | 885     |       |
|      |      | Utility Solar/Storage - PV - Yakima               | -    | -     | -     | -     | 177   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 430   | -     | 177                | 607     |       |
|      |      | Total Solar                                       | -    | -     | -     | 713   | 905   | -     | -    | -    | -     | -    | -     | -     | 100  | 475   | -    | -    | -     | 430   | 343   | 1,618              | 2,966   |       |
|      |      | Demand Response, OR-Ancillary Services            | -    | -     | -     | -     | -     | -     | -    | -    | -     | 8    | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 8       |       |
|      |      | Demand Response, WA-Ancillary Services            | -    | -     | -     | -     | -     | -     | -    | -    | -     | 1.9  | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 1.9     |       |
|      |      | Demand Response, CA-Cool/WH                       | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 1.5   | -                  | 1.5     |       |
|      |      | Demand Response, CA-3rd Party Contracts           | -    | -     | -     | -     | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 1.1   | -                  | 1.1     |       |
|      |      | Demand Response, CA-Irrigate                      |      |       |       |       |       |       |      |      |       |      |       |       |      |       |      |      |       |       |       |                    |         |       |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

| East | P-07  | Capacity (MW) |       |       |       |       |       |      |      |       |       |       |       |       |      |       |      |      |       |       |       | Resource Totals 1/ |         |
|------|---|---------------|-------|-------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|------|-------|------|------|-------|-------|-------|--------------------|---------|
|      |   | 2019          | 2020  | 2021  | 2022  | 2023  | 2024  | 2025 | 2026 | 2027  | 2028  | 2029  | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |
| East | Existing Plant Retirements and PPA Termination  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |
|      | Craig 1 (Coal Early Retirement/Conversions)     | -             | -     | -     | -     | -     | -     | -    | (82) | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |
|      | Craig 2 (Coal Early Retirement/Conversions)     | -             | -     | -     | -     | -     | -     | -    | (82) | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |
|      | Hayden 1  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -     | -                  | (44)    |
|      | Hayden 2  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -     | -                  | (33)    |
|      | Huntington 1                                    | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | (459) | -     | (459)              |         |
|      | Huntington 2                                    | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | (450) | -     | (450)              |         |
|      | Colstrip 3 (Coal Early Retirement/Conversions)  | -             | -     | -     | -     | -     | -     | -    | -    | (74)  | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (74)               | (74)    |
|      | Colstrip 4 (Coal Early Retirement/Conversions)  | -             | -     | -     | -     | -     | -     | -    | -    | (74)  | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (74)               | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)    | -             | -     | (387) | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (387)              | (387)   |
|      | DaveJohnston 1                                  | -             | -     | -     | -     | -     | -     | -    | -    | (99)  | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (99)               | (99)    |
|      | DaveJohnston 2                                  | -             | -     | -     | -     | -     | -     | -    | -    | (106) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (106)              | (106)   |
|      | DaveJohnston 3                                  | -             | -     | -     | -     | -     | -     | -    | -    | (220) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (220)              | (220)   |
|      | DaveJohnston 4                                  | -             | -     | -     | -     | -     | -     | -    | -    | (330) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (330)              | (330)   |
|      | Naughton 1                                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | (156) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (156)              | (156)   |
|      | Naughton 2                                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | (201) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (201)              | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)  | -             | (280) | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (280)              | (280)   |
|      | Gadsby 1-6                                      | -             | -     | (238) | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | (119) | -    | -    | -     | -     | -     | (238)              | (238)   |
|      | Retire - Hydro                                  | -             | -     | -     | -     | -     | (20)  | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (20)               | (20)    |
|      | Retire - Wind                                   | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | Expire - Wind PPA                               | -             | (27)  | (17)  | (49)  | (0)   | -     | -    | (65) | (3)   | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -     | (160)              | (924)   |
|      | Expire - Solar PPA                              | -             | -     | -     | -     | -     | (1)   | (1)  | -    | -     | -     | -     | -     | -     | -    | -     | -    | (35) | (94)  | (849) | -     | (1)                | (979)   |
|      | Retire - Other                                  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (32)  | -                  | (33)    |
|      | Coal Ret. WY - Gas RePower                      | -             | 247   | -     | -     | -     | -     | -    | -    | -     | -     | -     | (247) | -     | -    | -     | -    | -    | -     | -     | -     | 247                | -       |
|      | Expansion Resources                             | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | SCCT Frame NTN                                  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | 370   | 555   | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 555     |
|      | SCCT Frame WYSW                                 | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | 370   | 555   | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 555     |
|      | Total SCCT                                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | 370   | 555   | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 555     |
|      | Wind, Dickinson                                 | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | 620   | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 620     |
|      | Wind, CO  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | 1,055 | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 1,055   |
|      | Wind, WVAE                                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | 1,920              | 1,920   |
|      | Total Wind                                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | 620   | 1,055 | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 1,920   |
|      | Utility Solar - PV - Utah-S                     | -             | -     | 146   | 59    | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | 400  | -     | -     | -     | 205                | 605     |
|      | Utility Solar - PV - WYSW                       | -             | -     | -     | -     | -     | 100   | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | 100                | 100     |
|      | Utility Solar/Storage - PV - Utah-S             | -             | -     | -     | -     | -     | 95    | -    | -    | -     | -     | -     | 500   | -     | -    | -     | -    | -    | -     | -     | -     | 95                 | 595     |
|      | Utility Solar/Storage - PV - CO                 | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | 45    | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 45      |
|      | Utility Solar - PV - Huntington                 | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 27    | -     | 27                 | 27      |
|      | Utility Solar/Storage - PV - Huntington         | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 882   | -     | 882                | 882     |
|      | Utility Solar - PV - Utah-N                     | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | 900   | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 900     |
|      | Total Solar                                     | -             | -     | 146   | 59    | -     | 195   | -    | -    | -     | -     | -     | 900   | 545   | -    | -     | -    | 400  | 909   | -     | 400   | 3,155              | 3,155   |
|      | Demand Response, ID-Cool/WH                     | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 2.6   | -     | 2.6                | 2.6     |
|      | Demand Response, ID-3rd Party Contracts         | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.8   | -     | 1.8                | 1.8     |
|      | Demand Response, ID-Ingate                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | 5.2  | -     | -    | -    | -     | 3.7   | -     | 10.6               | 10.6    |
|      | Demand Response, ID-Thermostat                  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 8.3   | -     | 8.3                | 8.3     |
|      | Demand Response, UT-Cool/WH                     | 4.1           | -     | 7.0   | -     | 9.9   | -     | -    | -    | 7.2   | -     | -     | 6.7   | -     | 6.8  | -     | -    | 7.0  | -     | -     | 7.2   | 28.1               | 55.9    |
|      | Demand Response, UT-3rd Party Contracts         | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 74.1  | -     | 76.7               | 76.7    |
|      | Demand Response, UT-Ingate                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.9   | -     | 1.9                | 1.9     |
|      | Demand Response, UT-Thermostat                  | -             | -     | -     | -     | -     | -     | -    | -    | -     | 116.7 | -     | 8.2   | -     | -    | -     | -    | 8.3  | -     | -     | 5.1   | 116.7              | 138.3   |
|      | Demand Response, WY-Cool/WH                     | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.4   | 1.8   | -                  | 5.2     |
|      | Demand Response, WY-3rd Party Contracts         | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 39.4  | -     | 39.4               | 39.4    |
|      | Demand Response, WY-Ingate                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.8   | -     | 1.8                | 1.8     |
|      | Demand Response, WY-Thermostat                  | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 18.7  | -     | 18.7               | 18.7    |
|      | Demand Response, UT-Ancillary Services          | -             | -     | 8.3   | -     | -     | -     | -    | 5.3  | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 1.2   | -                  | 19.9    |
|      | Demand Response, WY-Ancillary Services          | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.2   | -     | 13.5               | 16.7    |
|      | Demand Response, Total                          | 4.1           | -     | 15.3  | -     | 9.9   | -     | -    | 3.0  | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | 3.0                | 3.0     |
|      | Energy Efficiency, ID                           | 6             | 6     | 6     | 7     | 8     | 7     | 7    | 8.2  | 7.2   | -     | 116.7 | 6.7   | 8.2   | -    | 12.0  | 20.5 | -    | 15.3  | -     | 136.6 | 21.6               | 161.2   |
|      | Energy Efficiency, UT                           | 58            | 67    | 67    | 73    | 75    | 68    | 67   | 65   | 63    | 62    | 54    | 54    | 52    | 50   | 49    | 36   | 32   | 26    | 25    | 26    | 665                | 1,069   |
|      | Energy Efficiency, WY                           | 10            | 12    | 13    | 14    | 18    | 16    | 17   | 17   | 17    | 17    | 15    | 14    | 13    | 12   | 11    | 9    | 8    | 7     | 5     | 5     | 150                | 249     |
|      | Energy Efficiency, Total                        | 74            | 85    | 86    | 93    | 100   | 91    | 91   | 89   | 87    | 87    | 76    | 75    | 71    | 67   | 65    | 49   | 44   | 36    | 33    | 34    | 883                | 1,434   |
|      | Battery Storage - Utah-N                        | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 300   | 615                | 915     |
|      | Battery Storage - WYSW                          | -             | -     | -     | -     | 150.0 | -     | -    | -    | -     | -     | -     | 300.0 | -     | -    | -     | -    | -    | -     | -     | 105.0 | 450.0              | 555.0   |
|      | Battery Storage - Idaho                         | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 300.0 | 75.0  | -                  | 375.0   |
|      | POT East - Summer                               | -             | -     | -     | -     | -     | -     | -    | -    | -     | 286   | 212   | 296   | 300   | 174  | 298   | 300  | 300  | 300   | 300   | 300   | 29                 | 153     |
| West | Existing Plant Retirements and PPA Termination  | -             | -     | -     | -     | -     | (351) | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (351)              | (351)   |
|      | JimBridge 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | -     | (351) | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (351)              | (351)   |
|      | JimBridge 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | (356) | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (356)   |
|      | JimBridge 3                                     | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (349) | -                  | (349)   |
|      | JimBridge 4                                     | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (353) | -                  | (353)   |
|      | Hermiston                                       | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (237) | -                  | (237)   |
|      | Retire - Hydro                                  | -             | (1)   | (169) | -     | (1)   | (41)  | -    | (1)  | (7)   | -     | (75)  | -     | (6)   | -    | (75)  | -    | (1)  | -     | -     | (179) | (262)              | (262)   |
|      | Expire - Wind PPA                               | -             | -     | -     | (175) | -     | (41)  | -    | -    | -     | -     | (75)  | -     | (10)  | -    | (20)  | -    | (10) | -     | (10)  | -     | (216)              | (360)   |
|      | Expire - Solar PPA                              | -             | -     | -     | -     | -     | -     | -    | -    | -     | (2)   | -     | (67)  | -     | -    | -     | -    | (1)  | (115) | (175) | (11)  | (2)                | (420)   |
|      | Expansion Resources                             | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | SCCT Frame WY                                   | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 443   | -                  | 443     |
|      | Total SCCT                                      | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 443   | -                  | 443     |
|      | Utility Solar - PV - S-Oregon                   | -             | -     | -     | -     | -     | 90    | -    | -    | -     | -     | -     | -     | -     | 179  | -     | -    | -    | -     | -     | -     | 90                 | 269     |
|      | Utility Solar - PV - Yakima                     | -             | -     | -     | -     | -     | 405   | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | 405                | 777     |
|      | Utility Solar - PV - Bridger                    | -             | -     | -     | -     | -     | 354   | -    | -    | -     | -     | -     | 359   | -     | -    | -     | -    | -    | -     | -     | -     | 354                | 737     |
|      | Utility Solar/Storage - PV - Bridger            | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 24    | 354                | 737     |
|      | Utility Solar - PV - Walla Walla                | -             | -     | -     | -     | -     | -     | -    | -    | -     | -     | -     | -     | -     | -    | 100   | -    | -    | -     | -     | -     | 100                | 100     |



| East | P-08   | Capacity (MW) |       |       |       |      |      |      |       |      |       |       |       |       |      |       |      |      |       |       | Resource Totals 1/ |         |         |
|------|--|---------------|-------|-------|-------|------|------|------|-------|------|-------|-------|-------|-------|------|-------|------|------|-------|-------|--------------------|---------|---------|
|      |  | 2019          | 2020  | 2021  | 2022  | 2023 | 2024 | 2025 | 2026  | 2027 | 2028  | 2029  | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038               | 10-year | 20-year |
| East | Existing Plant Retirements and PPA Termination   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -       |
|      | Crng 1 (Coal Early Retirement/Conversions)       | -             | -     | -     | -     | -    | -    | -    | (82)  | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Crng 2 (Coal Early Retirement/Conversions)       | -             | -     | -     | -     | -    | -    | -    | -     | (82) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Hayden 1   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -                  | -       | (44)    |
|      | Hayden 2   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -                  | -       | (33)    |
|      | Huntington 1                                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (459) | -                  | -       | (459)   |
|      | Huntington 2                                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (450) | -                  | -       | (450)   |
|      | Colstrip 3 (Coal Early Retirement/Conversions)   | -             | -     | -     | -     | -    | -    | -    | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (74)    |
|      | Colstrip 4 (Coal Early Retirement/Conversions)   | -             | -     | -     | -     | -    | -    | -    | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -     | -     | -     | -    | -    | -    | (387) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (387)   |
|      | DaveJohnston 1                                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | (99)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (99)    |
|      | DaveJohnston 2                                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | (106) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (106)   |
|      | DaveJohnston 3                                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | (220) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (220)   |
|      | DaveJohnston 4                                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | (330) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (330)   |
|      | Naughton 1                                       | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | (156) | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (156)   |
|      | Naughton 2                                       | -             | -     | -     | -     | -    | -    | -    | -     | -    | (201) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)   | -             | (280) | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (280)   | (280)   |
|      | Cuddy 1-6  | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -                  | -       | (356)   |
|      | Retire - Hydro                                   | -             | -     | -     | -     | -    | (20) | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (20)    | (20)    |
|      | Retire - Wind                                    | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | (40)  | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (40)    |
|      | Expire - Wind PPA                                | -             | (27)  | (17)  | (49)  | (0)  | -    | -    | (65)  | (3)  | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -                  | (160)   | (924)   |
|      | Expire - Solar PPA                               | -             | -     | -     | -     | (1)  | (1)  | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | (35) | (94)  | (849) | -                  | (1)     | (979)   |
|      | Retire - Other                                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | (1)  | -    | -     | -     | (32)               | -       | (33)    |
|      | Coal Ret. WY - Gas RePower                       | -             | 35    | -     | -     | -    | -    | -    | -     | -    | -     | -     | (35)  | -     | -    | -     | -    | -    | -     | -     | -                  | 35      | -       |
|      | Expansion Resources                              | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -       |
|      | SCCT Frame NTN                                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | 370   | -     | -    | -     | 185  | -    | -     | -     | -                  | -       | 555     |
|      | SCCT Frame WYSW                                  | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | 370   | -     | -    | -     | 370  | -    | -     | -     | -                  | -       | 370     |
|      | Total SCCT                                       | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | 370   | -     | -    | -     | 555  | -    | -     | -     | -                  | -       | 925     |
|      | Wind, Dickinson                                  | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | 620   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 620     |
|      | Wind, CO   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | 1,100 | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 1,100   |
|      | Wind, WYAE                                       | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 1,920   |
|      | Total Wind                                       | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | 620   | 1,100 | -    | -     | -    | -    | -     | -     | -                  | -       | 3,640   |
|      | Utility Solar - PV - Utah-S                      | -             | -     | 146   | 59    | 67   | 28   | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | 400   | -     | -                  | 300     | 700     |
|      | Utility Solar - PV - WYSW                        | -             | -     | -     | -     | -    | 100  | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 100     | 100     |
|      | Utility Solar/Storage - PV - Utah-S              | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | 500   | -    | -     | -    | -    | -     | -     | -                  | -       | 500     |
|      | Utility Solar/Storage - PV - Huntington          | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 909   | -                  | -       | 909     |
|      | Utility Solar - PV - Utah-N                      | -             | -     | -     | -     | -    | -    | -    | -     | 11   | 37    | -     | 729   | -     | -    | -     | -    | -    | -     | -     | -                  | 47      | 776     |
|      | Utility Solar/Storage - PV - Utah-N              | -             | -     | -     | -     | -    | 124  | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 124     | 124     |
|      | Total Solar                                      | -             | -     | 146   | 59    | 67   | 252  | -    | -     | 11   | 37    | -     | 729   | 500   | -    | -     | -    | -    | 400   | 909   | -                  | 571     | 3,109   |
|      | Demand Response, ID-Cool/WH                      | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | 2.6   | -     | -                  | -       | 2.6     |
|      | Demand Response, ID-3rd Party Contracts          | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | 1.8  | -    | -     | -     | -                  | -       | 1.8     |
|      | Demand Response, ID-Irrigate                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | 5.2  | -     | -    | -    | -     | 3.7   | 1.8                | -       | 10.6    |
|      | Demand Response, ID-Thermostat                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 8.3   | -                  | -       | 8.3     |
|      | Demand Response, UT-Cool/WH                      | 4.1           | -     | 7.0   | -     | 9.9  | -    | -    | 7.2   | -    | -     | 6.7   | -     | -     | -    | 6.8   | -    | -    | 7.0   | -     | 7.2                | 28.1    | 55.9    |
|      | Demand Response, UT-3rd Party Contracts          | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 74.1  | 2.6                | -       | 76.7    |
|      | Demand Response, UT-Irrigate                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.9   | -                  | -       | 1.9     |
|      | Demand Response, UT-Thermostat                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | 116.7 | 8.2   | -     | -    | -     | -    | 8.3  | -     | -     | 5.1                | -       | 138.3   |
|      | Demand Response, WY-Cool/WH                      | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 3.4                | 1.8     | 5.2     |
|      | Demand Response, WY-3rd Party Contracts          | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 39.4               | -       | 39.4    |
|      | Demand Response, WY-Irrigate                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | 1.8   | -    | -    | -     | -     | -                  | -       | 1.8     |
|      | Demand Response, WY-Thermostat                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | 18.7  | -    | -    | -     | -     | 1.2                | -       | 19.9    |
|      | Demand Response, UT-Ancillary Services           | -             | -     | 8.3   | -     | -    | -    | -    | 5.3   | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.2   | -                  | 13.5    | 16.7    |
|      | Demand Response, WY-Ancillary Services           | -             | -     | -     | -     | -    | -    | -    | 3.0   | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 3.0     | 6.0     |
|      | Demand Response Total                            | 4.1           | -     | 15.3  | -     | 9.9  | -    | 8.2  | 7.2   | -    | -     | 123.3 | 8.2   | -     | 12.0 | 22.3  | -    | 15.3 | -     | 134.8 | 21.6               | 44.6    | 382.2   |
|      | Energy Efficiency, ID                            | 6             | 6     | 6     | 7     | 7    | 7    | 7    | 7     | 7    | 7     | 6     | 6     | 6     | 6    | 6     | 4    | 4    | 3     | 3     | 3                  | 69      | 117     |
|      | Energy Efficiency, UT                            | 58            | 67    | 67    | 68    | 69   | 68   | 67   | 68    | 65   | 62    | 54    | 56    | 52    | 50   | 49    | 36   | 32   | 26    | 25    | 26                 | 659     | 1,065   |
|      | Energy Efficiency, WY                            | 10            | 10    | 11    | 14    | 15   | 16   | 17   | 18    | 19   | 18    | 15    | 14    | 13    | 12   | 9     | 8    | 7    | 6     | 6     | 6                  | 149     | 254     |
|      | Energy Efficiency Total                          | 74            | 83    | 85    | 88    | 91   | 92   | 92   | 94    | 91   | 87    | 76    | 76    | 72    | 68   | 66    | 49   | 45   | 37    | 33    | 35                 | 876     | 1,433   |
|      | Battery Storage - Utah-N                         | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | 300.0 | -     | -     | -    | -     | -    | -    | -     | 330   | 330                | 300     | 960     |
|      | Battery Storage - WYSW                           | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | 165.0 | -     | -     | -    | -     | -    | -    | -     | 225.0 | 45.0               | 165.0   | 435.0   |
|      | Battery Storage - Idaho                          | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 210.0 | 210.0              | 420.0   | 420.0   |
|      | POT East - Summer                                | -             | -     | -     | -     | -    | -    | -    | -     | -    | 101   | 298   | 292   | 300   | 261  | 227   | 229  | 300  | 300   | 300   | 300                | 10      | 145     |
| West | Existing Plant Retirements and PPA Termination   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -       |
|      | Jimbringer 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | (351) | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (351)   |
|      | Jimbringer 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -                  | -       | (356)   |
|      | Jimbringer 3                                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (349)              | -       | (349)   |
|      | Jimbringer 4                                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (353)              | -       | (353)   |
|      | Hermiston  | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (237)              | -       | (237)   |
|      | Retire - Hydro                                   | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (262)   |
|      | Expire - Wind PPA                                | -             | (1)   | (169) | -     | (1)  | (41) | -    | (1)   | -    | (7)   | -     | (6)   | -     | -    | -     | (75) | -    | (1)   | -     | (179)              | -       | (179)   |
|      | Expire - Solar PPA                               | -             | -     | -     | (175) | -    | -    | -    | -     | -    | (75)  | (10)  | -     | -     | (20) | (20)  | -    | (75) | -     | (10)  | (10)               | (216)   | (360)   |
|      | Expire - Solar PPA                               | -             | -     | -     | -     | -    | -    | -    | -     | -    | (2)   | -     | (67)  | (49)  | -    | -     | -    | (1)  | (115) | (175) | (11)               | (2)     | (420)   |
|      | Expansion Resources                              | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -       |
|      | SCCT Frame WY                                    | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | 221   | -    | -    | -     | 221   | -                  | -       | 443     |
|      | Total SCCT                                       | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | 221   | -    | -    | -     | 221   | -                  | -       | 443     |
|      | Utility Solar - PV - S-Oregon                    | -             | -     | -     | -     | -    | 500  | -    | -     | -    | -     | -     | 114   | 14    | -    | -     | -    | -    | -     | -     | -                  | 500     | 628     |
|      | Utility Solar - PV - Yakima                      | -             | -     | -     | -     | -    | 405  | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 31                 | 405     | 436     |
|      | Utility Solar - PV - Bridger                     | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | 354   | -     | -     | -    | 298   | -    | -    | -     | -     | -                  | 652     | 652     |
|      | Utility Solar/Storage - PV - Bridger             | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | -    | 61    | -    | -    | -     | -     | 343                | -       | 404     |
|      | Utility Solar - PV - Walla Walla                 | -             | -     | -     | -     | -    | -    | -    | -     | -    | -     | -     | -     | -     | 100  | -     | -    | -    | -     | -     | -                  | 100     | 100     |
|      | Utility Solar/Storage - PV - S-Oregon            |               |       |       |       |      |      |      |       |      |       |       |       |       |      |       |      |      |       |       |                    |         |         |

| East | P-09   | Capacity (MW) |       |       |       |      |      |       |       |      |       |       |       |       |      |       |      |      |       |       |       | Resource Totals 1/ |         |
|------|--|---------------|-------|-------|-------|------|------|-------|-------|------|-------|-------|-------|-------|------|-------|------|------|-------|-------|-------|--------------------|---------|
|      |  | 2019          | 2020  | 2021  | 2022  | 2023 | 2024 | 2025  | 2026  | 2027 | 2028  | 2029  | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |
| East | Existing Plant Retirements and PPA Termination   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |
|      | Crng 1 (Coal Early Retirement/Conversions)       | -             | -     | -     | -     | -    | -    | -     | -     | (82) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |
|      | Crng 2 (Coal Early Retirement/Conversions)       | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |
|      | Hayden 1   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -     | -                  | (44)    |
|      | Hayden 2   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -     | -                  | (33)    |
|      | Huntington 1                                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (459) | -     | -                  | (459)   |
|      | Huntington 2                                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (450) | -     | -                  | (450)   |
|      | Coktrip 3 (Coal Early Retirement/Conversions)    | -             | -     | -     | -     | -    | -    | -     | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (74)    |
|      | Coktrip 4 (Coal Early Retirement/Conversions)    | -             | -     | -     | -     | -    | -    | -     | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -     | -     | -     | -    | -    | -     | (387) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (387)   |
|      | DaveJohnston 1                                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | (99)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (99)               | (99)    |
|      | DaveJohnston 2                                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | (106) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (106)              | (106)   |
|      | DaveJohnston 3                                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | (220) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (220)              | (220)   |
|      | DaveJohnston 4                                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | (330) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (330)              | (330)   |
|      | Naughton 1                                       | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | (156) | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (156)   |
|      | Naughton 2                                       | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | (201) | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)   | -             | (280) | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (280)              | (280)   |
|      | Cadaby 1-6                                       | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -     | -                  | (356)   |
|      | Retire - Hydro                                   | -             | -     | -     | -     | -    | -    | (20)  | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (20)               | (20)    |
|      | Retire - Wind                                    | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | (40)  | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (40)    |
|      | Expire - Wind PPA                                | -             | (27)  | (17)  | (49)  | (0)  | -    | -     | (65)  | (3)  | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -     | (160)              | (924)   |
|      | Expire - Solar PPA                               | -             | -     | -     | -     | -    | (1)  | (1)   | -     | -    | -     | -     | -     | -     | -    | -     | -    | (35) | (94)  | (849) | -     | (1)                | (979)   |
|      | Retire - Other                                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | (1)  | -    | -     | -     | (32)  | -                  | (33)    |
|      | Coal Ret. WY - Gas RePower                       | -             | 247   | -     | -     | -    | -    | -     | -     | -    | -     | -     | (247) | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 247     |
|      | Expansion Resources                              | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | SCCT Frame NTN                                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | 370   | -     | -    | 185   | -    | -    | -     | -     | -     | -                  | 555     |
|      | SCCT Frame WYSW                                  | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | 370   | -     | -    | 370   | -    | -    | -     | -     | -     | -                  | 370     |
|      | Total SCCT                                       | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | 370   | -     | -    | 555   | -    | -    | -     | -     | -     | -                  | 925     |
|      | Wind, Dickinson                                  | -             | -     | -     | -     | -    | -    | -     | -     | 620  | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 620     |
|      | Wind, CO   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | 1,083 | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 1,083   |
|      | Wind, WYAE                                       | -             | -     | -     | -     | -    | -    | 1,920 | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | 1,920              | 1,920   |
|      | Total Wind                                       | -             | -     | -     | -     | -    | -    | 1,920 | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | 1,920              | 3,623   |
|      | Utility Solar - PV - Utah-S                      | -             | -     | 146   | 59    | 67   | 28   | -     | -     | -    | -     | 620   | 1,083 | -     | -    | -     | -    | -    | 400   | -     | -     | 300                | 700     |
|      | Utility Solar - PV - WYSW                        | -             | -     | -     | -     | -    | 100  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 100   | 100                |         |
|      | Utility Solar/Storage - PV - Utah-S              | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | 500   | -    | -     | -    | -    | -     | -     | -     | 500                |         |
|      | Utility Solar/Storage - PV - W                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | 17    | -    | -     | -    | -    | -     | -     | -     | 17                 |         |
|      | Utility Solar/Storage - PV - Huntington          | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 897   | 12    | 909                |         |
|      | Utility Solar - PV - Utah-N                      | -             | -     | -     | -     | -    | -    | -     | -     | -    | 37    | -     | 729   | -     | -    | -     | -    | -    | -     | -     | -     | 37                 | 765     |
|      | Utility Solar/Storage - PV - Utah-N              | -             | -     | -     | -     | -    | 135  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 135   | 135                |         |
|      | Total Solar                                      | -             | -     | 146   | 59    | 67   | 263  | -     | -     | -    | 37    | -     | 729   | 517   | -    | -     | -    | -    | 400   | 897   | 12    | 571                | 3,226   |
|      | Demand Response, ID-Cool/WH                      | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 2.6   | -     | -                  | 2.6     |
|      | Demand Response, ID-3rd Party Contracts          | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | 1.8   | -    | -    | -     | -     | -     | -                  | 1.8     |
|      | Demand Response, ID-Irrigate                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | 5.2  | -     | -    | -    | -     | 3.7   | 1.8   | -                  | 10.6    |
|      | Demand Response, ID-Thermostat                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 8.3   | -     | -                  | 8.3     |
|      | Demand Response, UT-Cool/WH                      | 4.1           | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | Demand Response, UT-Cool/WH                      | -             | -     | 7.0   | -     | 9.9  | -    | -     | 7.2   | -    | -     | 6.7   | -     | -     | -    | 6.8   | -    | 7.0  | -     | -     | 7.2   | 28.1               | 55.9    |
|      | Demand Response, UT-3rd Party Contracts          | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 74.1  | 2.6   | -                  | 76.7    |
|      | Demand Response, UT-Irrigate                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 1.9   | -                  | 1.9     |
|      | Demand Response, UT-Thermostat                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | 124.9 | -     | -    | -     | -    | 8.3  | -     | -     | 5.1   | -                  | 138.3   |
|      | Demand Response, WY-Cool/WH                      | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.4   | 1.8   | -                  | 5.2     |
|      | Demand Response, WY-3rd Party Contracts          | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 39.4  | -     | -                  | 39.4    |
|      | Demand Response, WY-Irrigate                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | 1.8   | -    | -    | -     | -     | -     | -                  | 1.8     |
|      | Demand Response, WY-Thermostat                   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | 18.7  | -    | -    | -     | -     | 1.2   | -                  | 19.9    |
|      | Demand Response, UT-Ancillary Services           | -             | -     | -     | -     | -    | 8.3  | -     | 5.3   | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.2   | -     | 13.5               | 16.7    |
|      | Demand Response, WY-Ancillary Services           | -             | -     | -     | -     | -    | -    | 3.0   | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 3.0     |
|      | Demand Response Total                            | 4.1           | -     | 7.0   | -     | 18.1 | -    | 8.2   | 7.2   | -    | -     | 6.7   | 124.9 | -     | 12.0 | 22.3  | -    | 15.3 | -     | 134.8 | 21.6  | 44.6               | 382.2   |
|      | Energy Efficiency, ID                            | 6             | 6     | 6     | 7     | 6    | 7    | 7     | 7     | 7    | 6     | 6     | 6     | 6     | 6    | 4     | 4    | 3    | 3     | 3     | 3     | 68                 | 126     |
|      | Energy Efficiency, UT                            | 58            | 67    | 67    | 68    | 69   | 68   | 67    | 68    | 65   | 64    | 62    | 54    | 52    | 50   | 49    | 36   | 32   | 26    | 25    | 26    | 659                | 1,063   |
|      | Energy Efficiency, WY                            | 10            | 10    | 11    | 14    | 15   | 16   | 17    | 18    | 19   | 18    | 15    | 14    | 13    | 12   | 11    | 9    | 8    | 7     | 5     | 5     | 147                | 248     |
|      | Energy Efficiency Total                          | 74            | 83    | 85    | 88    | 91   | 92   | 91    | 93    | 91   | 87    | 76    | 74    | 71    | 68   | 66    | 49   | 45   | 37    | 33    | 35    | 874                | 1,427   |
|      | Battery Storage - Utah-N                         | -             | -     | -     | -     | -    | -    | -     | -     | -    | 405.0 | -     | -     | -     | -    | -     | -    | -    | -     | 60    | 225   | 405                | 690     |
|      | Battery Storage - WYSW                           | -             | -     | -     | -     | -    | -    | -     | -     | -    | 45.0  | -     | -     | -     | -    | -     | -    | -    | -     | -     | 300.0 | 45.0               | 345.0   |
|      | Battery Storage - Idaho                          | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 225.0 | 60.0  | -                  | 285.0   |
|      | POT East - Summer                                | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | 131   | 294   | 300   | 290  | 269   | 271  | 300  | 300   | 300   | 300   | -                  | 138     |
| West | Existing Plant Retirements and PPA Termination   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | Jimbridget 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | (351) | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | (351)   |
|      | Jimbridget 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -     | -                  | (356)   |
|      | Jimbridget 3                                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (349) | -                  | (349)   |
|      | Jimbridget 4                                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (353) | -                  | (353)   |
|      | Hemiston   | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | Retire - Hydro                                   | -             | (1)   | (169) | -     | (1)  | -    | -     | (1)   | -    | (7)   | -     | -     | -     | -    | -     | (75) | -    | (1)   | -     | (237) | -                  | (237)   |
|      | Expire - Wind PPA                                | -             | -     | -     | (175) | -    | (41) | -     | -     | -    | -     | (75)  | (10)  | -     | (20) | (20)  | -    | -    | (10)  | (10)  | -     | (216)              | (360)   |
|      | Expire - Solar PPA                               | -             | -     | -     | -     | -    | -    | -     | -     | -    | (2)   | -     | -     | (67)  | (49) | -     | -    | (1)  | (115) | (175) | (11)  | (2)                | (420)   |
|      | Expansion Resources                              | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |
|      | SCCT Frame WY                                    | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | 221   | -    | -    | -     | 221   | -     | -                  | 443     |
|      | Total SCCT                                       | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | 221   | -    | -    | -     | 221   | -     | -                  | 443     |
|      | Utility Solar - PV - S-Oregon                    | -             | -     | -     | -     | -    | 482  | -     | -     | -    | -     | -     | -     | -     | 276  | -     | -    | -    | -     | -     | -     | 482                | 758     |
|      | Utility Solar - PV - Yakima                      | -             | -     | -     | -     | -    | 405  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | 405                | 405     |
|      | Utility Solar - PV - Bridger                     | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | 354   | -     | -     | -    | -     | 359  | -    | -     | -     | -     | -                  | 713     |
|      | Utility Solar/Storage - PV - Bridger             | -             | -     | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 702   | -                  | 702     |
|      | Utility Solar - PV - Walla Walla                 | -             | -     | -     | -     | -    |      |       |       |      |       |       |       |       |      |       |      |      |       |       |       |                    |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

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| East | P-13   | Capacity (MW)                                  |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |      |       |       |       | Resource Totals 1/ |         |       |
|------|--|--|-------|-------|-------|------|-------|------|------|------|-------|-------|-------|-------|------|-------|------|------|-------|-------|-------|--------------------|---------|-------|
|      |  | 2019   | 2020  | 2021  | 2022  | 2023 | 2024  | 2025 | 2026 | 2027 | 2028  | 2029  | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |       |
|      |  | Existing Plant Retirements and PPA Termination |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |      |       |       |       |                    |         |       |
|      | Crnig 1 (Coal Early Retirement/Conversions)    | -  | -     | -     | -     | -    | -     | -    | (82) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |       |
|      | Crnig 2 (Coal Early Retirement/Conversions)    | -  | -     | -     | -     | -    | -     | -    | -    | (82) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (82)               | (82)    |       |
|      | Hayden 1                                       | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -     | (44)               | (44)    |       |
|      | Hayden 2                                       | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -     | (33)               | (33)    |       |
|      | Huntington 1                                   | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (459) | -     | (459)              | (459)   |       |
|      | Huntington 2                                   | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (450) | -     | (450)              | (450)   |       |
|      | Colstrip 3 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | -    | -     | -    | -    | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (74)               | (74)    |       |
|      | Colstrip 4 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | -    | -     | -    | -    | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (74)               | (74)    |       |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -  | -     | (387) | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (387)              | (387)   |       |
|      | DaveJohnston 1                                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | (99)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (99)               | (99)    |       |
|      | DaveJohnston 2                                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | (106) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (106)              | (106)   |       |
|      | DaveJohnston 3                                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | (220) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (220)              | (220)   |       |
|      | DaveJohnston 4                                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | (330) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (330)              | (330)   |       |
|      | Naughton 1                                     | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | (156) | -     | -     | -    | -     | -    | -    | -     | -     | -     | (156)              | (156)   |       |
|      | Naughton 2                                     | -  | -     | -     | -     | -    | -     | -    | -    | -    | (201) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (201)              | (201)   |       |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -  | (280) | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (280)              | (280)   |       |
|      | Cuddy 1-6                                      | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -     | (356)              | (356)   |       |
|      | Retire - Hydro                                 | -  | -     | -     | -     | -    | (20)  | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (20)               | (20)    |       |
|      | Retire - Wind                                  | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | (40)  | -     | -    | -     | -    | -    | -     | -     | -     | (40)               | (40)    |       |
|      | Expire - Wind PPA                              | (27)   | (17)  | (49)  | (0)   | -    | -     | -    | (65) | (3)  | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -     | (160)              | (924)   |       |
|      | Expire - Solar PPA                             | -  | -     | -     | -     | (1)  | (1)   | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | (35) | (94)  | (849) | -     | (1)                | (979)   |       |
|      | Retire - Other                                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | (1)  | -    | -     | -     | (32)  | -                  | (33)    |       |
|      | Coal Ret. WY - Gas RePower                     | -  | 247   | -     | -     | -    | -     | -    | -    | -    | -     | -     | (247) | -     | -    | -     | -    | -    | -     | -     | -     | 247                | -       |       |
|      | Expansion Resources                            |  |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |      |       |       |       |                    |         |       |
|      | SCCT Frame NTN                                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | 185  | 370   | -    | -    | -     | -     | -     | -                  | 555     |       |
|      | SCCT Frame WYSW                                | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 370   | -     | -                  | 370     |       |
|      | Total SCCT                                     | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | 185  | 370   | -    | -    | -     | -     | 370   | -                  | 925     |       |
|      | Wind, Dickinson                                | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | 620   | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 620     |       |
|      | Wind, CO                                       | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | 1,099 | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 1,099   |       |
|      | Wind, WYAE                                     | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 1,920   |       |
|      | Total Wind                                     | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | 620   | 1,099 | -    | -     | -    | -    | -     | -     | -     | -                  | 1,920   |       |
|      | Utility Solar - PV - Utah-S                    | -  | -     | 146   | 59    | 67   | 1,920 | -    | -    | -    | -     | -     | 620   | 1,099 | -    | -     | -    | -    | -     | -     | -     | 1,920              | 3,639   |       |
|      | Utility Solar - PV - WYSW                      | -  | -     | -     | -     | -    | 100   | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | 400   | -     | -     | -                  | 300     |       |
|      | Utility Solar/Storage - PV - Utah-S            | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 100     |       |
|      | Utility Solar/Storage - PV - Huntington        | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 500     |       |
|      | Utility Solar - PV - Utah-N                    | -  | -     | -     | -     | -    | -     | -    | -    | 40   | 37    | -     | 3     | 726   | -    | -     | -    | -    | -     | -     | 909   | -                  | 909     |       |
|      | Utility Solar/Storage - PV - Utah-N            | -  | -     | -     | -     | -    | 95    | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 76      |       |
|      | Total Solar                                    | -  | -     | 146   | 59    | 67   | 223   | -    | -    | 40   | 37    | 3     | 726   | 500   | -    | -     | -    | -    | -     | 400   | -     | 909                | 571     | 3,109 |
|      | Demand Response, ID-Cool/WH                    | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 2.6   | -     | -                  | 2.6     |       |
|      | Demand Response, ID-3rd Party Contracts        | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.8   | -     | -                  | 1.8     |       |
|      | Demand Response, ID-Irrigate                   | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.7   | 1.8   | -                  | 10.6    |       |
|      | Demand Response, ID-Thermostat                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 8.3   | -     | -                  | 8.3     |       |
|      | Demand Response, UT-Cool/WH                    | 4.1  | -     | 7.0   | -     | 9.9  | -     | -    | 7.2  | -    | -     | 6.7   | -     | -     | -    | -     | -    | 7.0  | -     | -     | 7.2   | 28.1               | 55.9    |       |
|      | Demand Response, UT-3rd Party Contracts        | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 2.6   | -     | -                  | 2.6     |       |
|      | Demand Response, UT-Irrigate                   | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 74.1  | 1.9   | -                  | 76.7    |       |
|      | Demand Response, UT-Thermostat                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.9   | -     | -                  | 1.9     |       |
|      | Demand Response, WY-Cool/WH                    | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.4   | 1.8   | -                  | 5.2     |       |
|      | Demand Response, WY-3rd Party Contracts        | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 39.4  | -     | -                  | 39.4    |       |
|      | Demand Response, WY-Irrigate                   | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.8   | -     | -                  | 1.8     |       |
|      | Demand Response, WY-Thermostat                 | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 18.7  | 1.2   | -                  | 19.9    |       |
|      | Demand Response, UT-Ancillary Services         | -  | -     | -     | -     | -    | 8.3   | -    | 5.3  | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.2   | -     | -                  | 13.5    |       |
|      | Demand Response, WY-Ancillary Services         | -  | -     | -     | -     | -    | -     | -    | 3.0  | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 3.0     |       |
|      | Demand Response Total                          | 4.1  | -     | 7.0   | -     | 18.1 | -     | -    | 8.2  | 7.2  | -     | 6.7   | 124.9 | -     | -    | 12.0  | -    | -    | 15.3  | -     | 157.1 | 21.6               | 44.6    |       |
|      | Energy Efficiency, ID                          | 6  | 6     | 6     | 7     | 7    | 7     | 7    | 7    | 7    | 6     | 6     | 6     | 6     | 6    | 6     | 4    | 3    | 3     | 3     | 3     | 68                 | 115     |       |
|      | Energy Efficiency, UT                          | 58   | 67    | 67    | 68    | 69   | 68    | 67   | 68   | 65   | 62    | 54    | 53    | 52    | 50   | 49    | 36   | 32   | 26    | 20    | 22    | 659                | 1,053   |       |
|      | Energy Efficiency, WY                          | 10   | 10    | 11    | 14    | 15   | 16    | 16   | 18   | 19   | 18    | 15    | 14    | 13    | 12   | 11    | 9    | 8    | 7     | 5     | 5     | 147                | 247     |       |
|      | Energy Efficiency Total                        | 74   | 83    | 85    | 88    | 91   | 91    | 93   | 91   | 91   | 87    | 76    | 74    | 71    | 68   | 65    | 49   | 45   | 36    | 28    | 30    | 873                | 1,415   |       |
|      | Battery Storage - Utah-N                       | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |       |
|      | Battery Storage - WYSW                         | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |       |
|      | Battery Storage - Idaho                        | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |       |
|      | POT East - Summer                              | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | -       |       |
|      | Existing Plant Retirements and PPA Termination |  |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |      |       |       |       |                    |         |       |
|      | JimHedger 1                                    | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (351) | -                  | (351)   |       |
|      | JimHedger 2                                    | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (356)              | (356)   |       |
|      | JimHedger 3                                    | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (349)              | (349)   |       |
|      | JimHedger 4                                    | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | (353)              | (353)   |       |
|      | Hermiston                                      | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (237) | -                  | (237)   |       |
|      | Retire - Hydro                                 | -  | (1)   | (169) | -     | (1)  | -     | -    | (1)  | -    | -     | (7)   | -     | (6)   | -    | -     | (75) | -    | (1)   | -     | -     | (179)              | (262)   |       |
|      | Expire - Wind PPA                              | -  | -     | -     | (175) | -    | (41)  | -    | -    | -    | -     | (75)  | (10)  | -     | (20) | (20)  | -    | -    | (10)  | (10)  | -     | (216)              | (360)   |       |
|      | Expire - Solar PPA                             | -  | -     | -     | -     | -    | -     | -    | -    | -    | (2)   | -     | -     | (67)  | (49) | -     | -    | (1)  | (115) | (175) | (11)  | (2)                | (420)   |       |
|      | Expansion Resources                            |  |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |      |       |       |       |                    |         |       |
|      | SCCT Frame WY                                  | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 443     |       |
|      | Total SCCT                                     | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 443     |       |
|      | Utility Solar - PV - S-Oregon                  | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 500     |       |
|      | Utility Solar - PV - Yakima                    | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 405     |       |
|      | Utility Solar/Storage - PV - Hedger            | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 1,056   |       |
|      | Utility Solar - PV - Walla Walla               | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 100     |       |
|      | Utility Solar/Storage - PV - S-Oregon          | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 72      |       |
|      | Utility Solar/Storage - PV - Yakima            | -  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -     | -                  | 430     |       |
|      | Total Solar                                    | -  | -     | -     | -     | -    | 905   | -    | -    | -    | -     | -     | -     | 503   | 72   | -     | -    | -    | -     | 430   | 1,056 | 905                | 2,966   |       |
|      | Demand Response, OR-Ancillary Services         | -  | -     |       |       |      |       |      |      |      |       |       |       |       |      |       |      |      |       |       |       |                    |         |       |



| East | P-15  | Capacity (MW)                                  |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       | Resource Totals 1/ |         |         |
|------|---|--|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|--------------------|---------|---------|
|      |   | 2019   | 2020 | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  | 2028  | 2029  | 2030  | 2031  | 2032  | 2033  | 2034  | 2035 | 2036  | 2037  | 2038               | 10-year | 20-year |
|      |   | Existing Plant Retirements and PPA Termination |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |                    |         |         |
|      | Crane 1 (Coal Early Retirement/Conversions)       | -  | -    | -     | -     | -     | (82)  | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (82)    | (82)    |
|      | Crane 2 (Coal Early Retirement/Conversions)       | -  | -    | -     | -     | -     | (82)  | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (82)    | (82)    |
|      | Hayden 1 (Coal Early Retirement/Conversions)      | -  | -    | -     | -     | -     | -     | -     | (44)  | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (44)    | (44)    |
|      | Hayden 2 (Coal Early Retirement/Conversions)      | -  | -    | -     | -     | -     | -     | (33)  | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (33)    | (33)    |
|      | Hunter 1 (Coal Early Retirement/Conversions)      | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | (418) | -     | -     | -     | -     | -     | -    | -     | -     | -                  | -       | (418)   |
|      | Hunter 2 (Coal Early Retirement/Conversions)      | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | (269) | -     | -     | -     | -     | -    | -     | -     | -                  | -       | (269)   |
|      | Hunter 3 (Coal Early Retirement/Conversions)      | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | (471) | -     | -     | -     | -    | -     | -     | -                  | -       | (471)   |
|      | Huntington 1 (Coal Early Retirement/Conversions)  | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | (459) | -     | -     | -     | -     | -    | -     | -     | -                  | -       | (459)   |
|      | Huntington 2 (Coal Early Retirement/Conversions)  | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | (450) | -     | -     | -     | -     | -    | -     | -     | -                  | -       | (450)   |
|      | Colstrip 3 (Coal Early Retirement/Conversions)    | -  | -    | -     | -     | -     | -     | -     | -     | (74)  | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (74)    | (74)    |
|      | Colstrip 4 (Coal Early Retirement/Conversions)    | -  | -    | -     | -     | -     | -     | -     | -     | (74)  | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (74)    | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)      | -  | -    | (387) | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (387)   | (387)   |
|      | DaveJohnston 1                                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | (99)  | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (99)    | (99)    |
|      | DaveJohnston 2                                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | (106) | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (106)   | (106)   |
|      | DaveJohnston 3                                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | (220) | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (220)   | (220)   |
|      | DaveJohnston 4                                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | (330) | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (330)   | (330)   |
|      | Naughton 1 (Coal Early Retirement/Conversions)    | -  | -    | -     | -     | -     | (156) | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (156)   | (156)   |
|      | Naughton 2 (Coal Early Retirement/Conversions)    | -  | -    | -     | -     | (201) | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (201)   | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)    | -  | -    | (280) | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (280)   | (280)   |
|      | Wyodak (Coal Early Retirement/Conversions)        | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | (268) | -     | -     | -     | -     | -    | -     | -     | -                  | -       | (268)   |
|      | Gadsby 1-6  | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | (356) | -     | -    | -     | -     | -                  | -       | (356)   |
|      | Retire - Hydro                                    | -  | -    | -     | -     | -     | (20)  | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (20)    | (20)    |
|      | Retire - Wind                                     | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | (40)  | -     | -     | -     | -     | -     | -    | -     | -     | -                  | -       | (40)    |
|      | Expire - Wind PPA                                 | -  | (27) | (17)  | (49)  | (0)   | -     | -     | (65)  | (3)   | -     | (19)  | (99)  | (200) | (45)  | (181) | (80)  | -    | (60)  | (80)  | -                  | (160)   | (924)   |
|      | Expire - Solar PPA                                | -  | -    | -     | -     | -     | (1)   | (1)   | -     | -     | -     | -     | -     | -     | -     | -     | -     | (35) | (94)  | (849) | -                  | (1)     | (979)   |
|      | Retire - Other                                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | (1)   | -    | -     | -     | (32)               | -       | (33)    |
|      | Coal Ret. WY - Gas RePower                        | -  | 247  | -     | -     | -     | -     | -     | -     | -     | -     | -     | (247) | -     | -     | -     | -     | -    | -     | -     | -                  | 247     | -       |
|      | Expansion Resources                               |  |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |                    |         |         |
|      | CCCT - Utah-N - J 1st                             | -  | -    | -     | -     | -     | -     | -     | -     | 252   | 315   | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 567     | 567     |
|      | Total CCCT  | -  | -    | -     | -     | -     | -     | -     | -     | 252   | 315   | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 567     | 567     |
|      | SCCT Frame NTN                                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | 370   | -     | -     | -     | -     | -    | -     | -     | -                  | 370     | 370     |
|      | SCCT Frame UTS                                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 195   | -     | -     | -     | -    | -     | -     | -                  | 195     | 195     |
|      | SCCT Frame WYSW                                   | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | 370   | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 370     | 370     |
|      | Total SCCT  | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | 370   | 370   | 195   | -     | -     | -     | -    | -     | -     | -                  | 934     | 934     |
|      | Wind, Dickinson                                   | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | 337   | 283   | -     | -     | -     | -     | -    | -     | -     | -                  | 620     | 1,079   |
|      | Wind, GO  | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | 1,079 | -     | -     | -     | -     | -    | -     | -     | -                  | 1,079   | 1,079   |
|      | Wind, WYAE  | -  | -    | -     | -     | -     | 1,920 | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 1,920   | 1,920   |
|      | Total Wind  | -  | -    | -     | -     | -     | 1,920 | -     | -     | -     | -     | 337   | 1,363 | -     | -     | -     | -     | -    | -     | -     | -                  | 1,920   | 3,619   |
|      | Utility Solar - PV - Utah-S                       | -  | -    | 146   | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 400   | -    | -     | -     | -                  | 146     | 546     |
|      | Utility Solar - PV - WYSW                         | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 100   | -     | -     | -     | -    | -     | -     | -                  | 100     | 100     |
|      | Utility Solar/Storage - PV - Utah-S               | -  | -    | -     | -     | -     | 154   | -     | -     | -     | -     | -     | -     | 306   | -     | -     | -     | -    | -     | -     | -                  | 154     | 459     |
|      | Utility Solar/Storage - PV - GO                   | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | 21    | -     | -     | -     | -     | -    | -     | -     | -                  | -       | 21      |
|      | Utility Solar - PV - Naughton                     | -  | -    | -     | -     | 111   | 156   | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 267     | 267     |
|      | Utility Solar/Storage - PV - Huntington           | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | 265   | 450   | -     | -     | -     | -     | -    | -     | -     | -                  | 715     | 715     |
|      | Utility Solar - PV - Utah-N                       | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | 33    | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 33      | 33      |
|      | Utility Solar/Storage - PV - Utah-N               | -  | -    | 146   | 64    | 111   | 546   | -     | -     | -     | -     | 298   | 471   | 406   | -     | -     | -     | -    | 400   | -     | -                  | 300     | 2,441   |
|      | Total Solar                                       | -  | -    | 146   | 64    | 111   | 546   | -     | -     | -     | -     | 298   | 471   | 406   | -     | -     | -     | -    | 400   | -     | -                  | 867     | 2,441   |
|      | Demand Response, ID-Cool/WH                       | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 2.6   | -     | -     | -     | -    | -     | -     | -                  | 2.6     | 2.6     |
|      | Demand Response, ID-3rd Party Contracts           | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 1.8   | -     | -     | -    | -     | -     | -                  | 1.8     | 1.8     |
|      | Demand Response, ID-Irrigate                      | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 5.2   | -     | -     | -    | 3.7   | -     | -                  | 1.8     | 10.6    |
|      | Demand Response, ID-Thermostat                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 8.3   | -     | -    | -     | -     | -                  | 8.3     | 8.3     |
|      | Demand Response, UT-Cool/WH                       | 4.1  | -    | 7.0   | -     | 9.9   | -     | -     | 7.2   | -     | -     | 6.7   | -     | -     | 6.8   | -     | -     | 7.0  | -     | -     | 7.2                | 28.1    | 55.9    |
|      | Demand Response, UT-3rd Party Contracts           | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 68.5  | -     | -     | -     | -    | -     | -     | 2.6                | -       | 71.1    |
|      | Demand Response, UT-Irrigate                      | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | 1.9   | -                  | 1.9     | 1.9     |
|      | Demand Response, UT-Thermostat                    | -  | -    | -     | -     | -     | -     | -     | -     | 116.7 | -     | -     | -     | 8.2   | -     | -     | -     | 8.3  | -     | -     | 5.1                | 116.7   | 138.3   |
|      | Demand Response, WY-Cool/WH                       | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 3.4   | -     | -     | -     | -    | -     | -     | 1.8                | -       | 5.2     |
|      | Demand Response, WY-3rd Party Contracts           | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | 37.3  | -     | -     | -     | -    | -     | -     | -                  | 37.3    | 37.3    |
|      | Demand Response, WY-Irrigate                      | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | 1.8   | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 1.8     | 1.8     |
|      | Demand Response, WY-Thermostat                    | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | 18.7  | -     | -     | -     | -     | -     | -    | -     | -     | 1.2                | -       | 19.9    |
|      | Demand Response, WY-Ancillary Services            | -  | -    | -     | -     | -     | 8.3   | -     | -     | -     | 5.3   | -     | -     | -     | -     | -     | -     | -    | -     | 3.2   | -                  | 13.5    | 16.7    |
|      | Demand Response, WY-CA-Ancillary Services         | -  | -    | -     | -     | -     | -     | -     | -     | -     | 3.0   | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | 3.0     | 3.0     |
|      | Demand Response Total                             | 4.1  | -    | 7.0   | -     | 18.1  | -     | 8.2   | 7.2   | 116.7 | -     | 25.4  | 10.0  | 120.2 | 13.8  | -     | -     | 15.3 | 3.7   | 3.2   | 21.6               | 161.2   | 374.5   |
|      | Energy Efficiency, ID                             | 6  | 7    | 7     | 7     | 8     | 8     | 7     | 7     | 7     | 7     | 7     | 6     | 6     | 6     | 6     | 5     | 4    | 4     | 3     | 3                  | 71      | 121     |
|      | Energy Efficiency, UT                             | 58   | 69   | 72    | 73    | 75    | 75    | 71    | 74    | 70    | 67    | 62    | 65    | 61    | 58    | 58    | 40    | 40   | 32    | 20    | 23                 | 704     | 1,162   |
|      | Energy Efficiency, WY                             | 10   | 13   | 13    | 14    | 17    | 17    | 18    | 19    | 18    | 16    | 15    | 13    | 12    | 11    | 9     | 8     | 7    | 5     | 3     | 155                | 258     |         |
|      | Energy Efficiency Total                           | 74   | 87   | 92    | 94    | 100   | 99    | 96    | 96    | 96    | 92    | 85    | 87    | 81    | 76    | 75    | 53    | 43   | 28    | 31    | 929                | 1,541   | 1,541   |
|      | Battery Storage - Utah-N                          | -  | -    | -     | -     | -     | 105.0 | -     | 435.0 | -     | -     | -     | 360.0 | 120.0 | 30.0  | -     | 330.0 | -    | -     | -     | -                  | 540     | 1,380   |
|      | Battery Storage - WYSW                            | -  | -    | -     | -     | -     | -     | -     | -     | 180.0 | -     | -     | 150.0 | -     | 285.0 | 60.0  | -     | -    | -     | -     | -                  | 180.0   | 705.0   |
|      | Battery Storage - Idaho                           | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | 330.0 | -     | -     | 60.0  | -     | -    | -     | -     | -                  | 390.0   | 390.0   |
|      | FOT East - Summer                                 | -  | -    | -     | -     | -     | -     | 71    | 246   | 235   | 300   | 300   | 300   | 300   | 300   | 300   | 300   | 300  | 300   | 300   | 300                | 55      | 178     |
| West | Existing Plant Retirements and PPA Termination    |  |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |                    |         |         |
|      | Jim Bridger 1 (Coal Early Retirement/Conversions) | -  | -    | -     | -     | -     | -     | -     | -     | -     | (351) | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (351)   | (351)   |
|      | Jim Bridger 2 (Coal Early Retirement/Conversions) | -  | -    | -     | -     | -     | -     | -     | -     | -     | (356) | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (356)   | (356)   |
|      | Jim Bridger 3 (Coal Early Retirement/Conversions) | -  | -    | -     | -     | -     | (349) | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (349)   | (349)   |
|      | Jim Bridger 4 (Coal Early Retirement/Conversions) | -  | -    | -     | -     | -     | -     | (353) | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | -     | -                  | (353)   | (353)   |
|      | Hermiston   | -  | -    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     | -    | -     | (237) | -                  | -       | (237)   |
|      | Retire - Hydro                                    | -  | (1)  | (169) | -     | (1)   | -     | -     | (1)   | -     | -     | (7)   | -     | -     | (6)   | -     | (75)  | -    | (1)   | -     | -                  | (179)   | (262)   |
|      | Expire - Wind PPA                                 | -  | -    | -     | (175) | -     | (41)  | -     | -     | -     | -     | (75)  | (10)  | -     | (67)  | (20)  | (20)  | -    | (110) | (10)  | -                  | (216)   | (360)   |
|      | Expire - Solar PPA                                |  |      |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |                    |         |         |



1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

| P-17 |  | Capacity (MW) |      |      |      |       |       |      |      |       |       |       |       |       |       |       |      |      |      |       | Resource Totals 1/ |         |         |
|------|--|---------------|------|------|------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|------|------|------|-------|--------------------|---------|---------|
| East |  | 2019          | 2020 | 2021 | 2022 | 2023  | 2024  | 2025 | 2026 | 2027  | 2028  | 2029  | 2030  | 2031  | 2032  | 2033  | 2034 | 2035 | 2036 | 2037  | 2038               | 10-year | 20-year |
|      | Existing Plant Retirements and PPA Termination   |               |      |      |      |       |       |      |      |       |       |       |       |       |       |       |      |      |      |       |                    |         |         |
|      | Crain 1 (Coal Early Retirement/Conversions)      | -             | -    | -    | -    | -     | (82)  | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (82)    | (82)    |
|      | Crain 2 (Coal Early Retirement/Conversions)      | -             | -    | -    | -    | -     | (82)  | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (82)    | (82)    |
|      | Hayden 1 (Coal Early Retirement/Conversions)     | -             | -    | -    | -    | -     | -     | -    | (44) | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (44)    | (44)    |
|      | Hayden 2 (Coal Early Retirement/Conversions)     | -             | -    | -    | -    | -     | -     | (33) | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (33)    | (33)    |
|      | Hunter 1 (Coal Early Retirement/Conversions)     | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | (418) | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (418)   | (418)   |
|      | Hunter 2 (Coal Early Retirement/Conversions)     | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | (269) | -     | -     | -     | -    | -    | -    | -     | -                  | (269)   | (471)   |
|      | Hunter 3 (Coal Early Retirement/Conversions)     | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | (471) | -     | -     | -    | -    | -    | -     | -                  | (471)   | (471)   |
|      | Huntington 1 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | (459) | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (459)   | (459)   |
|      | Huntington 2 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | (450) | -     | -     | -     | -    | -    | -    | -     | -                  | (450)   | (450)   |
|      | Colstrip 3 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | -     | -     | -    | -    | (74)  | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (74)    | (74)    |
|      | Colstrip 4 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | -     | -     | -    | -    | (74)  | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (74)    | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -    | -    | -    | (387) | -     | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (387)   | (387)   |
|      | Dave Johnston 1                                  | -             | -    | -    | -    | -     | -     | -    | -    | -     | (99)  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (99)    | (99)    |
|      | Dave Johnston 2                                  | -             | -    | -    | -    | -     | -     | -    | -    | -     | (106) | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (106)   | (106)   |
|      | Dave Johnston 3                                  | -             | -    | -    | -    | -     | -     | -    | -    | -     | (220) | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (220)   | (220)   |
|      | Dave Johnston 4                                  | -             | -    | -    | -    | -     | -     | -    | -    | -     | (330) | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (330)   | (330)   |
|      | Naughton 1 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | -     | (156) | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (156)   | (156)   |
|      | Naughton 2 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | -     | (201) | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (201)   | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | (280) | -     | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (280)   | (280)   |
|      | Wyodak (Coal Early Retirement/Conversions)       | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | (268) | -     | -     | -    | -    | -    | -     | -                  | (268)   | (268)   |
|      | Gadsby 1.6                                       | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | -     | -     | (356) | -    | -    | -    | -     | -                  | (356)   | (356)   |
|      | Retire - Hydro                                   | -             | -    | -    | -    | -     | (20)  | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | (20)    | (20)    |
|      | Retire - Wind                                    | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | (40)  | -     | -     | -     | -     | -    | -    | -    | -     | -                  | -       | (40)    |
|      | Expire - Wind PPA                                | -             | (27) | (17) | (49) | (0)   | -     | -    | (65) | (3)   | -     | (19)  | (99)  | (200) | (45)  | (181) | (80) | -    | (60) | (80)  | -                  | (160)   | (924)   |
|      | Expire - Solar PPA                               | -             | -    | -    | -    | (1)   | (1)   | -    | -    | -     | -     | -     | -     | -     | -     | -     | (1)  | (35) | (94) | (849) | -                  | (1)     | (979)   |
|      | Retire - Other                                   | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | (32)               | -       | (33)    |
|      | Coal Ret. WY - Gas BelPower                      | -             | 247  | -    | -    | -     | -     | -    | -    | -     | -     | -     | (247) | -     | -     | -     | -    | -    | -    | -     | -                  | 247     | -       |
|      | Expansion Resources                              |               |      |      |      |       |       |      |      |       |       |       |       |       |       |       |      |      |      |       |                    |         |         |
|      | CCCT - Utah-N - J 1st                            | -             | -    | -    | -    | -     | -     | -    | -    | -     | 504   | 63    | -     | -     | -     | -     | -    | -    | -    | -     | -                  | 504     | 567     |
|      | Total CCCT                                       | -             | -    | -    | -    | -     | -     | -    | -    | -     | 504   | 63    | -     | -     | -     | -     | -    | -    | -    | -     | -                  | 504     | 567     |
|      | SCCT Frame DJ                                    | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | 195   | -     | -     | -    | -    | -    | -     | -                  | -       | 195     |
|      | SCCT Frame NTN                                   | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | 370   | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 370     |
|      | SCCT Frame UTS                                   | -             | -    | -    | -    | 195   | -     | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | 195     | 195     |
|      | SCCT Frame WYSW                                  | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | 389   | -     | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 389     |
|      | Total SCCT                                       | -             | -    | -    | -    | 195   | -     | -    | -    | -     | -     | 185   | -     | -     | 185   | -     | -    | -    | -    | -     | -                  | -       | 370     |
|      | Wind, Dickinson                                  | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | 574   | 370   | 379   | -     | -     | -    | -    | -    | -     | -                  | 195     | 1,518   |
|      | Wind, GCO  | -             | -    | -    | -    | -     | -     | -    | -    | -     | 16    | 396   | 14    | -     | -     | -     | -    | -    | -    | -     | -                  | 16      | 425     |
|      | Wind, WYAE                                       | -             | -    | -    | -    | -     | 1,920 | -    | -    | -     | -     | -     | 103   | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 103     |
|      | Wind, Storage, GCO                               | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | 195   | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 195     |
|      | Total Wind                                       | -             | -    | -    | -    | -     | 1,920 | -    | -    | -     | 16    | 396   | 311   | -     | -     | -     | -    | -    | -    | -     | -                  | 1,936   | 2,643   |
|      | Utility Solar - PV - Utah-S                      | -             | -    | 146  | -    | -     | -     | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 400  | -     | -                  | 146     | 546     |
|      | Utility Solar - PV - WYSW                        | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | 100   | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 100     |
|      | Utility Solar/Storage - PV - Utah-S              | -             | -    | -    | -    | -     | 154   | -    | -    | -     | -     | 111   | -     | -     | -     | -     | -    | -    | -    | -     | -                  | 154     | 265     |
|      | Utility Solar/Storage - PV - GCO                 | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | 803   | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 803     |
|      | Utility Solar - PV - Naughton                    | -             | -    | -    | -    | -     | 111   | 156  | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | 267     | 267     |
|      | Utility Solar/Storage - PV - Huntington          | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | 459   | 256   | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 715     |
|      | Utility Solar - PV - Utah-N                      | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | 33    | -     | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 33      |
|      | Utility Solar/Storage - PV - Utah-N              | -             | -    | -    | -    | -     | 64    | 42   | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | 106     | 106     |
|      | Total Solar                                      | -             | -    | 146  | 64   | 111   | 351   | -    | -    | -     | -     | 603   | 1,158 | -     | -     | -     | -    | -    | 400  | -     | -                  | 673     | 2,834   |
|      | Demand Response, ID-Cool/WH                      | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | 2.6   | -     | -     | -    | -    | -    | -     | -                  | -       | 2.6     |
|      | Demand Response, ID-3rd Party Contracts          | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | -     | 1.8   | -     | -    | -    | -    | -     | -                  | -       | 1.8     |
|      | Demand Response, ID-Irrigate                     | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | -     | 5.2   | -     | -    | -    | 3.7  | -     | -                  | 1.8     | 10.6    |
|      | Demand Response, ID-Thermostat                   | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | 8.3   | -     | -     | -    | -    | -    | -     | -                  | -       | 8.3     |
|      | Demand Response, UT-Cool/WH                      | 4.1           | -    | 7.0  | -    | 9.9   | -     | -    | -    | 7.2   | -     | 6.7   | -     | -     | -     | -     | 7.0  | -    | -    | -     | 7.2                | 28.1    | 55.9    |
|      | Demand Response, UT-3rd Party Contracts          | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | 68.5  | 6.8   | -     | -     | -    | -    | -    | -     | 5.7                | -       | 76.7    |
|      | Demand Response, UT-Irrigate                     | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | 1.9                | 1.9     |         |
|      | Demand Response, UT-Thermostat                   | -             | -    | -    | -    | -     | -     | -    | -    | 116.7 | -     | -     | 8.2   | -     | -     | -     | -    | -    | -    | -     | 8.3                | 116.7   | 138.3   |
|      | Demand Response, WY-Cool/WH                      | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | 3.4   | -     | -     | -    | -    | -    | -     | 1.8                | -       | 5.2     |
|      | Demand Response, WY-3rd Party Contracts          | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | -     | 37.3  | -     | -     | -    | -    | 2.1  | -     | -                  | -       | 39.4    |
|      | Demand Response, WY-Irrigate                     | -             | -    | -    | -    | -     | -     | -    | -    | -     | -     | -     | 1.8   | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 1.8     |
|      | Demand Response, WY-Thermostat                   | -             | -    | -    | -    | -     | -     | -    | -    | -     | 18.7  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | 1.2     | 18.7    |
|      | Demand Response, UT-Ancillary Services           | -             | -    | -    | -    | 8.3   | -     | -    | 5.3  | -     | -     | -     | -     | -     | -     | -     | -    | -    | 3.2  | -     | -                  | 13.5    | 16.7    |
|      | Demand Response, WY-Ancillary Services           | -             | -    | -    | -    | -     | -     | -    | 3.0  | -     | -     | -     | -     | -     | -     | -     | -    | -    | -    | -     | -                  | -       | 3.0     |
|      | Demand Response, Total                           | 4.1           | -    | 7.0  | -    | 18.1  | -     | -    | 8.2  | 7.2   | 116.7 | 18.7  | 6.7   | 8.2   | 121.9 | 13.8  | -    | 23.0 | 3.7  | 3.2   | 21.6               | 179.9   | 382.2   |
|      | Energy Efficiency, ID                            | 6             | 7    | 7    | 7    | 7     | 8     | 7    | 7    | 7     | 7     | 7     | 6     | 6     | 6     | 6     | 4    | 4    | 4    | 3     | 3                  | 70      | 118     |
|      | Energy Efficiency, UT                            | 58            | 69   | 69   | 69   | 75    | 72    | 71   | 72   | 65    | 62    | 57    | 56    | 52    | 50    | 49    | 38   | 35   | 28   | 20    | 22                 | 682     | 1,087   |
|      | Energy Efficiency, WY                            | 10            | 10   | 11   | 12   | 15    | 16    | 16   | 16   | 17    | 18    | 17    | 13    | 13    | 12    | 11    | 9    | 7    | 5    | 3</   |                    |         |         |

[illegible]

|                        |       |     |       |     |       |
|------------------------|-------|-----|-------|-----|-------|
| Total Annual Additions | 1,080 | 880 | 1,478 | 997 | 1,238 |
|------------------------|-------|-----|-------|-----|-------|

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

| East | P-19   | Capacity (MW)                                  |       |       |       |       |       |      |      |      |       |      |      |      |       |       |       |      |       |       |       | Resource Totals 1/ |         |       |
|------|--|--|-------|-------|-------|-------|-------|------|------|------|-------|------|------|------|-------|-------|-------|------|-------|-------|-------|--------------------|---------|-------|
|      |  | 2019   | 2020  | 2021  | 2022  | 2023  | 2024  | 2025 | 2026 | 2027 | 2028  | 2029 | 2030 | 2031 | 2032  | 2033  | 2034  | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |       |
|      |  | Existing Plant Retirements and PPA Termination |       |       |       |       |       |      |      |      |       |      |      |      |       |       |       |      |       |       |       |                    |         |       |
| East | Existing Plant Retirements and PPA Termination   | -  | -     | -     | -     | -     | -     | -    | -    | (82) | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (82)               | (82)    |       |
|      | Craig 1 (Coal Early Retirement/Conversions)      | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | -                  | (82)    |       |
|      | Craig 2  | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | (82) | -     | -     | -     | -                  | (82)    |       |
|      | Hayden 1   | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | (44) | -     | -     | -     | -    | -     | -     | -     | -                  | (44)    |       |
|      | Hayden 2   | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | (33) | -     | -     | -     | -    | -     | -     | -     | -                  | (33)    |       |
|      | Huntington 1                                     | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | (459) | -     | -                  | (459)   |       |
|      | Huntington 2                                     | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | (450) | -     | -                  | (450)   |       |
|      | Cholla 4 (Coal Early Retirement/Conversions)     | -  | -     | (387) | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (387)              | (387)   |       |
|      | DaveJohnston 1                                   | -  | -     | -     | -     | -     | -     | -    | -    | -    | (99)  | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (99)               | (99)    |       |
|      | DaveJohnston 2                                   | -  | -     | -     | -     | -     | -     | -    | -    | -    | (106) | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (106)              | (106)   |       |
|      | DaveJohnston 3                                   | -  | -     | -     | -     | -     | -     | -    | -    | -    | (220) | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (220)              | (220)   |       |
|      | DaveJohnston 4                                   | -  | -     | -     | -     | -     | -     | -    | -    | -    | (330) | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (330)              | (330)   |       |
|      | Naughton 1 (Coal Early Retirement/Conversions)   | -  | -     | -     | -     | (156) | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (156)              | (156)   |       |
|      | Naughton 2 (Coal Early Retirement/Conversions)   | -  | -     | -     | -     | (201) | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (201)              | (201)   |       |
|      | Naughton 3 (Coal Early Retirement/Conversions)   | -  | (280) | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (280)              | (280)   |       |
|      | Cadsby 1-6                                       | -  | -     | (238) | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | (119) | -     | -    | -     | -     | -     | (238)              | (356)   |       |
|      | Retire - Hydro                                   | -  | -     | -     | -     | -     | (20)  | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (20)               | (20)    |       |
|      | Retire - Wind                                    | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | (40) | -    | -     | -     | -     | -    | -     | -     | -     | -                  | (40)    |       |
|      | Expire - Wind PPA                                | -  | (27)  | (17)  | (49)  | (0)   | -     | -    | (65) | (3)  | -     | (19) | -    | (99) | (200) | (45)  | (181) | (80) | -     | (60)  | (80)  | -                  | (160)   |       |
|      | Expire - Solar PPA                               | -  | -     | -     | -     | (1)   | (1)   | -    | -    | -    | -     | -    | -    | -    | -     | -     | (1)   | (35) | (94)  | (849) | -     | (1)                | (979)   |       |
|      | Retire - Other                                   | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | (32)  | -                  | (33)    |       |
|      | Expansion Resources                              | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | -                  | -       |       |
|      | CCCT - Utah-N - J 1st                            | -  | -     | -     | -     | -     | -     | -    | -    | -    | 567   | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 567                | 567     |       |
|      | Total CCCT                                       | -  | -     | -     | -     | -     | -     | -    | -    | -    | 567   | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 567                | 567     |       |
|      | SCCT Frame ITN                                   | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 195   | -     | 195                | 195     |       |
|      | SCCT Frame NTN                                   | -  | -     | -     | -     | 185   | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 185                | 185     |       |
|      | SCCT Frame UTN                                   | -  | -     | -     | -     | 195   | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 195                | 195     |       |
|      | SCCT Frame W YSW                                 | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 370   | -     | 370                | 370     |       |
|      | Total SCCT                                       | -  | -     | -     | -     | 379   | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 564   | -     | 379                | 944     |       |
|      | Wind, Djohnston                                  | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | 529  | 91   | -    | -     | -     | -     | -    | -     | -     | -     | -                  | 620     | 620   |
|      | Wind, GO   | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | 1,062 | -     | -     | -    | -     | -     | -     | -                  | 1,062   | 1,062 |
|      | Wind, WYAE                                       | -  | -     | -     | -     | -     | 1,920 | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 1,920              | 1,920   |       |
|      | Total Wind                                       | -  | -     | -     | -     | -     | 1,920 | -    | -    | -    | -     | -    | 529  | 91   | 1,062 | -     | -     | -    | -     | -     | -     | 1,920              | 3,602   |       |
|      | Utility Solar - PV - Utah-S                      | -  | -     | 146   | 59    | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | 325   | 400  | -     | -     | -     | 205                | 1,026   |       |
|      | Utility Solar - PV - W YSW                       | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | 100   | -    | -     | -     | -     | 100                | 100     |       |
|      | Utility Solar/Storage - PV - Utah-S              | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | 175   | -    | -     | -     | -     | 175                | 175     |       |
|      | Utility Solar/Storage - PV - GO                  | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | 2    | 35    | -     | -     | -    | -     | -     | -     | 38                 | 38      |       |
|      | Utility Solar - PV - Naughton                    | -  | -     | -     | -     | 82    | 370   | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 452                | 452     |       |
|      | Utility Solar - PV - Huntington                  | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 125   | -     | 125                | 125     |       |
|      | Utility Solar/Storage - PV - Huntington          | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 589   | -     | 589                | 589     |       |
|      | Utility Solar - PV - Utah-N                      | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | 139   | -     | -     | -    | -     | -     | -     | 139                | 139     |       |
|      | Total Solar                                      | -  | -     | 146   | 59    | 82    | 370   | -    | -    | -    | -     | -    | 2    | 269  | -     | -     | 100   | 500  | 400   | 714   | -     | 657                | 2,643   |       |
|      | Demand Response, ID-Cool/WH                      | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 2.6   | -     | 2.6                | 2.6     |       |
|      | Demand Response, ID-3rd Party Contracts          | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 1.8   | -     | 1.8                | 1.8     |       |
|      | Demand Response, ID-Irrigate                     | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 3.7   | 1.8   | -                  | 10.6    |       |
|      | Demand Response, ID-Thermostat                   | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | 8.3   | -                  | 8.3     |       |
|      | Demand Response, UT-Cool/WH                      | 4.1  | -     | -     | 7.0   | -     | 9.9   | -    | -    | 7.2  | -     | -    | 6.7  | -    | -     | 6.8   | -     | -    | 7.0   | -     | -     | 28.1               | 55.9    |       |
|      | Demand Response, UT-3rd Party Contracts          | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 74.1  | 2.6   | -                  | 76.7    |       |
|      | Demand Response, UT-Irrigate                     | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | 1.9   | -                  | 1.9     |       |
|      | Demand Response, UT-Thermostat                   | -  | -     | -     | -     | 79.4  | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | 5.1   | 116.7              | 138.3   |       |
|      | Demand Response, WY-Cool/WH                      | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | 5.2   | -                  | 5.2     |       |
|      | Demand Response, WY-3rd Party Contracts          | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 2.1   | 37.3  | -                  | 39.4    |       |
|      | Demand Response, WY-Irrigate                     | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 1.8   | -     | 1.8                | 1.8     |       |
|      | Demand Response, WY-Thermostat                   | -  | -     | -     | -     | 12.9  | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 5.8   | 1.2   | 12.9               | 19.9    |       |
|      | Demand Response, WY-Ancillary Services           | -  | -     | 8.3   | -     | -     | -     | 5.3  | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 3.2   | -     | 13.5               | 16.7    |       |
|      | Demand Response, WY-Ancillary Services           | -  | -     | -     | -     | -     | -     | 3.0  | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 3.0                | 3.0     |       |
|      | Demand Response Total                            | 4.1  | -     | 15.3  | -     | 102.1 | -     | 8.2  | 7.2  | 37.3 | -     | 6.7  | -    | 8.2  | 12.0  | -     | -     | 15.3 | -     | 92.5  | 73.3  | 174.1              | 382.2   |       |
|      | Energy Efficiency, ID                            | 6  | 6     | 6     | 7     | 7     | 6     | 7    | 7    | 7    | 6     | 6    | 6    | 8    | 8     | 4     | 4     | 4    | 3     | 3     | 3     | 65                 | 110     |       |
|      | Energy Efficiency, UT                            | 58   | 67    | 67    | 68    | 69    | 60    | 59   | 53   | 52   | 48    | 46   | 44   | 42   | 41    | 31    | 23    | 20   | 22    | 23    | 22    | 623                | 991     |       |
|      | Energy Efficiency, WY                            | 10   | 10    | 11    | 14    | 15    | 14    | 14   | 15   | 15   | 14    | 13   | 14   | 12   | 11    | 11    | 8     | 7    | 5     | 5     | 5     | 133                | 226     |       |
|      | Energy Efficiency Total                          | 74   | 83    | 85    | 88    | 91    | 80    | 81   | 84   | 81   | 73    | 71   | 71   | 66   | 62    | 60    | 44    | 42   | 33    | 28    | 30    | 820                | 1,326   |       |
|      | Battery Storage - Utah-N                         | -  | -     | -     | -     | 270.0 | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 405                | 270     |       |
|      | Battery Storage - W YSW                          | -  | -     | -     | -     | 210.0 | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | 30.0               | 600.0   |       |
|      | Battery Storage - Idaho                          | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | 135.0 | 150.0              |         |       |
|      | FOT East - Summer                                | -  | -     | -     | -     | 295   | 76    | 176  | 156  | 186  | 213   | 263  | 243  | 300  | 300   | 268   | 271   | 300  | 300   | 300   | 300   | 110                | 197     |       |
| West | Existing Plant Retirements and PPA Termination   | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | -                  | -       |       |
|      | JimBridger 1 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | (351) | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (351)              | (351)   |       |
|      | JimBridger 2 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | (356) | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (356)              | (356)   |       |
|      | JimBridger 3                                     | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (349)              | (349)   |       |
|      | JimBridger 4                                     | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | (353)              | (353)   |       |
|      | Hermiston  | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | (237) | -                  | (237)   |       |
|      | Retire - Hydro                                   | -  | (1)   | (169) | -     | (1)   | -     | -    | (1)  | -    | (7)   | -    | (6)  | -    | -     | -     | (75)  | -    | (1)   | -     | -     | (179)              | (262)   |       |
|      | Expire - Wind PPA                                | -  | -     | -     | (175) | -     | (41)  | -    | -    | -    | -     | (75) | (10) | -    | (20)  | (20)  | -     | -    | (10)  | (10)  | -     | (216)              | (360)   |       |
|      | Expire - Solar PPA                               | -  | -     | -     | -     | -     | -     | -    | -    | -    | (2)   | -    | (75) | (10) | (67)  | (49)  | -     | (1)  | (115) | (175) | (11)  | (2)                | (420)   |       |
|      | Expansion Resources                              | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | -     | -                  | -       |       |
|      | SCCT Frame SO                                    | -  | -     | -     | -     | -     | -     | -    | -    | -    | 210   | -    | -    | -    | -     | -     | 210   | -    | -     | -     | 419   | -                  | 839     |       |
|      | SCCT Frame WY                                    | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | 221   | 221   | -                  | 443     |       |
|      | SCCT Frame YK                                    | -  | -     | -     | -     | -     | -     | -    | -    | -    | -     | -    | -    | -    | -     | -     | -     | -    | -     | -     | 233   | -                  | 233     |       |
|      | Total SCCT                                       | -</  |       |       |       |       |       |      |      |      |       |      |      |      |       |       |       |      |       |       |       |                    |         |       |

|   |  | Capacity (MW) |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       | Resource Totals 1/ |         |       |
|---|--|---------------|-------|-------|-------|-------|------|-------|------|------|------|-------|-------|-------|-------|------|-------|------|-------|-------|-------|--------------------|---------|-------|
| P-20  |  | 2019          | 2020  | 2021  | 2022  | 2023  | 2024 | 2025  | 2026 | 2027 | 2028 | 2029  | 2030  | 2031  | 2032  | 2033 | 2034  | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |       |
| East  | Existing Plant Retirements and PPA Termination |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |
|   | Crnig 1 (Coal Early Retirement/Conversions)    |               |       |       |       |       |      |       |      |      | (82) |       |       |       |       |      |       |      |       |       |       |                    | (82)    | (82)  |
|   | Crnig 2 (Coal Early Retirement/Conversions)    |               |       |       |       |       |      |       |      |      | (82) |       |       |       |       |      |       |      |       |       |       |                    | (82)    | (82)  |
|   | Hayden 1                                       |               |       |       |       |       |      |       |      |      |      |       |       |       | (44)  |      |       |      |       |       |       |                    | (44)    | (44)  |
|   | Hayden 2                                       |               |       |       |       |       |      |       |      |      |      |       |       |       | (33)  |      |       |      |       |       |       |                    | (33)    | (33)  |
|   | Huntington 1                                   |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | (459) |                    | (459)   | (459) |
|   | Huntington 2                                   |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | (450) |                    | (450)   | (450) |
|   | Cokstrip 3 (Coal Early Retirement/Conversions) |               |       |       |       |       |      |       |      |      |      | (74)  |       |       |       |      |       |      |       |       |       |                    | (74)    | (74)  |
|   | Cokstrip 4 (Coal Early Retirement/Conversions) |               |       |       |       |       |      |       |      |      |      | (74)  |       |       |       |      |       |      |       |       |       |                    | (74)    | (74)  |
|   | Cholla 4 (Coal Early Retirement/Conversions)   |               |       |       | (387) |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    | (387)   | (387) |
|   | DaveJohnston 1                                 |               |       |       |       |       |      |       |      |      |      | (99)  |       |       |       |      |       |      |       |       |       |                    | (99)    | (99)  |
|   | DaveJohnston 2                                 |               |       |       |       |       |      |       |      |      |      | (106) |       |       |       |      |       |      |       |       |       |                    | (106)   | (106) |
|   | DaveJohnston 3                                 |               |       |       |       |       |      |       |      |      |      | (220) |       |       |       |      |       |      |       |       |       |                    | (220)   | (220) |
|   | DaveJohnston 4                                 |               |       |       |       |       |      |       |      |      |      | (330) |       |       |       |      |       |      |       |       |       |                    | (330)   | (330) |
|   | Naughton 1                                     |               |       |       |       |       |      |       |      |      |      |       |       | (156) |       |      |       |      |       |       |       |                    | (156)   | (156) |
|   | Naughton 2                                     |               |       |       |       |       |      |       |      |      |      |       |       | (201) |       |      |       |      |       |       |       |                    | (201)   | (201) |
|   | Naughton 3 (Coal Early Retirement/Conversions) |               |       | (280) |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    | (280)   | (280) |
|   | Gadsby 1-6                                     |               |       |       | (238) |       |      |       |      |      |      |       |       |       |       |      | (119) |      |       |       |       |                    | (238)   | (238) |
|   | Retire - Hydro                                 |               |       |       |       |       |      | (20)  |      |      |      |       |       |       |       |      |       |      |       |       |       |                    | (20)    | (20)  |
|   | Retire - Wind                                  |               |       |       |       |       |      |       |      |      |      |       |       | (40)  |       |      |       |      |       |       |       |                    |         | (40)  |
|   | Expire - Wind PPA                              |               | (27)  | (17)  | (49)  | (0)   |      |       | (65) | (3)  |      |       | (19)  | (99)  | (200) | (45) | (181) | (80) |       | (60)  | (80)  |                    | (160)   | (924) |
|   | Expire - Solar PPA                             |               |       |       |       |       | (1)  | (1)   |      |      |      |       |       |       |       |      |       |      | (35)  | (94)  | (849) |                    | (1)     | (979) |
|   | Retire - Other                                 |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       | (1)  |       |       |       | (32)               |         | (33)  |
|   | Coal Ret. WY - Gas RePower                     |               |       | 247   |       |       |      |       |      |      |      |       |       |       | (247) |      |       |      |       |       |       |                    | 247     |       |
|   | Expansion Resources                            |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |
|   | SCCT Frame NTN                                 |               |       |       |       |       |      |       |      |      |      |       |       | 555   |       |      |       |      |       |       |       |                    |         | 555   |
|   | SCCT Frame WYSW                                |               |       |       |       |       |      |       |      |      |      |       | 185   |       | 185   |      |       |      |       |       |       |                    |         | 370   |
|   | Total SCCT                                     |               |       |       |       |       |      |       |      |      |      |       | 185   | 555   |       | 185  |       |      |       |       |       |                    |         | 925   |
|   | Wind, Dickinson                                |               |       |       |       |       |      |       |      |      |      | 620   |       |       |       |      |       |      |       |       |       |                    | 620     | 620   |
|   | Wind, CO                                       |               |       |       |       |       |      |       |      |      |      |       |       | 1,100 |       |      |       |      |       |       |       |                    |         | 1,100 |
|   | Wind, WYAE                                     |               |       |       |       |       |      | 1,920 |      |      |      |       |       |       |       |      |       |      |       |       |       |                    | 1,920   | 1,920 |
|   | Total Wind                                     |               |       |       |       |       |      | 1,920 |      |      |      |       | 620   | 1,100 |       |      |       |      |       |       |       |                    | 2,540   | 3,640 |
|   | Utility Solar - PV - Utah-S                    |               |       |       | 146   | 59    |      | 95    |      |      |      |       |       |       |       |      |       |      |       | 400   |       |                    | 300     | 700   |
|   | Utility Solar - PV - WYSW                      |               |       |       |       |       |      | 100   |      |      |      |       |       |       |       |      |       |      |       |       |       |                    | 100     | 100   |
|   | Utility Solar+Storage - PV - Utah-S            |               |       |       |       |       |      |       |      |      |      |       |       |       | 500   |      |       |      |       |       |       |                    | 500     | 500   |
|   | Utility Solar+Storage - PV - Huntington        |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 909   |                    | 909     | 909   |
|   | Utility Solar - PV - Utah-N                    |               |       |       |       |       |      |       |      |      |      |       | 295   |       |       |      |       |      |       |       |       |                    | 295     | 295   |
|   | Utility Solar+Storage - PV - Utah-N            |               |       |       |       |       |      | 605   |      |      |      |       |       |       |       |      |       |      |       |       |       |                    | 605     | 605   |
|   | Total Solar                                    |               |       |       | 146   | 59    |      | 801   |      |      |      |       | 295   |       | 500   |      |       |      |       | 400   | 909   |                    | 1,006   | 3,109 |
|   | Demand Response, ID-Cool/WH                    |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 2.6   |                    |         | 2.6   |
|   | Demand Response, ID-3rd Party Contracts        |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 1.8   |                    |         | 1.8   |
|   | Demand Response, ID-Irrigate                   |               |       |       |       |       |      |       |      |      |      |       |       |       |       | 5.2  |       |      |       |       | 3.7   | 1.8                |         | 10.6  |
|   | Demand Response, ID-Thermostat                 |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 8.3   |                    |         | 8.3   |
|   | Demand Response, UT-Cool/WH                    | 4.1           |       |       | 7.0   |       | 9.9  |       |      |      | 7.2  |       | 6.7   |       |       | 6.8  |       |      | 7.0   |       |       | 7.2                | 28.1    | 55.9  |
|   | Demand Response, UT-3rd Party Contracts        |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 74.1  | 2.6                |         | 76.7  |
|   | Demand Response, UT-Irrigate                   |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       | 1.9                |         | 1.9   |
|   | Demand Response, UT-Thermostat                 |               |       |       |       |       |      |       |      |      |      |       | 116.7 | 8.2   |       |      |       |      | 8.3   |       |       | 5.1                |         | 138.3 |
|   | Demand Response, WY-Cool/WH                    |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 3.4   | 1.8                |         | 5.2   |
|   | Demand Response, WY-3rd Party Contracts        |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 39.4  |                    |         | 39.4  |
|   | Demand Response, WY-Irrigate                   |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 1.8   |                    |         | 1.8   |
|   | Demand Response, WY-Thermostat                 |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 18.7  | 1.2                |         | 19.9  |
|   | Demand Response, UT-Ancillary Services         |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 3.2   |                    |         | 13.5  |
|   | Demand Response, WY-Ancillary Services         |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    | 3.0     | 16.7  |
| Demand Response Total                           |  |               |       | 15.3  |       | 9.9   |      |       |      | 8.2  | 7.2  |       | 123.3 | 8.2   |       | 12.0 |       | 15.3 |       | 157.1 | 21.6  | 44.6               | 382.2   |       |
| Energy Efficiency, ID                           |  | 6             | 7     | 8     | 7     | 9     | 7    | 8     | 7    | 7    | 8    | 7     | 8     | 6     | 6     | 6    | 5     | 4    | 7     | 6     | 3     | 71                 | 120     |       |
| Energy Efficiency, UT                           | 58   | 67            | 67    | 69    | 75    | 72    | 71   | 68    | 68   | 67   | 57   | 56    | 52    | 50    | 38    | 34   | 28    | 28   | 30    | 683   | 1,106 |                    |         |       |
| Energy Efficiency, WY                           | 10   | 12            | 13    | 14    | 16    | 17    | 19   | 19    | 19   | 18   | 16   | 15    | 13    | 12    | 11    | 9    | 8     | 7    | 6     | 5     | 155   | 258                |         |       |
| Energy Efficiency Total                         | 74   | 85            | 87    | 90    | 98    | 96    | 97   | 94    | 94   | 94   | 93   | 80    | 77    | 72    | 68    | 67   | 51    | 47   | 39    | 38    | 909   | 1,483              |         |       |
| Battery Storage - Utah-N                        |  |               |       |       |       |       |      |       |      |      |      | 360.0 |       |       |       |      |       |      |       | 210   | 390   |                    | 360     |       |
| Battery Storage - WYSW                          |  |               |       |       |       |       |      |       |      |      |      | 30.0  |       |       |       |      |       |      |       |       |       |                    |         |       |
| Battery Storage - Idaho                         |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       | 165.0 | 195.0 | 30.0               | 390.0   |       |
| FOY East - Summer                               |  |               |       |       |       |       |      |       |      |      |      | 205   | 300   | 300   | 300   | 172  | 292   | 293  | 300   | 300   | 300   | 21                 | 153     |       |
| Existing Plant Retirements and PPA Termination  |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |
| Jimbridge 1 (Coal Early Retirement/Conversions) |  |               |       |       |       | (351) |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       | (351)              | (351)   |       |
| Jimbridge 2 (Coal Early Retirement/Conversions) |  |               |       |       |       |       |      |       |      |      |      |       | (356) |       |       |      |       |      |       |       |       |                    | (356)   |       |
| Jimbridge 3                                     |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | (349) |                    | (349)   |       |
| Jimbridge 4                                     |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       | (353)              | (353)   |       |
| Hemiston  |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |
| Retire - Hydro                                  |  | (1)           | (169) |       |       | (1)   |      |       |      | (1)  | (7)  |       |       | (6)   |       |      | (75)  |      | (1)   |       | (237) |                    | (237)   |       |
| Expire - Wind PPA                               |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |
| Expire - Solar PPA                              |  |               |       |       | (175) |       | (41) |       |      |      |      | (75)  | (10)  |       | (20)  | (20) |       | (1)  | (10)  |       | (179) | (262)              |         |       |
| Retire - Other                                  |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | (216) | (360)              |         |       |
| Coal Ret. WY - Gas RePower                      |  |               |       |       |       |       |      |       |      |      |      | (2)   | (75)  | (10)  | (67)  | (49) | (20)  | (1)  | (115) | (175) | (11)  | (2)                | (420)   |       |
| Expansion Resources                             |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |
| SCCT Frame WY                                   |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |
| Total SCCT                                      |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       | 443   |                    | 443     |       |
| Wind, YK  |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       | 48   |       |      |       |       | 443   |                    | 443     |       |
| Total Wind                                      |  |               |       |       |       |       |      |       |      |      |      |       |       |       |       |      |       |      |       |       |       |                    |         |       |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

|      |  | Capacity (MW) |       |       |      |      |       |      |      |      |       |      |       |       |      |       |      |      |      |       |      | Resource Totals 1/ |         |
|------|--|---------------|-------|-------|------|------|-------|------|------|------|-------|------|-------|-------|------|-------|------|------|------|-------|------|--------------------|---------|
| East | P-30   | 2019          | 2020  | 2021  | 2022 | 2023 | 2024  | 2025 | 2026 | 2027 | 2028  | 2029 | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036 | 2037  | 2038 | 10-year            | 20-year |
|      | Existing Plant Retirements and PPA Termination |               |       |       |      |      |       |      |      |      |       |      |       |       |      |       |      |      |      |       |      |                    |         |
|      | Craig 1 (Coal Early Retirement/Conversions)    | -             | -     | -     | -    | -    | -     | -    | -    | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (82)               | (82)    |
|      | Craig 2 (Coal Early Retirement/Conversions)    | -             | -     | -     | -    | -    | -     | -    | -    | -    | (82)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (82)               | (82)    |
|      | Hayden 1                                       | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | (44)  | -    | -     | -    | -    | -    | -     | -    | -                  | (44)    |
|      | Hayden 2                                       | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | (33)  | -    | -     | -    | -    | -    | -     | -    | -                  | (33)    |
|      | Huntington 1                                   | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | (459) | -    | -                  | (459)   |
|      | Huntington 2                                   | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | (450) | -    | -                  | (450)   |
|      | Cokstrip 3 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -     | -    | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (74)               | (74)    |
|      | Cokstrip 4 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -     | -    | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (74)               | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -     | (387) | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (387)              | (387)   |
|      | Dave Johnston 1                                | -             | -     | -     | -    | -    | -     | -    | -    | -    | (99)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (99)               | (99)    |
|      | Dave Johnston 2                                | -             | -     | -     | -    | -    | -     | -    | -    | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (106)              | (106)   |
|      | Dave Johnston 3                                | -             | -     | -     | -    | -    | -     | -    | -    | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (220)              | (220)   |
|      | Dave Johnston 4                                | -             | -     | -     | -    | -    | -     | -    | -    | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (330)              | (330)   |
|      | Naughton 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | (156) | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (156)              | (156)   |
|      | Naughton 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | (201) | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (201)              | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -             | (280) | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (280)              | (280)   |
|      | Gadsby 1-6                                     | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | (356) | -    | -    | -    | -     | -    | -                  | (356)   |
|      | Retire - Hydro                                 | -             | -     | -     | -    | -    | (20)  | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (20)               | (20)    |
|      | Retire - Wind                                  | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | (40)  | -     | -    | -     | -    | -    | -    | -     | -    | -                  | (40)    |
|      | Expire - Wind PPA                              | -             | (27)  | (17)  | (49) | (0)  | -     | -    | (65) | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60) | (80)  | -    | (160)              | (924)   |
|      | Expire - Solar PPA                             | -             | -     | -     | -    | (1)  | (1)   | -    | -    | -    | -     | -    | -     | -     | -    | -     | (1)  | (35) | (94) | (849) | -    | (1)                | (979)   |
|      | Retire - Other                                 | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | (32) | -                  | (33)    |
|      | Coal Ret. WY - Gas RePower                     | -             | 247   | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | (247) | -    | -     | -    | -    | -    | -     | -    | 247                | -       |
|      | Expansion Resources                            | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | 185   | -     | -    | -     | -    | -    | -    | -     | -    | -                  | 185     |
|      | SCCT Frame NTN                                 | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | 185   | -     | -    | -     | -    | -    | -    | -     | -    | -                  | 185     |
|      | SCCT Frame WYSW                                | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | 185   | -     | -    | -     | -    | -    | -    | -     | -    | -                  | 185     |
|      | Total SCCT                                     | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | 185   | -     | -    | -     | -    | -    | -    | -     | -    | -                  | 370     |
|      | Wind, Diphinston                               | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | 620   | -     | -    | -     | -    | -    | -    | -     | -    | -                  | 620     |
|      | Wind, CO                                       | -             | -     | -     | -    | -    | -     | -    | -    | -    | -     | -    | 1,100 | -     | -    | -     | -    | -    | -    | -     | -    | -                  | 1,100   |
|      | Wind, WYAE                                     | -             | -     | -     | -    | -    | 1,920 | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | 1,920              | 1,920   |
|      | Total Wind                                     | -             | -     | -     | -    | -    | 1,920 | -    | -    | -    | -     | -    | 620   | 1,100 | -    | -     | -    | -    | -    | -     | -    | 1,920              | 3,640   |
|      | Utility Solar - PV - Utah-S                    | -             | -     | 146   | 59   | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | 400  | -     | -    | 205                | 605     |
|      | Utility Solar - PV - WYSW                      | -             | -     | -     | -    | -    | 100   | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | 100                | 100     |
|      | Utility Solar+Storage - PV - Utah-S            | -             | -     | -     | -    | -    | 95    | -    | -    | -    | -     | -    | 500   | -     | -    | -     | -    | -    | -    | -     | -    | 95                 | 595     |
|      | Utility Solar - PV - Naughton                  | -             | -     | -     | -    | 357  | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | 357                | 357     |
|      | Utility Solar - PV - Huntington                | -             | -     | -     | -    | -    | -     | -    | -    | -    | -</   |      |       |       |      |       |      |      |      |       |      |                    |         |

|                        |       |     |       |       |       |
|------------------------|-------|-----|-------|-------|-------|
| Total Annual Additions | 1,279 | 991 | 1,032 | 1,003 | 1,844 |
|------------------------|-------|-----|-------|-------|-------|

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

|      |  | Capacity (MW)                       |      |      |      |       |      |      |      |      |       |       |       |       |       |      |       |      |      |      |       | Resource Totals 1/ |         |       |     |
|------|--|-------------------------------------|------|------|------|-------|------|------|------|------|-------|-------|-------|-------|-------|------|-------|------|------|------|-------|--------------------|---------|-------|-----|
| P-31 |  | 2019                                | 2020 | 2021 | 2022 | 2023  | 2024 | 2025 | 2026 | 2027 | 2028  | 2029  | 2030  | 2031  | 2032  | 2033 | 2034  | 2035 | 2036 | 2037 | 2038  | 10-year            | 20-year |       |     |
| East | Existing Plant Retirements and PPA Termination   |                                     |      |      |      |       |      |      |      |      |       |       |       |       |       |      |       |      |      |      |       |                    |         |       |     |
|      | Craig 1 (Coal Early Retirement/Conversions)      | -                                   | -    | -    | -    | -     | -    | -    | (82) | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | (82)               | (82)    |       |     |
|      | Craig 2 (Coal Early Retirement/Conversions)      | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | (82)  | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | (82)               | (82)    |       |     |
|      | Hayden 1   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | (44)  | -    | -     | -    | -    | -    | -     | -                  | (44)    |       |     |
|      | Hayden 2   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | (33)  | -    | -     | -    | -    | -    | -     | -                  | (33)    |       |     |
|      | Huntington 1                                     | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | (459) | -                  | (459)   |       |     |
|      | Huntington 2                                     | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | (450)              | (450)   |       |     |
|      | Coktrip 3 (Coal Early Retirement/Conversions)    | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | (74)  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    | (74)  |     |
|      | Coktrip 4 (Coal Early Retirement/Conversions)    | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | (74)  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    | (74)  |     |
|      | Cholla 4 (Coal Early Retirement/Conversions)     | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (387)   | (387) |     |
|      | Dave Johnston 1                                  | -                                   | -    | -    | -    | (387) | -    | -    | -    | -    | -     | (99)  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (99)    | (99)  |     |
|      | Dave Johnston 2                                  | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | (106) | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (106)   | (106) |     |
|      | Dave Johnston 3                                  | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | (220) | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (220)   | (220) |     |
|      | Dave Johnston 4                                  | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | (330) | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (330)   | (330) |     |
|      | Naughton 1 (Coal Early Retirement/Conversions)   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | (156) | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (156)   | (156) |     |
|      | Naughton 2 (Coal Early Retirement/Conversions)   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | (201) | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (201)   | (201) |     |
|      | Naughton 3 (Coal Early Retirement/Conversions)   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (280)   | (280) |     |
|      | Gadsby 1-6                                       | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | (356) | -    | -    | -    | -     | -                  | -       | (356) |     |
|      | Retire - Hydro                                   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | (20)  | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (20)    | (20)  |     |
|      | Retire - Wind                                    | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | (40)  | -     | -    | -     | -    | -    | -    | -     | -                  | -       | (40)  |     |
|      | Expire - Wind PPA                                | -                                   | -    | (27) | (17) | (49)  | (0)  | -    | -    | (65) | (3)   | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | -    | (60)  | (80)               | -       | (160) |     |
|      | Expire - Solar PPA                               | -                                   | -    | -    | -    | -     | (1)  | -    | (1)  | -    | -     | -     | -     | -     | -     | -    | -     | -    | (35) | (94) | (849) | -                  | (1)     | (979) |     |
|      | Retire - Other                                   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | (1)  | -    | -     | (32)               | -       | (33)  |     |
|      | Coal Ret. WY - Gas RePower                       | -                                   | -    | 247  | -    | -     | -    | -    | -    | -    | -     | -     | -     | (247) | -     | -    | -     | -    | -    | -    | -     | -                  | 247     | -     |     |
|      | Expansion Resources                              |                                     |      |      |      |       |      |      |      |      |       |       |       |       |       |      |       |      |      |      |       |                    |         |       |     |
|      |  | SCCT Frame NTN                      | -    | -    | -    | -     | -    | -    | -    | 185  | -     | -     | -     | 185   | -     | -    | 185   | -    | -    | -    | -     | -                  | 185     | 555   |     |
|      |  | SCCT Frame WYSW                     | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | 370   | -    | -    | -    | -     | -                  | -       | 370   |     |
|      |  | Total SCCT                          | -    | -    | -    | -     | -    | -    | -    | 185  | -     | -     | -     | 185   | -     | -    | 555   | -    | -    | -    | -     | -                  | 185     | 925   |     |
|      |  | Wind, Dickinson                     | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | 620   | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | 620   |     |
|      |  | Wind, CO                            | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | 1,083 | -     | -    | -     | -    | -    | -    | -     | -                  | -       | 1,083 |     |
|      |  | Wind, WY&E                          | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 1,920   | 1,920 |     |
|      |  | Total Wind                          | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | 620   | 1,083 | -     | -    | -     | -    | -    | -    | -     | -                  | 1,920   | 3,623 |     |
|      |  | Utility Solar - PV - Utah-S         | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 300     | 700   |     |
|      |  | Utility Solar - PV - WYSW           | -    | -    | 146  | 59    | 67   | 28   | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | 400  | -     | -                  | 100     | 100   |     |
|      |  | Utility Solar/Storage - PV - Utah-S | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | 500   | -    | -     | -    | -    | -    | -     | -                  | -       | 500   |     |
|      |  | Utility Solar/Storage - PV - CO     | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | 17    | -    | -     | -    | -    | -    | -     | -                  | -       | 17    |     |
|      |  | Utility Solar - PV - Huntington     | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | 100   | -                  | 100     | -     |     |
|      | Utility Solar/Storage - PV - Huntington          | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | 797  | 12    | 809                | -       |       |     |
|      | Utility Solar - PV - Utah-N                      | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | 40    | 37    | -     | 129   | -     | -    | -     | -    | -    | -    | -     | 76                 | 205     |       |     |
|      | Utility Solar/Storage - PV - Utah-N              | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 695                | 695     |       |     |
|      | Total Solar                                      | -                                   | -    | 146  | 59   | 67    | 823  | -    | -    | 40   | 37    | -     | 129   | 517   | -     | -    | -     | -    | 400  | 897  | 12    | 1,171              | 3,126   |       |     |
|      | Demand Response, ID-Cool/WH                      | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 2.6                | -       |       |     |
|      | Demand Response, ID-3rd Party Contracts          | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 1.8                | -       |       |     |
|      | Demand Response, ID-Irrigate                     | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | 5.2   | -    | -     | -    | -    | -    | 3.7   | 1.8                | -       | 10.6  |     |
|      | Demand Response, ID-Thermostat                   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 8.3                | -       | 8.3   |     |
|      | Demand Response, UT-Cool/WH                      | 4.1                                 | -    | -    | 7.0  | -     | 9.9  | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | 7.0  | -    | -    | -     | 7.2                | 28.1    | 55.9  |     |
|      | Demand Response, UT-3rd Party Contracts          | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | 74.1  | 2.6                | -       | 76.7  |     |
|      | Demand Response, UT-Irrigate                     | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | -     |     |
|      | Demand Response, UT-Thermostat                   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | 116.7 | 8.2   | -     | -     | -    | -     | -    | 8.3  | -    | -     | 1.9                | -       | -     | 1.9 |
|      | Demand Response, WY-Cool/WH                      | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 3.4                | 1.8     | -     | 5.2 |
|      | Demand Response, WY-3rd Party Contracts          | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | 39.4  | -                  | -       | 39.4  |     |
|      | Demand Response, WY-Irrigate                     | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | -     |     |
|      | Demand Response, WY-Thermostat                   | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 1.2                | -       | 19.9  |     |
|      | Demand Response, UT-Ancillary Services           | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | -     |     |
|      | Demand Response, WY-Ancillary Services           | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 3.2                | -       | 13.5  |     |
|      | Demand Response Total                            | 4.1                                 | -    | 7.0  | -    | 18.1  | -    | 7.2  | -    | -    | -     | -     | 123.3 | 8.2   | -     | 12.0 | 20.5  | -    | 15.3 | -    | 136.6 | 21.6               | 44.6    | 382.2 |     |
|      | Energy Efficiency, ID                            | 6                                   | 6    | 6    | 7    | 7     | 7    | 7    | 8.2  | 7    | 7     | 7     | 7     | 6     | 6     | 6    | 4     | -    | 3    | -    | 136.6 | 21.6               | 44.6    | 382.2 |     |
|      | Energy Efficiency, UT                            | 58                                  | 67   | 67   | 68   | 69    | 66   | 67   | 68   | 65   | 62    | 54    | 53    | 52    | 50    | 51   | 36    | 32   | 25   | 22   | 26    | 657                | 1,059   | -     |     |
|      | Energy Efficiency, WY                            | 10                                  | 10   | 11   | 14   | 15    | 16   | 16   | 18   | 19   | 18    | 15    | 14    | 13    | 12    | 11   | 9     | 8    | 7    | 5    | 3     | 147                | 248     | -     |     |
|      | Energy Efficiency Total                          | 74                                  | 83   | 85   | 88   | 91    | 89   | 91   | 93   | 91   | 87    | 76    | 74    | 72    | 68    | 68   | 49    | 45   | 36   | 30   | 35    | 872                | 1,423   | -     |     |
|      | Battery Storage - Utah-N                         | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | 225.0 | -     | -     | -     | -    | -     | -    | -    | -    | 105   | -                  | 225     | 765   |     |
|      | Battery Storage - WYSW                           | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | 105.0 | -     | -     | -     | -    | -     | -    | -    | -    | -     | 165.0              | 105.0   | 270.0 |     |
|      | Battery Storage - Idaho                          | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | 135.0 | -                  | 210.0   | -     |     |
|      | POT East - Summer                                | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | 25    | 206   | 289   | 300   | 277  | 298   | 300  | 300  | 300  | 300   | 3                  | 145     | -     |     |
| West | Existing Plant Retirements and PPA Termination   |                                     |      |      |      |       |      |      |      |      |       |       |       |       |       |      |       |      |      |      |       |                    |         |       |     |
|      | JimBridger 1 (Coal Early Retirement/Conversions) | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | (351) | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | (351) |     |
|      | JimBridger 2 (Coal Early Retirement/Conversions) | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | (356) |     |
|      | JimBridger 3                                     | -                                   | -    | -    | -    | -     | -    | -    | -    | -    | -     | -     | -     | -     | -     | -    | -     |      |      |      |       |                    |         |       |     |



| East | P-32   | Capacity (MW) |       |       |       |       |      |       |       |      |       |       |       |       |      |       |      |      |       |       | Resource Totals 1/ |         |         |
|------|--|---------------|-------|-------|-------|-------|------|-------|-------|------|-------|-------|-------|-------|------|-------|------|------|-------|-------|--------------------|---------|---------|
|      |  | 2019          | 2020  | 2021  | 2022  | 2023  | 2024 | 2025  | 2026  | 2027 | 2028  | 2029  | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038               | 10-year | 20-year |
| East | Existing Plant Retirements and PPA Termination   | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Crug 1 (Coal Early Retirement/Conversions)       | -             | -     | -     | -     | -     | -    | -     | (82)  | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Crug 2 (Coal Early Retirement/Conversions)       | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Hayden 1   | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -                  | -       | (44)    |
|      | Hayden 2   | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -                  | -       | (33)    |
|      | Huntington 1                                     | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (459)   | (459)   |
|      | Huntington 2                                     | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (450)   | (450)   |
|      | Colstrip 3 (Coal Early Retirement/Conversions)   | -             | -     | -     | -     | -     | -    | -     | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (74)    |
|      | Colstrip 4 (Coal Early Retirement/Conversions)   | -             | -     | -     | -     | -     | -    | -     | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -     | (387) | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (387)   |
|      | DaveJohnston 1                                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | (99)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (99)    |
|      | DaveJohnston 2                                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | (106) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (106)   |
|      | DaveJohnston 3                                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | (220) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (220)   |
|      | DaveJohnston 4                                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | (330) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (330)   |
|      | Naughton 1 (Coal Early Retirement/Conversions)   | -             | -     | -     | -     | -     | -    | -     | (156) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (156)   |
|      | Naughton 2 (Coal Early Retirement/Conversions)   | -             | -     | -     | -     | -     | -    | -     | (201) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)   | -             | (280) | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (280)   |
|      | Cadaby 1-6                                       | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -                  | -       | (356)   |
|      | Retire - Hydro                                   | -             | -     | -     | -     | -     | -    | (20)  | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (20)    | (20)    |
|      | Retire - Wind                                    | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | (40)  | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (40)    |
|      | Expire - Wind PPA                                | -             | (27)  | (17)  | (49)  | (0)   | -    | -     | (65)  | (3)  | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -                  | (160)   | (924)   |
|      | Expire - Solar PPA                               | -             | -     | -     | -     | (1)   | (1)  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | (35) | (94)  | (849) | -                  | (1)     | (979)   |
|      | Retire - Other                                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | (1)  | -    | -     | -     | (32)               | -       | (33)    |
|      | Coal Ret. WY - Gas RePower                       | -             | 247   | -     | -     | -     | -    | -     | -     | -    | -     | -     | (247) | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 247     |
|      | Expansion Resources                              | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -       |
|      | SCCT Frame NTN                                   | -             | -     | -     | -     | -     | -    | -     | 185   | -    | -     | -     | 185   | -     | -    | 185   | -    | -    | -     | -     | -                  | 185     | 555     |
|      | SCCT Frame WYSW                                  | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | 370   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 370     |
|      | Total SCCT                                       | -             | -     | -     | -     | -     | -    | -     | 185   | -    | -     | 370   | 185   | -     | -    | 185   | -    | -    | -     | -     | -                  | 185     | 925     |
|      | Wind, Dickinson                                  | -             | -     | -     | -     | -     | -    | -     | -     | -    | 126   | 494   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 126     | 620     |
|      | Wind, CO   | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | 984   | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 984     |
|      | Wind, WYAE                                       | -             | -     | -     | -     | -     | -    | 1,920 | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920   |
|      | Total Wind                                       | -             | -     | -     | -     | -     | -    | 1,920 | -     | -    | 126   | 494   | 984   | -     | -    | -     | -    | -    | -     | -     | -                  | 2,046   | 3,524   |
|      | Utility Solar - PV - Utah-S                      | -             | -     | 146   | 59    | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | 400   | -     | -                  | 205     | 605     |
|      | Utility Solar - PV - WYSW                        | -             | -     | -     | -     | -     | 100  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 100     | 100     |
|      | Utility Solar/Storage - PV - Utah-S              | -             | -     | -     | -     | -     | 95   | -     | -     | -    | -     | -     | -     | 500   | -    | -     | -    | -    | -     | -     | -                  | 95      | 595     |
|      | Utility Solar/Storage - PV - CO                  | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | 53    | 63    | -    | -     | -    | -    | -     | -     | -                  | -       | 116     |
|      | Utility Solar/Storage - PV - Huntington          | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 909   | -                  | -       | 909     |
|      | Utility Solar - PV - Utah-N                      | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | 802   | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 802     |
|      | Utility Solar/Storage - PV - Utah-N              | -             | -     | -     | -     | -     | 98   | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 98      | 98      |
|      | Total Solar                                      | -             | -     | 146   | 59    | -     | 293  | -     | -     | -    | -     | -     | 855   | 563   | -    | -     | -    | -    | 400   | 909   | -                  | 498     | 3,225   |
|      | Demand Response, ID-Cool/WH                      | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 2.6   | -                  | -       | 2.6     |
|      | Demand Response, ID-3rd Party Contracts          | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.8   | -                  | -       | 1.8     |
|      | Demand Response, ID-Irrigate                     | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | 5.2  | -     | -    | -    | -     | 3.7   | 1.8                | -       | 10.6    |
|      | Demand Response, ID-Thermostat                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 8.3   | -                  | -       | 8.3     |
|      | Demand Response, UT-Cool/WH                      | 4.1           | -     | 7.0   | -     | 9.9   | -    | -     | -     | 7.2  | -     | 6.7   | -     | -     | -    | -     | -    | 7.0  | -     | -     | 7.2                | 28.1    | 55.9    |
|      | Demand Response, UT-3rd Party Contracts          | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 74.1  | 2.6                | -       | 76.7    |
|      | Demand Response, UT-Irrigate                     | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.9   | -                  | -       | 1.9     |
|      | Demand Response, UT-Thermostat                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | 116.7 | -     | 8.2   | -     | -    | -     | -    | 8.3  | -     | -     | 5.1                | 116.7   | 138.3   |
|      | Demand Response, WY-Cool/WH                      | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.4   | 1.8                | -       | 5.2     |
|      | Demand Response, WY-3rd Party Contracts          | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 39.4  | -                  | -       | 39.4    |
|      | Demand Response, WY-Irrigate                     | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | 1.8   | -    | -    | -     | 2.1   | -                  | -       | 1.8     |
|      | Demand Response, WY-Thermostat                   | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | 16.7  | -    | -    | -     | 2.1   | 1.2                | -       | 19.9    |
|      | Demand Response, UT-Ancillary Services           | -             | -     | -     | -     | 8.3   | -    | -     | 5.3   | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.2   | -                  | 13.5    | 16.7    |
|      | Demand Response, WY-Ancillary Services           | -             | -     | -     | -     | -     | -    | 3.0   | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 3.0     | 3.0     |
|      | Demand Response Total                            | 4.1           | -     | 7.0   | -     | 18.1  | -    | 8.2   | 7.2   | -    | 116.7 | 6.7   | 8.2   | -     | 12.0 | 18.4  | -    | 15.3 | -     | 138.7 | 21.6               | 161.2   | 382.2   |
|      | Energy Efficiency, ID                            | 6             | 6     | 6     | 7     | 8     | 7    | 7     | 6     | 6    | 6     | 6     | 6     | 6     | 6    | 6     | 4    | 4    | 3     | 3     | 70                 | 118     |         |
|      | Energy Efficiency, UT                            | 58            | 67    | 67    | 69    | 75    | 68   | 67    | 65    | 64   | 62    | 54    | 53    | 52    | 50   | 49    | 36   | 32   | 26    | 23    | 26                 | 667     | 1,074   |
|      | Energy Efficiency, WY                            | 10            | 12    | 13    | 14    | 18    | 16   | 17    | 18    | 19   | 18    | 15    | 14    | 13    | 12   | 11    | 9    | 8    | 7     | 5     | 5                  | 154     | 256     |
|      | Energy Efficiency Total                          | 74            | 85    | 86    | 90    | 100   | 92   | 92    | 94    | 91   | 87    | 76    | 74    | 72    | 68   | 66    | 49   | 45   | 37    | 32    | 35                 | 891     | 1,443   |
|      | Battery Storage - Utah-N                         | -             | -     | -     | -     | -     | -    | -     | -     | -    | 270.0 | -     | -     | -     | -    | -     | -    | -    | -     | 15    | 480                | 270     | 765     |
|      | Battery Storage - WYSW                           | -             | -     | -     | -     | -     | -    | -     | -     | -    | 150.0 | -     | -     | -     | -    | -     | -    | -    | -     | -     | 240.0              | 150.0   | 390.0   |
|      | Battery Storage - Idaho                          | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | 60.0  | -    | -    | -     | 150.0 | -                  | 210.0   |         |
|      | POT East - Summer                                | -             | -     | -     | -     | -     | -    | -     | -     | -    | 300   | 246   | 300   | 300   | 252  | 284   | 286  | 300  | 300   | 300   | 300                | 30      | 158     |
| West | Existing Plant Retirements and PPA Termination   | -             | -     | -     | -     | (351) | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (351)   | (351)   |
|      | Jimbridger 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | (351) | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (351)   |
|      | Jimbridger 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | (356) | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (356)   |
|      | Jimbridger 3                                     | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (349)              | -       | (349)   |
|      | Jimbridger 4                                     | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (353)              | -       | (353)   |
|      | Hermiston  | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (237)              | -       | (237)   |
|      | Retire - Hydro                                   | -             | -     | (1)   | (169) | -     | (1)  | -     | -     | (1)  | -     | (7)   | -     | -     | (6)  | -     | -    | (75) | -     | (1)   | -                  | (179)   | (262)   |
|      | Expire - Wind PPA                                | -             | -     | -     | (175) | -     | (41) | -     | -     | -    | -     | (75)  | (10)  | -     | (20) | (20)  | -    | -    | (10)  | (10)  | -                  | (216)   | (360)   |
|      | Expire - Solar PPA                               | -             | -     | -     | -     | -     | -    | -     | -     | -    | (2)   | -     | -     | (67)  | (49) | -     | -    | (1)  | (115) | (175) | (11)               | (2)     | (420)   |
|      | Expansion Resources                              | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -       |
|      | SCCT Frame WY                                    | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 443                | -       | 443     |
|      | Total SCCT                                       | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 443                | -       | 443     |
|      | Utility Solar - PV - S-Oregon                    | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | 92   | -     | -    | -    | -     | -     | -                  | -       | 92      |
|      | Utility Solar - PV - Yakima                      | -             | -     | -     | -     | -     | 405  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 405     |
|      | Utility Solar - PV - Bridger                     | -             | -     | -     | -     | -     | 354  | -     | -     | -    | -     | 359   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 354     | 713     |
|      | Utility Solar/Storage - PV - Bridger             | -             | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 343                | -       | 343     |
|      | Utility Solar/Storage - PV - S-Oregon            | -             | -     | -     | -     | -     | 500  | -     | -     | -    | -     | -     | -     | 383   | -    | -     | -    | -    | -     | -     | -                  | 500     | 883     |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

| East | P-34  | Capacity (MW) |       |       |      |       |      |      |      |      |       |      |       |       |      |       |      |       |       |       | Resource Totals 1/ |         |         |
|------|---|---------------|-------|-------|------|-------|------|------|------|------|-------|------|-------|-------|------|-------|------|-------|-------|-------|--------------------|---------|---------|
|      |   | 2019          | 2020  | 2021  | 2022 | 2023  | 2024 | 2025 | 2026 | 2027 | 2028  | 2029 | 2030  | 2031  | 2032 | 2033  | 2034 | 2035  | 2036  | 2037  | 2038               | 10-year | 20-year |
| East | Existing Plant Retirements and PPA Termination  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (82)    | (82)    |
|      | Crane 1 (Coal Early Retirement/Conversions)     | -             | -     | -     | -    | -     | -    | -    | -    | (82) | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (82)    | (82)    |
|      | Crane 2 (Coal Early Retirement/Conversions)     | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | (44)  | -    | -     | -    | -     | -     | -     | -                  | (44)    | (44)    |
|      | Hayden 1  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | (33)  | -    | -     | -    | -     | -     | -     | -                  | (33)    | (33)    |
|      | Hayden 2  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (459)   | (459)   |
|      | Huntington 1                                    | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (450)   | (450)   |
|      | Huntington 2                                    | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (74)    | (74)    |
|      | Coktrip 3 (Coal Early Retirement/Conversions)   | -             | -     | -     | -    | -     | -    | -    | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (74)    | (74)    |
|      | Coktrip 4 (Coal Early Retirement/Conversions)   | -             | -     | -     | -    | -     | -    | -    | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (74)    | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)    | -             | -     | (387) | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (387)   | (387)   |
|      | DaveJohnston 1                                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | (99)  | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (99)    | (99)    |
|      | DaveJohnston 2                                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | (106) | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (106)   | (106)   |
|      | DaveJohnston 3                                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | (220) | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (220)   | (220)   |
|      | DaveJohnston 4                                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | (330) | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (330)   | (330)   |
|      | Naughton 1                                      | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | (156) | -     | -    | -     | -    | -     | -     | -     | -                  | (156)   | (156)   |
|      | Naughton 2                                      | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | (201) | -     | -    | -     | -    | -     | -     | -     | -                  | (201)   | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)  | -             | (280) | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (280)   | (280)   |
|      | Cadeby 1-6                                      | -             | -     | (238) | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | (119) | -    | -     | -     | -     | -                  | (238)   | (238)   |
|      | Retire - Hydro                                  | -             | -     | -     | -    | -     | (20) | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (20)    | (20)    |
|      | Retire - Wind                                   | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (40)    | (40)    |
|      | Expire - Wind PPA                               | -             | (27)  | (17)  | (49) | (0)   | -    | -    | (65) | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -     | (60)  | (80)  | -                  | (160)   | (924)   |
|      | Expire - Solar PPA                              | -             | -     | -     | -    | -     | (1)  | (1)  | -    | -    | -     | -    | -     | -     | -    | -     | -    | (35)  | (94)  | (849) | -                  | (1)     | (979)   |
|      | Retire - Other                                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | (1)   | -     | -     | (32)               | -       | (33)    |
|      | Coal Ret. WY - Gas RePower                      | -             | 247   | -     | -    | -     | -    | -    | -    | -    | -     | -    | (247) | -     | -    | -     | -    | -     | -     | -     | -                  | 247     | -       |
|      | Expansion Resources                             | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | -       | -       |
|      | SCCT Frame NTN                                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | 555   | -     | -    | -     | -    | -     | -     | -     | -                  | -       | 555     |
|      | SCCT Frame WYSW                                 | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | 370  | -     | -     | -    | -     | -    | -     | -     | -     | -                  | 370     | 370     |
|      | Total SCCT                                      | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | 370  | -     | -     | -    | -     | -    | -     | -     | -     | -                  | 370     | 925     |
|      | Wind, Dickinson                                 | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | 345  | 275   | -     | -    | -     | -    | -     | -     | -     | -                  | 345     | 620     |
|      | Wind, CO  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | 1,100 | -    | -     | -    | -     | -     | -     | -                  | 1,100   | 1,100   |
|      | Wind, WVAE                                      | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | 1,920   | 1,920   |
|      | Total Wind                                      | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | 1,100 | -    | -     | -    | -     | -     | -     | -                  | 1,920   | 3,640   |
|      | Utility Solar - PV - Utah-S                     | -             | -     | 146   | 59   | -     | 63   | -    | -    | -    | -     | -    | 41    | -     | -    | -     | -    | -     | 400   | -     | -                  | 268     | 709     |
|      | Utility Solar - PV - WYSW                       | -             | -     | -     | -    | -     | 100  | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | 100                | 100     |         |
|      | Utility Solar/Storage - PV - Utah-S             | -             | -     | -     | -    | -     | 32   | -    | -    | -    | -     | -    | 407   | 52    | -    | -     | -    | -     | -     | -     | 32                 | 491     |         |
|      | Utility Solar - PV - Huntington                 | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 23    | -                  | 23      |         |
|      | Utility Solar/Storage - PV - Huntington         | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 886   | -                  | 886     |         |
|      | Utility Solar - PV - Utah-N                     | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | 300   | -     | -    | -     | -    | -     | -     | -     | -                  | 300     | 300     |
|      | Utility Solar/Storage - PV - Utah-N             | -             | -     | -     | -    | -     | 600  | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | 600                | 600     |         |
|      | Total Solar                                     | -             | -     | 146   | 59   | -     | 795  | -    | -    | -    | -     | -    | 748   | 52    | -    | -     | -    | -     | 400   | 909   | -                  | 1,000   | 3,109   |
|      | Demand Response, ID-Cool/WH                     | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 2.6   | -                  | 2.6     | -       |
|      | Demand Response, ID-3rd Party Contracts         | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 1.8   | -                  | 1.8     | -       |
|      | Demand Response, ID-Irrigate                    | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | 5.2  | -     | -    | -     | -     | 3.7   | -                  | 10.6    | -       |
|      | Demand Response, ID-Thermostat                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 8.3   | -                  | 8.3     | -       |
|      | Demand Response, UT-Cool/WH                     | 4.1           | -     | 7.0   | -    | 9.9   | -    | -    | -    | 7.2  | -     | 6.7  | -     | -     | -    | 6.8   | -    | -     | 7.0   | -     | 7.2                | 28.1    | 55.9    |
|      | Demand Response, UT-3rd Party Contracts         | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 74.1  | 2.6                | -       | 76.7    |
|      | Demand Response, UT-Irrigate                    | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 1.9   | -                  | 1.9     | -       |
|      | Demand Response, UT-Thermostat                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | 116.7 | -    | 8.2   | -     | -    | -     | -    | 8.3   | -     | 5.1   | 116.7              | 138.3   | -       |
|      | Demand Response, WY-Cool/WH                     | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 3.4   | 1.8                | -       | 5.2     |
|      | Demand Response, WY-3rd Party Contracts         | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 39.4  | -                  | 39.4    | -       |
|      | Demand Response, WY-Irrigate                    | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | 1.8   | -    | -     | -     | -     | -                  | 1.8     | -       |
|      | Demand Response, WY-Thermostat                  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 18.7  | 1.2                | -       | 19.9    |
|      | Demand Response, UT-Ancillary Services          | -             | -     | 8.3   | -    | -     | -    | 5.3  | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 3.2   | -                  | 13.5    | 16.7    |
|      | Demand Response, WY-Ancillary Services          | -             | -     | -     | -    | -     | -    | 3.0  | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | 3.0     | 3.0     |
|      | Demand Response Total                           | 4.1           | -     | 15.3  | -    | 9.9   | -    | 8.2  | 7.2  | -    | 116.7 | 6.7  | 8.2   | -     | -    | 12.0  | 1.8  | -     | 15.3  | -     | 158.3              | 21.6    | 161.2   |
|      | Energy Efficiency, ID                           | 6             | 6     | 6     | 7    | 7     | 7    | 7    | 7    | 7    | 6     | 6    | 6     | 6     | 6    | 4     | 4    | 3     | 3     | 3     | 69                 | 117     | -       |
|      | Energy Efficiency, UT                           | 58            | 67    | 67    | 69   | 72    | 66   | 66   | 65   | 65   | 62    | 56   | 56    | 52    | 50   | 49    | 36   | 32    | 26    | 25    | 26                 | 657     | 1,065   |
|      | Energy Efficiency, WY                           | 10            | 12    | 13    | 14   | 16    | 16   | 16   | 17   | 18   | 17    | 15   | 15    | 13    | 12   | 11    | 9    | 8     | 7     | 5     | 5                  | 149     | 250     |
|      | Energy Efficiency Total                         | 74            | 85    | 86    | 90   | 89    | 90   | 88   | 89   | 87   | 77    | 77   | 72    | 68    | 65   | 49    | 45   | 37    | 33    | 35    | 875                | 1,432   | -       |
|      | Battery Storage - Utah-N                        | -             | -     | -     | -    | 135.0 | -    | -    | -    | -    | 45.0  | -    | -     | -     | -    | -     | -    | -     | -     | 315   | 405                | 180     | 900     |
|      | Battery Storage - WYSW                          | -             | -     | -     | -    | 120.0 | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 105.0 | 315.0              | 120.0   | 540.0   |
|      | Battery Storage - Idaho                         | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | 180.0 | -     | -    | -     | -    | -     | -     | 15.0  | 135.0              | -       | 330.0   |
|      | POT East - Summer                               | -             | -     | -     | -    | 290   | -    | -    | -    | -    | 300   | 300  | 300   | -     | 162  | 298   | 300  | 300   | 300   | 300   | 300                | 59      | 170     |
| West | Existing Plant Retirements and PPA Termination  | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | -       | -       |
|      | Jimbridge 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | (351) | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (351)   | (351)   |
|      | Jimbridge 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | (356) | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | (356)   | (356)   |
|      | Jimbridge 3                                     | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | -       | -       |
|      | Jimbridge 4                                     | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | (349)              | (349)   |         |
|      | Jimbridge 4                                     | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | (353)              | (353)   |         |
|      | Hermiston                                       | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | (237)              | -       | (237)   |
|      | Retire - Hydro                                  | -             | (1)   | (169) | -    | (1)   | -    | -    | (1)  | -    | (7)   | -    | (6)   | -     | -    | (75)  | -    | -     | (11)  | -     | -                  | (179)   | (262)   |
|      | Expire - Wind PPA                               | -             | -     | -     | -    | (175) | -    | (41) | -    | -    | -     | (75) | (10)  | -     | (20) | (20)  | -    | -     | (10)  | -     | -                  | (216)   | (360)   |
|      | Expire - Solar PPA                              | -             | -     | -     | -    | -     | -    | -    | -    | (2)  | -     | -    | (67)  | (49)  | -    | -     | (11) | (115) | (175) | (11)  | -                  | (2)     | (420)   |
|      | Expansion Resources                             | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | -       | -       |
|      | SCCT Frame WY                                   | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 443   | -                  | 443     | 443     |
|      | Total SCCT                                      | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 443   | -                  | 443     | 443     |
|      | Utility Solar - PV - S-Oregon                   | -             | -     | -     | -    | -     | 500  | -    | -    | -    | -     | -    | -     | -     | 95   | -     | -    | -     | -     | -     | 500                | 595     |         |
|      | Utility Solar - PV - Yakima                     | -             | -     | -     | -    | -     | 405  | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | 19                 | 405     | 424     |
|      | Utility Solar - PV - Jbrdger                    | -             | -     | -     | -    | -     | 713  | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 12    | 713                | 725     |         |
|      | Utility Solar/Storage - PV - Jbrdger            | -             | -     | -     | -    | -     | -    | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -     | -                  | -       | -       |
|      | Utility Solar - PV - Walla Walla                | -             | -     |       |      |       |      |      |      |      |       |      |       |       |      |       |      |       |       |       |                    |         |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

| East | P-46  | Capacity (MW)                                  |       |       |       |      |       |      |       |       |       |       |       |       |      |       |       |      |       |       |       | Resource Totals 1/ |         |
|------|---|--|-------|-------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|------|-------|-------|------|-------|-------|-------|--------------------|---------|
|      |   | 2019   | 2020  | 2021  | 2022  | 2023 | 2024  | 2025 | 2026  | 2027  | 2028  | 2029  | 2030  | 2031  | 2032 | 2033  | 2034  | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |
|      |   | Existing Plant Retirements and PPA Termination |       |       |       |      |       |      |       |       |       |       |       |       |      |       |       |      |       |       |       |                    |         |
|      | Coal 1 (Coal Early Retirement/Conversions)        | -  | -     | -     | -     | -    | -     | -    | (82)  | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (82)               | (82)    |
|      | Coal 2 (Coal Early Retirement/Conversions)        | -  | -     | -     | -     | -    | -     | -    | -     | (82)  | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (82)               | (82)    |
|      | Hayden 1  | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | (44)  | -    | -     | -     | -    | -     | -     | -     | (44)               | (44)    |
|      | Hayden 2  | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | (33)  | -    | -     | -     | -    | -     | -     | -     | (33)               | (33)    |
|      | Huntington 1                                      | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | (459) | -     | (459)              | (459)   |
|      | Huntington 2                                      | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | (450) | -     | (450)              | (450)   |
|      | Colstrip 3 (Coal Early Retirement/Conversions)    | -  | -     | -     | -     | -    | -     | -    | -     | -     | (74)  | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (74)               | (74)    |
|      | Colstrip 4 (Coal Early Retirement/Conversions)    | -  | -     | -     | -     | -    | -     | -    | -     | -     | (74)  | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (74)               | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)      | -  | -     | (387) | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (387)              | (387)   |
|      | Dave Johnston 1                                   | -  | -     | -     | -     | -    | -     | -    | -     | -     | (99)  | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (99)               | (99)    |
|      | Dave Johnston 2                                   | -  | -     | -     | -     | -    | -     | -    | -     | -     | (106) | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (106)              | (106)   |
|      | Dave Johnston 3                                   | -  | -     | -     | -     | -    | -     | -    | -     | -     | (220) | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (220)              | (220)   |
|      | Dave Johnston 4                                   | -  | -     | -     | -     | -    | -     | -    | -     | -     | (330) | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (330)              | (330)   |
|      | Naughton 1 (Coal Early Retirement/Conversions)    | -  | -     | -     | -     | -    | -     | -    | (156) | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (156)              | (156)   |
|      | Naughton 2 (Coal Early Retirement/Conversions)    | -  | -     | -     | -     | -    | -     | -    | (201) | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (201)              | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions)    | -  | (280) | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (280)              | (280)   |
|      | Cadby 1-6   | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | (356) | -     | -    | -     | -     | -     | (356)              | (356)   |
|      | Retire - Hydro                                    | -  | -     | -     | -     | -    | (20)  | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (20)               | (20)    |
|      | Retire - Wind                                     | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | (40)  | -     | -    | -     | -     | -    | -     | -     | -     | (40)               | (40)    |
|      | Expire - Wind PPA                                 | -  | (27)  | (17)  | (49)  | (0)  | -     | -    | (65)  | (3)   | -     | (19)  | (99)  | (200) | (45) | (181) | (80)  | -    | (60)  | (80)  | -     | (160)              | (924)   |
|      | Expire - Solar PPA                                | -  | -     | -     | -     | (1)  | (1)   | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | (35) | (94)  | (849) | -     | (1)                | (979)   |
|      | Retire - Other                                    | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | (1)   | -    | -     | -     | (32)  | -                  | (33)    |
|      | Coal Ret. WY - Gas RePower                        | -  | 247   | -     | -     | -    | -     | -    | -     | -     | -     | -     | (247) | -     | -    | -     | -     | -    | -     | -     | -     | 247                | -       |
|      | Expansion Resources                               |  |       |       |       |      |       |      |       |       |       |       |       |       |      |       |       |      |       |       |       |                    |         |
|      | SCCT Frame NTN                                    | -  | -     | -     | -     | -    | -     | -    | 185   | -     | -     | -     | 370   | -     | -    | -     | -     | -    | -     | -     | -     | 185                | 555     |
|      | SCCT Frame WYSW                                   | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | 370   | -     | -     | -    | -     | -     | -    | -     | -     | -     | -                  | 370     |
|      | Total SCCT  | -  | -     | -     | -     | -    | -     | -    | 185   | -     | -     | 370   | 370   | -     | -    | -     | -     | -    | -     | -     | -     | 185                | 925     |
|      | Wind, Dickinson                                   | -  | -     | -     | -     | -    | -     | -    | -     | 544   | 76    | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 544                | 620     |
|      | Wind, CO  | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | 1,100 | -     | -    | -     | -     | -    | -     | -     | -     | -                  | 1,100   |
|      | Wind, WYAE  | -  | -     | -     | -     | -    | 1,920 | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 1,920              | 1,920   |
|      | Total Wind  | -  | -     | -     | -     | -    | 1,920 | -    | -     | -     | 544   | 76    | 1,100 | -     | -    | -     | -     | -    | -     | -     | -     | 2,464              | 3,640   |
|      | Utility Solar - PV - Utah-S                       | -  | -     | 146   | 59    | 67   | 28    | -    | -     | -     | -     | -     | -     | 169   | -    | -     | -     | -    | 400   | -     | -     | 300                | 869     |
|      | Utility Solar - PV - WYSW                         | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | 100   | -    | -     | -     | -    | -     | -     | -     | 100                | 100     |
|      | Utility Solar/Storage - PV - Utah-S               | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | 331   | -    | -     | -     | -    | -     | -     | -     | 331                | 331     |
|      | Utility Solar/Storage - PV - Huntington           | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | 909   | -     | 909                | 909     |
|      | Utility Solar - PV - Utah-N                       | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | 202   | -     | -    | -     | -     | -    | -     | -     | -     | 202                | 202     |
|      | Utility Solar/Storage - PV - Utah-N               | -  | -     | -     | -     | -    | 698   | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 698                | 698     |
|      | Total Solar                                       | -  | -     | 146   | 59    | 67   | 726   | -    | -     | -     | -     | -     | 202   | 600   | -    | -     | -     | -    | 400   | 909   | -     | 998                | 3,109   |
|      | Demand Response, ID-Cool/WH                       | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | 2.6   | -     | 2.6                | 2.6     |
|      | Demand Response, ID-3rd Party Contracts           | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 1.8   | -     | -    | -     | -     | -     | 1.8                | 1.8     |
|      | Demand Response, ID-Irrigate                      | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | 5.2  | -     | -     | -    | 3.7   | -     | -     | 10.6               | 10.6    |
|      | Demand Response, ID-Thermostat                    | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | 8.3   | -     | 8.3                | 8.3     |
|      | Demand Response, UT-Cool/WH                       | 4.1  | -     | 7.0   | -     | 9.9  | -     | -    | 7.2   | -     | -     | 6.7   | -     | -     | 6.8  | -     | -     | 7.0  | -     | -     | 7.2   | 28.1               | 55.9    |
|      | Demand Response, UT-3rd Party Contracts           | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 68.5  | -     | -    | -     | 5.7   | -     | 74.1               | 74.1    |
|      | Demand Response, UT-Irrigate                      | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | 1.9   | -     | 1.9                | 1.9     |
|      | Demand Response, UT-Thermostat                    | -  | -     | -     | -     | -    | -     | -    | -     | -     | 116.7 | -     | 8.2   | -     | -    | -     | -     | 8.3  | -     | -     | 5.1   | 116.7              | 138.3   |
|      | Demand Response, WY-Cool/WH                       | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -                  | -       |
|      | Demand Response, WY-3rd Party Contracts           | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 3.4   | -     | -    | -     | -     | -     | 3.4                | 3.4     |
|      | Demand Response, WY-Irrigate                      | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 37.3  | -     | -    | 2.1   | -     | -     | 39.4               | 39.4    |
|      | Demand Response, WY-Thermostat                    | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 1.8   | -     | -    | -     | -     | -     | 1.8                | 1.8     |
|      | Demand Response, UT-Ancillary Services            | -  | -     | -     | 8.3   | -    | 5.3   | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | 3.2   | -     | 13.5               | 16.7    |
|      | Demand Response, WY-Ancillary Services            | -  | -     | -     | -     | -    | 3.0   | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 3.0                | 3.0     |
|      | Demand Response Total                             | 4.1  | 6     | 7.0   | -     | 18.1 | -     | -    | 8.2   | 7.2   | -     | 116.7 | 25.4  | 8.2   | -    | 12.0  | 112.8 | -    | 15.3  | 3.7   | 21.9  | 17.3               | 361.2   |
|      | Energy Efficiency, ID                             | 6  | 6     | 7     | 7     | 7    | 7     | 7    | 8     | 7     | 6     | 6     | 6     | 6     | 6    | 5     | 4     | 3    | 3     | 3     | 3     | 68                 | 117     |
|      | Energy Efficiency, UT                             | 58   | 67    | 67    | 68    | 69   | 66    | 67   | 65    | 65    | 62    | 57    | 54    | 52    | 50   | 49    | 38    | 32   | 26    | 25    | 26    | 654                | 1,063   |
|      | Energy Efficiency, WY                             | 10   | 10    | 11    | 12    | 13   | 16    | 16   | 17    | 17    | 15    | 14    | 13    | 12    | 11   | 9     | 8     | 7    | 5     | 5     | 5     | 139                | 238     |
|      | Energy Efficiency Total                           | 74   | 83    | 85    | 86    | 89   | 90    | 91   | 88    | 89    | 86    | 79    | 74    | 71    | 67   | 65    | 51    | 45   | 37    | 33    | 35    | 861                | 1,417   |
|      | Battery Storage - Utah-S                          | -  | -     | -     | -     | -    | -     | -    | -     | -     | 240.0 | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 240                | 240     |
|      | Battery Storage - Utah-S                          | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | 495.0 | -     | 495.0              | 495.0   |
|      | Battery Storage - WYSW                            | -  | -     | -     | -     | -    | -     | -    | -     | -     | 240.0 | -     | -     | -     | -    | -     | -     | -    | -     | -     | 135.0 | 240.0              | 375.0   |
|      | Battery Storage - Idaho                           | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | 15.0  | 210.0 | 60.0  | 285.0              | 285.0   |
|      | POT East - Summer                                 | -  | -     | -     | -     | -    | -     | -    | 227   | -     | 227   | 241   | 159   | 208   | 135  | 285   | 286   | 300  | 286   | 300   | 300   | 23                 | 136     |
| West | Existing Plant Retirements and PPA Termination    |  |       |       |       |      |       |      |       |       |       |       |       |       |      |       |       |      |       |       |       |                    |         |
|      | Jim Bridger 1 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | (351) | -     | -     | -    | -     | -     | -    | -     | -     | -     | -                  | (351)   |
|      | Jim Bridger 2 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | (356) | -     | -    | -     | -     | -     | -                  | (356)   |
|      | Jim Bridger 3 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | -    | -     | -    | -     | (349) | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (349)              | (349)   |
|      | Jim Bridger 4 (Coal Early Retirement/Conversions) | -  | -     | -     | -     | -    | -     | -    | -     | (353) | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (353)              | (353)   |
|      | Hermiston   | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | (237) | -     | (237)              | (237)   |
|      | Retire - Hydro                                    | -  | (1)   | (169) | -     | (1)  | -     | -    | (1)   | -     | (7)   | -     | -     | (6)   | -    | -     | (75)  | -    | (1)   | -     | -     | (179)              | (262)   |
|      | Expire - Wind PPA                                 | -  | -     | -     | (175) | -    | (41)  | -    | -     | -     | (75)  | (10)  | -     | -     | (20) | (20)  | -     | -    | (10)  | -     | -     | (216)              | (360)   |
|      | Expire - Solar PPA                                | -  | -     | -     | -     | -    | -     | -    | -     | (2)   | -     | (75)  | (10)  | -     | (67) | (49)  | -     | (1)  | (115) | (175) | (11)  | (2)                | (420)   |
|      | Expansion Resources                               |  |       |       |       |      |       |      |       |       |       |       |       |       |      |       |       |      |       |       |       |                    |         |
|      | SCCT Frame WY                                     | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 443   | -     | -    | -     | -     | -     | 443                | 443     |
|      | Total SCCT  | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 443   | -     | -    | -     | -     | -     | 443                | 443     |
|      | Utility Solar - PV - Yakima                       | -  | -     | -     | -     | -    | 289   | -    | -     | -     | -     | -     | -     | -     | -    | -     | -     | -    | -     | 407   | 289   | 696                | 696     |
|      | Utility Solar - PV - Bridger                      | -  | -     | -     | -     | -    | -     | -    | 713   | -     | -     | 349   | -     | -     | -    | 251   | -     | -    | -     | -     | -     | 713                | 1,313   |
|      | Utility Solar/Storage - PV - Bridger              | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 102   | -     | -    | -     | -     | -     | 102                | 102     |
|      | Utility Solar - PV - Walla Walla                  | -  | -     | -     | -     | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | 100   | -     | -    | -     | -     | -     | 100                | 100     |
|      | Utility Solar/Storage - PV - S                    |  |       |       |       |      |       |      |       |       |       |       |       |       |      |       |       |      |       |       |       |                    |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

|   |   | Capacity (MW) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Resource Totals 1/ |         |         |
|---|---|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------------|---------|---------|
|   |   | 2019          | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038               | 10-year | 20-year |
| East                                    | P-54  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Existing Plant Retirements and PPA Termination    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Craig 1 (Coal Early Retirement/Conversions)       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Craig 2 (Coal Early Retirement/Conversions)       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Hayden 1  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Hayden 2  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Huntington 1                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Huntington 2                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Colstrip 3 (Coal Early Retirement/Conversions)    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Colstrip 4 (Coal Early Retirement/Conversions)    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Cholla 4 (Coal Early Retirement/Conversions)      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | DaveJohnston 1                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | DaveJohnston 2                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | DaveJohnston 3                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | DaveJohnston 4                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Naughton 1 (Coal Early Retirement/Conversions)    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Naughton 2 (Coal Early Retirement/Conversions)    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Naughton 3 (Coal Early Retirement/Conversions)    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Gadsby 1-6  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Retire - Hydro                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Retire - Wind                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Expire - Wind PPA                                 |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Expire - Solar PPA                                |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Retire - Other                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Coal Ret. WY - Gas RePower                        |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Expansion Resources                               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | SCCT Frame NTN                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | SCCT Frame WYSW                                   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Total SCCT  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Wind - Dickinson                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Wind - GO   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Wind - WYAE                                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Total Wind  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar - PV - Utah-S                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar - PV - WYSW                         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar-Storage - PV - Utah-S               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar-Storage - PV - GO                   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar-Storage - PV - Huntington           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar - PV - Utah-N                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar-Storage - PV - Utah-N               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Total Solar                                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, ID-Cool/WH                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, ID-3rd Party Contracts           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, ID-Irrigate                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, ID-Thermostat                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, UT-Cool/WH                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, UT-3rd Party Contracts           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, UT-Irrigate                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, UT-Thermostat                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, WY-Cool/WH                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Demand Response, WY-3rd Party Contracts |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Demand Response, WY-Irrigate            |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Demand Response, WY-Thermostat          |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Demand Response, WY-Ancillary Services  |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Demand Response, WY-Ancillary Services  |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Demand Response, Total                  |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Energy Efficiency, ID                   |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Energy Efficiency, UT                   |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Energy Efficiency, WY                   |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Energy Efficiency, Total                |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Battery Storage - Utah-N                |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Battery Storage - WYSW                  |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| Battery Storage - Idaho                 |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| FOI East - Summer                       |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
| West                                    | Existing Plant Retirements and PPA Termination    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Judithridge 1 (Coal Early Retirement/Conversions) |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Judithridge 2 (Coal Early Retirement/Conversions) |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Judithridge 3                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Judithridge 4                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Hermiston   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Retire - Hydro                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Expire - Wind PPA                                 |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Expire - Solar PPA                                |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Expansion Resources                               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | SCCT Frame WY                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Total SCCT  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar - PV - S-Oregon                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar - PV - Yakima                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar - PV - Bridger                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar-Storage - PV - Bridger              |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar - PV - Walls Walls                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar-Storage - PV - S-Oregon             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Utility Solar-Storage - PV - Yakima               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Total Solar                                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, OR-Ancillary Services            |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, WA-Ancillary Services            |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, CA-Cool/WH                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, CA-3rd Party Contracts           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, CA-Irrigate                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, CA-Thermostat                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, OR-Cool/WH                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, OR-3rd Party Contracts           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, OR-Irrigate                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, OR-Thermostat                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, WA-Cool/WH                       |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, WA-3rd Party Contracts           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, WA-Irrigate                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, WA-Thermostat                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Demand Response, Total                            |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Energy Efficiency, CA                             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Energy Efficiency, OR                             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Energy Efficiency, WA                             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Energy Efficiency, Total                          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Battery Storage - S-Oregon                        |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Battery Storage - Willamette Valley               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Battery Storage - Portland, NC                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Battery Storage - Walls Walls                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Battery Storage - Yakima                          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | FOI West - Summer                                 |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | FOI West - Winter                                 |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Existing Plant Retirements/Conversions            |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Annual Additions, Long Term Resources             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Annual Additions, Short Term Resources            |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |
|   | Total Annual Additions                            |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.



Table K.13 - C-Cases, Detailed Capacity Expansion Portfolio

|   |  | Capacity (MW) |      |      |      |      |      |      |      |      |      |       |      |      |      |      |       |      |       |      |      | Resource Totals 1/ |         |       |       |
|---|--|---------------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|-------|------|-------|------|------|--------------------|---------|-------|-------|
|   |  | 2019          | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029  | 2030 | 2031 | 2032 | 2033 | 2034  | 2035 | 2036  | 2037 | 2038 | 10-year            | 20-year |       |       |
| East                                    | P-31C  |               |      |      |      |      |      |      |      |      |      |       |      |      |      |      |       |      |       |      |      |                    |         |       |       |
|   | Existing Plant Retirements and PPA Termination |               |      |      |      |      |      |      |      |      |      |       |      |      |      |      |       |      |       |      |      |                    |         |       |       |
|   | Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -    | -    | -    | -    | -    | -    | (82) | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (82)    | (82)  |       |
|   | Craig 2 (Coal Early Retirement/Conversions)    | -             | -    | -    | -    | -    | -    | -    | -    | -    | (82) | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (82)    | (82)  |       |
|   | Hayden 1                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (44)    | (44)  |       |
|   | Hayden 2                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | (44) | -    | -    | -     | -    | -     | -    | -    | -                  | (44)    | (44)  |       |
|   | Huntington 1                                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (33)    | (33)  |       |
|   | Huntington 2                                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | (459)              | -       | (459) |       |
|   | Coktrip 3 (Coal Early Retirement/Conversions)  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (74)  | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (450)   | (450) |       |
|   | Coktrip 4 (Coal Early Retirement/Conversions)  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (74)  | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (74)    | (74)  |       |
|   | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (387)   | (387) |       |
|   | DaveJohnston 1                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (99)  | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (99)    | (99)  |       |
|   | DaveJohnston 2                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (106) | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (106)   | (106) |       |
|   | DaveJohnston 3                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (220) | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (220)   | (220) |       |
|   | DaveJohnston 4                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (330) | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (330)   | (330) |       |
|   | Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (156) | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (156)   | (156) |       |
|   | Naughton 2 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | (201) | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (201)   | (201) |       |
|   | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (280)   | (280) |       |
|   | Gadsby 1-6                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | (356) | -    | -     | -    | -    | -                  | -       | (356) |       |
|   | Retire - Hydro                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | (20)    | (20)  |       |
|   | Retire - Wind                                  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | (40)  |       |
|   | Expire - Wind PPA                              | -             | (27) | (17) | (49) | (0)  | -    | -    | -    | -    | -    | (65)  | (3)  | -    | (19) | (99) | (200) | (45) | (181) | (80) | -    | (60)               | (80)    | (35)  | (94)  |
|   | Expire - Solar PPA                             | -             | -    | -    | -    | -    | -    | (1)  | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | -     | (160) |
|   | Retire - Other                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | -     | (1)   |
|   | Coal Ret. W.Y. - Gas RePower                   | -             | -    | 247  | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | -     | (32)  |
|   | Expansion Resources                            |               |      |      |      |      |      |      |      |      |      |       |      |      |      |      |       |      |       |      |      |                    |         |       |       |
|   | SCCT Frame NTN                                 | -             | -    | -    | -    | -    | -    | -    | -    | -    | 185  | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 185   | 555   |
|   | SCCT Frame WYSW                                | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | 370  | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 370   | 370   |
|   | Total SCCT                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | 185  | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 370   | 185   |
|   | Wind, Dickinson                                | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | -     | 620   |
|   | Wind, CO                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | -     | 883   |
|   | Wind, WYAE                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | -     | 1,920 |
|   | Total Wind                                     | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | -     | 1,920 |
| Utility Solar+Storage - PV - Utah-S     | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 300   |       |
| Utility Solar+Storage - PV - CO         | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 217   |       |
| Utility Solar+Storage - PV - Huntington | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 909   |       |
| Utility Solar+Storage - PV - Utah-N     | -  | -             | -    | 159  | 64   | 73   | 604  | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 900   |       |
| Total Solar                             | -  | -             | -    | 159  | 64   | 73   | 904  | -    | -    | -    | -    | -     | 149  | 68   | 500  | -    | -     | -    | -     | -    | -    | -                  | -       | 909   |       |
| Demand Response, ID-Cool/WH             | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 2.6   |       |
| Demand Response, ID-3rd Party Contracts | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 1.8   |       |
| Demand Response, ID-Irrigate            | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 5.2   |       |
| Demand Response, ID-Thermostat          | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 8.3   |       |
| Demand Response, UT-Cool/WH             | 4.1  | -             | -    | 7.0  | -    | -    | 9.9  | -    | -    | -    | 7.2  | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  | -       | 7.0   |       |
| Demand Response, UT-3rd Party Contracts | -  | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -     | -    | -    | -    | -    | -     | -    | -     | -    | -    | -                  |         |       |       |

|   |  | Capacity (MW) |      |       |       |      |       |       |      |       |      |       |      |       |       |      |       |      |       |       | Resource Totals 1/ |         |         |       |
|---|--|---------------|------|-------|-------|------|-------|-------|------|-------|------|-------|------|-------|-------|------|-------|------|-------|-------|--------------------|---------|---------|-------|
| P-36C                                   |  | 2019          | 2020 | 2021  | 2022  | 2023 | 2024  | 2025  | 2026 | 2027  | 2028 | 2029  | 2030 | 2031  | 2032  | 2033 | 2034  | 2035 | 2036  | 2037  | 2038               | 10-year | 20-year |       |
| East                                    | Existing Plant Retirements and PPA Termination |               |      |       |       |      |       |       |      |       |      |       |      |       |       |      |       |      |       |       |                    |         |         |       |
|   | Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -     | -     | -    | -     | -     | (82) | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (82)    | (82)    |       |
|   | Craig 2 (Coal Early Retirement/Conversions)    | -             | -    | -     | -     | -    | -     | -     | -    | (82)  | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (82)    | (82)    |       |
|   | Hayden 1                                       | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | (44)  | -     | -    | -     | -    | -     | -     | -                  | (44)    | (44)    |       |
|   | Hayden 2                                       | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | (33)  | -     | -    | -     | -    | -     | -     | -                  | (33)    | (33)    |       |
|   | Huntington 1                                   | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | (459) | -                  | -       | (459)   |       |
|   | Huntington 2                                   | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | (450) | -                  | -       | (450)   |       |
|   | Coktrip 3 (Coal Early Retirement/Conversions)  | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | (74)  | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (74)    | (74)    |       |
|   | Coktrip 4 (Coal Early Retirement/Conversions)  | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | (74)  | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (74)    | (74)    |       |
|   | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -     | (387) | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (387)   | (387)   |       |
|   | DaveJohnston 1                                 | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | (99)  | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (99)    | (99)    |       |
|   | DaveJohnston 2                                 | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | (106) | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (106)   | (106)   |       |
|   | DaveJohnston 3                                 | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | (220) | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (220)   | (220)   |       |
|   | DaveJohnston 4                                 | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | (330) | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (330)   | (330)   |       |
|   | Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -     | -     | -    | (156) | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (156)   | (156)   |       |
|   | Naughton 2 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -     | -     | -    | (201) | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (201)   | (201)   |       |
|   | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | (280) | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (280)   | (280)   |       |
|   | Gadsby 1-6                                     | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | (356) | -    | -     | -     | -                  | -       | (356)   |       |
|   | Retire - Hydro                                 | -             | -    | -     | -     | -    | -     | (20)  | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | (20)    | (20)    |       |
|   | Retire - Wind                                  | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | (40)  | -     | -    | -     | -    | -     | -     | -                  | -       | (40)    |       |
|   | Expire - Wind PPA                              | -             | (27) | (17)  | (49)  | (0)  | -     | -     | -    | (65)  | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -     | (60)  | (80)               | -       | (160)   | (924) |
|   | Expire - Solar PPA                             | -             | -    | -     | -     | -    | (1)   | (1)   | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | (35)  | (94)  | (849)              | -       | (1)     | (979) |
|   | Retire - Other                                 | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | (1)  | -     | -     | -                  | (32)    | -       | (33)  |
|   | Coal Ret. WY - Gas RePower                     | -             | -    | 247   | -     | -    | -     | -     | -    | -     | -    | -     | -    | (247) | -     | -    | -     | -    | -     | -     | -                  | -       | 247     | -     |
|   | Expansion Resources                            |               |      |       |       |      |       |       |      |       |      |       |      |       |       |      |       |      |       |       |                    |         |         |       |
|   | SCCT Frame NTN                                 | -             | -    | -     | -     | -    | -     | -     | -    | 185   | -    | -     | -    | 370   | -     | -    | -     | -    | -     | -     | -                  | -       | 185     | 555   |
|   | SCCT Frame WYSW                                | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | 185  | -     | -     | -    | 185   | -    | -     | -     | -                  | -       | -       | 370   |
|   | Total SCCT                                     | -             | -    | -     | -     | -    | -     | -     | -    | 185   | -    | -     | -    | 370   | -     | -    | 185   | -    | -     | -     | -                  | -       | 185     | 925   |
|   | Wind, Djohnston                                | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | 280  | 321   | 20    | -    | -     | -    | -     | -     | -                  | -       | -       | 620   |
|   | Wind, GO                                       | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | 1,097 | -     | -    | -     | -    | -     | -     | -                  | -       | -       | 1,097 |
|   | Wind, UT                                       | -             | -    | -     | -     | 151  | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | -       | 151     | 151   |
|   | Wind, WYAE                                     | -             | -    | -     | -     | -    | -     | 1,920 | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | -       | 1,920   | 1,920 |
|   | Total Wind                                     | -             | -    | -     | -     | 151  | 1,920 | -     | -    | -     | -    | -     | 280  | 1,417 | 20    | -    | -     | -    | -     | -     | -                  | -       | 2,071   | 3,788 |
|   | Utility Solar+Storage - PV - Utah-S            | -             | -    | -     | -     | -    | -     | 149   | -    | -     | -    | -     | -    | -     | -     | 500  | -     | -    | -     | -     | -                  | -       | 149     | 649   |
|   | Utility Solar+Storage - PV - CO                | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | 3     | -    | -     | -    | -     | -     | -                  | -       | 3       | 3     |
|   | Utility Solar+Storage - PV - Huntington        | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | 909   | -                  | -       | 909     | 909   |
|   | Utility Solar+Storage - PV - Utah-N            | -             | -    | -     | 159   | 64   | -     | 677   | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | -       | 900     | 900   |
|   | Total Solar                                    | -             | -    | -     | 159   | 64   | -     | 826   | -    | -     | -    | -     | -    | -     | 3     | 500  | -     | -    | -     | -     | 909                | -       | 1,049   | 2,461 |
|   | Demand Response, ID-Cool/WH                    | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 2.6                | -       | 2.6     |       |
|   | Demand Response, ID-3rd Party Contracts        | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 1.8                | -       | 1.8     |       |
|   | Demand Response, ID-Irrigate                   | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | 5.2  | -     | -    | -     | -     | 3.7                | 1.8     | 10.6    |       |
|   | Demand Response, ID-Thermostat                 | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 8.3                | -       | 8.3     |       |
|   | Demand Response, UT-Cool/WH                    | 4.1           | -    | -     | 7.0   | -    | 9.9   | -     | -    | 7.2   | -    | -     | 6.7  | -     | -     | -    | 6.8   | -    | 7.0   | -     | -                  | 7.2     | 28.1    | 55.9  |
|   | Demand Response, UT-3rd Party Contracts        | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 74.1               | -       | 74.1    |       |
|   | Demand Response, UT-Irrigate                   | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | -                  | 1.9     | -       | 1.9   |
| Demand Response, UT-Thermostat          | -  | -             | -    | -     | -     | -    | -     | -     | -    | -     | 46.7 | 70.0  | -    | 8.2   | -     | -    | -     | -    | -     | 8.3   | 5.1                | 116.7   | 138.3   |       |
| Demand Response, WY-Cool/WH             | -  | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | 3.4   | 1.8                | 5.2     |         |       |
| Demand Response, WY-3rd Party Contracts | -  | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | 39.4  | -                  | 39.4    |         |       |
| Demand Response, WY-Irrigate            | -  | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | 1.8  | -     | -    | -     | -     | -                  | 1.8     |         |       |
| Demand Response, WY-Thermostat          | -  | -             | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | 18.7  | 1.2                | 19.9    |         |       |
| Demand Response, UT-Ancillary Services  | -  | -             | -    | -     | -     | 8.3  | -     | 5.3   | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | 3.2   | -                  | 13.5    | 16.7    |       |
| Demand Response, WY-Ancillary Services  | -  | -             | -    | -     | -     | -    | -     | 3.0   | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -     | -     | 3.0                | 3.0     | 3.0     |       |
| Demand Response Total                   | 4.1  | -             | 7.0  | -     | 18.1  | -    | 8.2   | 7.2   | 46.7 | 70.0  | 6.7  | 8.2   | -    | 12.0  | 1.8   | -    | 7.0   | -    | 163.7 | 19.1  | 161.2              | 379.6   |         |       |
| Energy Efficiency, ID                   | -  | 6             | 6    | 6     | 7     | 7    | 7     | 7     | 7    | 7     | 7    | 7     | 6    | 6     | 6     | 6    | 4     | 4    | 3     | 3     | 3                  | 70      | 118     |       |
| Energy Efficiency, UT                   | -  | 58            | 67   | 67    | 68    | 71   | 68    | 71    | 68   | 63    | 59   | 57    | 53   | 50    | 48    | 49   | 36    | 32   | 26    | 25    | 23                 | 659     | 1,059   |       |
| Energy Efficiency, WY                   | -  | 10            | 10   | 11    | 14    | 15   | 16    | 17    | 18   | 17    | 16   | 15    | 14   | 12    | 12    | 11   | 9     | 8    | 7     | 5     | 5                  | 144     | 242     |       |
| Energy Efficiency Total                 | -  | 74            | 83   | 85    | 88    | 94   | 92    | 95    | 93   | 86    | 82   | 79    | 73   | 68    | 65    | 65   | 49    | 45   | 37    | 33    | 31                 | 873     | 1,418   |       |
| Battery Storage - Utah-N                | -  | -             | -    | -     | -     | -    | -     | -     | 15.0 | 105.0 | -    | -     | -    | -     | -     | -</  |       |      |       |       |                    |         |         |       |

|   |  | Capacity (MW) |      |      |       |      |      |       |      |      |      |       |       |       |       |       |       |       |      |      |       | Resource Totals 1/ |         |       |       |
|---|--|---------------|------|------|-------|------|------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|--------------------|---------|-------|-------|
| P-45C                                   |  | 2019          | 2020 | 2021 | 2022  | 2023 | 2024 | 2025  | 2026 | 2027 | 2028 | 2029  | 2030  | 2031  | 2032  | 2033  | 2034  | 2035  | 2036 | 2037 | 2038  | 10-year            | 20-year |       |       |
| East                                    | Existing Plant Retirements and PPA Termination | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | (82)               | (82)    |       |       |
|   | Crug 1 (Coal Early Retirement/Conversions)     | -             | -    | -    | -     | -    | -    | -     | -    | (82) | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | (82)    | (82)  |       |
|   | Crug 2 (Coal Early Retirement/Conversions)     | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (44)  |       |
|   | Hayden 1                                       | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | (44)  | -     | -     | -     | -    | -    | -     | -                  | -       | (44)  |       |
|   | Hayden 2                                       | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | (33)  | -     | -     | -     | -    | -    | -     | -                  | -       | (33)  |       |
|   | Huntington 1                                   | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | (459)              | -       | (459) |       |
|   | Huntington 2                                   | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | (450)              | -       | (450) |       |
|   | Colstrip 3 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (74)  | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (74)  | (74)  |
|   | Colstrip 4 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (74)  | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (74)  | (74)  |
|   | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -    | (387) | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (387) | (387) |
|   | DaveJohnston 1                                 | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (99)  | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (99)  | (99)  |
|   | DaveJohnston 2                                 | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (106) | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (106) | (106) |
|   | DaveJohnston 3                                 | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (220) | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (220) | (220) |
|   | DaveJohnston 4                                 | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (330) | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (330) | (330) |
|   | Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (156) | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (156) | (156) |
|   | Naughton 2 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | (201) | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (201) | (201) |
|   | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (280) | (280) |
|   | Gadsby 1-6                                     | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | (356) | -     | -    | -    | -     | -                  | -       | -     | (356) |
|   | Retire - Hydro                                 | -             | -    | -    | -     | -    | -    | (20)  | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (20)  | (20)  |
|   | Retire - Wind                                  | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | (40)  | -     | -     | -     | -     | -    | -    | -     | -                  | -       | (40)  | (40)  |
|   | Expire - Wind PPA                              | -             | -    | (27) | (17)  | (49) | (0)  | -     | -    | -    | (65) | (3)   | -     | (19)  | (99)  | (200) | (45)  | (181) | (80) | -    | (60)  | (80)               | -       | (160) | (924) |
|   | Expire - Solar PPA                             | -             | -    | -    | -     | -    | (1)  | (1)   | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | (35) | (94) | (849) | -                  | -       | (1)   | (979) |
|   | Retire - Other                                 | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | (1)   | -    | -    | -     | -                  | (32)    | -     | (33)  |
|   | Coal Ret. WY - Gas RePower                     | -             | -    | 247  | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | (247) | -     | -     | -     | -    | -    | -     | -                  | -       | 247   | -     |
|   | Expansion Resources                            |               |      |      |       |      |      |       |      |      |      |       |       |       |       |       |       |       |      |      |       |                    |         |       |       |
|   | SCCT Frame NTN                                 | -             | -    | -    | -     | -    | -    | -     | -    | 185  | -    | -     | -     | 185   | -     | -     | 185   | -     | -    | -    | -     | -                  | 185     | 555   | -     |
|   | SCCT Frame WYSW                                | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 370   | -                  | 370     | -     | -     |
|   | Total SCCT                                     | -             | -    | -    | -     | -    | -    | -     | -    | 185  | -    | -     | -     | 185   | -     | -     | 185   | -     | -    | -    | 370   | -                  | 185     | 925   | -     |
|   | Wind, Dohnston                                 | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | 620   | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | 620   | -     |
|   | Wind, GO                                       | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | 1,045 | -     |
|   | Wind, UT                                       | -             | -    | -    | -     | -    | 18   | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | 18    | -     |
|   | Wind, WY&E                                     | -             | -    | -    | -     | -    | -    | 1,920 | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | 1,920 | -     |
|   | Total Wind                                     | -             | -    | -    | -     | -    | 18   | 1,920 | -    | -    | -    | -     | 620   | 1,045 | -     | -     | -     | -     | -    | -    | -     | -                  | -       | 1,938 | 3,603 |
|   | Utility Solar+Storage - PV - Utah-S            | -             | -    | -    | -     | -    | -    | 282   | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | -       | 282   | -     |
|   | Utility Solar+Storage - PV - WYSW              | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | 500   | -     | -     | 38    | -    | -    | -     | -                  | -       | 38    | -     |
|   | Utility Solar+Storage - PV - GO                | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | 55    | -     | -     | -     | -     | -    | -    | -     | -                  | -       | 55    | -     |
|   | Utility Solar+Storage - PV - Huntington        | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 899   | 10                 | 909     | -     |       |
|   | Utility Solar+Storage - PV - Utah-N            | -             | -    | -    | 159   | 64   | 54   | 623   | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | -     | -                  | 900     | 900   |       |
|   | Total Solar                                    | -             | -    | -    | 159   | 64   | 54   | 904   | -    | -    | -    | -     | -     | 55    | 500   | -     | 38    | -     | -    | -    | 899   | 10                 | 1,182   | 2,684 |       |
|   | Demand Response, ID-Cool/WH                    | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 2.6   | -                  | -       | 2.6   | -     |
|   | Demand Response, ID-3rd Party Contracts        | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 1.8   | -                  | -       | 1.8   | -     |
|   | Demand Response, ID-Irrigate                   | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | 5.2   | -     | -     | -    | -    | 3.7   | 1.8                | -       | 10.6  | -     |
|   | Demand Response, ID-Thermostat                 | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 8.3   | -                  | -       | 8.3   | -     |
|   | Demand Response, UT-Cool/WH                    | 4.1           | -    | -    | 7.0   | -    | 9.9  | -     | -    | -    | 7.2  | -     | -     | 6.7   | -     | -     | 6.8   | -     | 7.0  | -    | -     | 7.2                | 28.1    | 55.9  | -     |
|   | Demand Response, UT-3rd Party Contracts        | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 74.1  | 2.6                | -       | 76.7  | -     |
| Demand Response, UT-Irrigate            | -  | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 1.9   | -                  | 1.9     | -     |       |
| Demand Response, UT-Thermostat          | -  | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | 116.7 | 8.2   | -     | -     | -     | -     | 8.3   | -    | -    | 5.1   | -                  | 138.3   | -     |       |
| Demand Response, WY-Cool/WH             | -  | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | 3.4  | 1.8   | -                  | 5.2     | -     |       |
| Demand Response, WY-3rd Party Contracts | -  | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | 39.4 | -     | -                  | 39.4    | -     |       |
| Demand Response, WY-Irrigate            | -  | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | 1.8  | -     | -                  | 1.8     | -     |       |
| Demand Response, WY-Thermostat          | -  | -             | -    | -    | -     | -    | -    | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | 18.7 | 1.2   | -                  | 19.9    | -     |       |
| Demand Response, UT-Ancillary Services  | -  | -             | -    | -    | -     | 8.3  | -    | -     | 5.3  | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | 3.2  | -     | 13.5               | 16.7    |       |       |
| Demand Response, WY-Ancillary Services  | -  | -             | -    | -    | -     | -    | 3.0  | -     | -    | -    | -    | -     | -     | -     | -     | -     | -     | -     | -    | -    | 3.0   | 3.0                | -       | -     |       |
| Demand Response Total                   | 4.1  | -             | -    | 7.0  | -     | 18.1 | -    | -     | 8.2  | 7.2  | -    | -     | 123.3 | 8.2   | -     | 12.0  | -     | -     | 15.3 | -    | 157.1 | 21.6               | 44.6    | 382.2 |       |
| Energy Efficiency, ID                   | 6  | 6             | 6    | 7    | 7     | 7    | 7    | 7     | 7    | 7    | 7    | 7     | 6     | 6     | 6     | 6     | 4     | 4     | 3    | 3    | 3     | 68                 | 116     | -     |       |
| Energy Efficiency, UT                   | 58   | 65            |      |      |       |      |      |       |      |      |      |       |       |       |       |       |       |       |      |      |       |                    |         |       |       |

|       |  | Capacity (MW)                           |       |       |      |      |      |       |       |      |       |       |      |       |      |       |       |      |      |       |       | Resource Totals 1/ |         |       |
|-------|--|---|-------|-------|------|------|------|-------|-------|------|-------|-------|------|-------|------|-------|-------|------|------|-------|-------|--------------------|---------|-------|
| P-46C |  | 2019                                    | 2020  | 2021  | 2022 | 2023 | 2024 | 2025  | 2026  | 2027 | 2028  | 2029  | 2030 | 2031  | 2032 | 2033  | 2034  | 2035 | 2036 | 2037  | 2038  | 10-year            | 20-year |       |
| East  | Existing Plant Retirements and PPA Termination |   |       |       |      |      |      |       |       |      |       |       |      |       |      |       |       |      |      |       |       |                    |         |       |
|       | Craig 1 (Coal Early Retirement/Conversions)    | -                                       | -     | -     | -    | -    | -    | -     | (82)  | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (82)               | (82)    |       |
|       | Craig 2 (Coal Early Retirement/Conversions)    | -                                       | -     | -     | -    | -    | -    | -     | -     | (82) | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (82)               | (82)    |       |
|       | Hayden 1                                       | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | (44)  | -    | -     | -     | -    | -    | -     | -     | -                  | (44)    |       |
|       | Hayden 2                                       | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | (33)  | -    | -     | -     | -    | -    | -     | -     | -                  | (33)    |       |
|       | Huntington 1                                   | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | (459) | -                  | (459)   |       |
|       | Huntington 2                                   | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | (450) | -                  | (450)   |       |
|       | Colstrip 3 (Coal Early Retirement/Conversions) | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | (74)  | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (74)    | (74)  |
|       | Colstrip 4 (Coal Early Retirement/Conversions) | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | (74)  | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (74)    | (74)  |
|       | Cholla 4 (Coal Early Retirement/Conversions)   | -                                       | -     | (387) | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (387)   | (387) |
|       | Dave Johnston 1                                | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | (99)  | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (99)    | (99)  |
|       | Dave Johnston 2                                | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | (106) | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (106)   | (106) |
|       | Dave Johnston 3                                | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | (220) | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (220)   | (220) |
|       | Dave Johnston 4                                | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | (330) | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (330)   | (330) |
|       | Naughton 1 (Coal Early Retirement/Conversions) | -                                       | -     | -     | -    | -    | -    | -     | (156) | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (156)   | (156) |
|       | Naughton 2 (Coal Early Retirement/Conversions) | -                                       | -     | -     | -    | -    | -    | -     | (201) | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (201)   | (201) |
|       | Naughton 3 (Coal Early Retirement/Conversions) | -                                       | (280) | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (280)   | (280) |
|       | Gadsby 1-6                                     | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | (356) | -    | -    | -     | -     | -                  | -       | (356) |
|       | Retire - Hydro                                 | -                                       | -     | -     | -    | -    | -    | (20)  | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (20)    | (20)  |
|       | Retire - Wind                                  | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | (40) | -     | -    | -     | -     | -    | -    | -     | -     | -                  | -       | (40)  |
|       | Expire - Wind PPA                              | -                                       | (27)  | (17)  | (49) | (0)  | -    | -     | (65)  | (3)  | -     | (19)  | (99) | (200) | (45) | (181) | (80)  | -    | (60) | (80)  | -     | -                  | (160)   | (924) |
|       | Expire - Solar PPA                             | -                                       | -     | -     | -    | (1)  | (1)  | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | (35) | (94) | (849) | -     | (1)                | (979)   |       |
|       | Retire - Other                                 | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | (1)  | -    | -     | -     | (32)               | -       | (33)  |
|       | Coal Ret. WY - Gas RePower                     | -                                       | 247   | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | (247) | -    | -     | -     | -    | -    | -     | -     | -                  | 247     | -     |
|       | Expansion Resources                            |   |       |       |      |      |      |       |       |      |       |       |      |       |      |       |       |      |      |       |       |                    |         |       |
|       |  | SCCT Frame NTN                          | -     | -     | -    | -    | -    | -     | -     | 185  | -     | -     | -    | 370   | -    | -     | -     | -    | -    | -     | -     | -                  | 185     | 555   |
|       |  | SCCT Frame WYSW                         | -     | -     | -    | -    | -    | -     | -     | -    | -     | 185   | 185  | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 185     | 370   |
|       |  | Total SCCT                              | -     | -     | -    | -    | -    | -     | -     | 185  | -     | 185   | 185  | 370   | -    | -     | -     | -    | -    | -     | -     | -                  | 370     | 925   |
|       |  | Wind, Djohnston                         | -     | -     | -    | -    | -    | -     | -     | -    | -     | 127   | 493  | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 127     | 620   |
|       |  | Wind, GO                                | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | 1,091 | -    | -     | -     | -    | -    | -     | -     | -                  | -       | 1,091 |
|       |  | Wind, UT                                | -     | -     | -    | -    | 294  | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 294     | 294   |
|       |  | Wind, WYAE                              | -     | -     | -    | -    | -    | 1,920 | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920 |
|       |  | Total Wind                              | -     | -     | -    | -    | 294  | 1,920 | -     | -    | -     | 127   | 493  | 1,091 | -    | -     | -     | -    | -    | -     | -     | -                  | 2,341   | 3,925 |
|       |  | Utility Solar+Storage - PV - Utah-S     | -     | -     | -    | -    | -    | 6     | -     | -    | -     | -     | -    | -     | 500  | -     | -     | -    | -    | -     | -     | -                  | 6       | 506   |
|       |  | Utility Solar+Storage - PV - WYSW       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | 100   | -    | -    | -     | -     | -                  | -       | 100   |
|       |  | Utility Solar+Storage - PV - CO         | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | 9     | -    | -     | -     | -    | -    | -     | -     | -                  | -       | 9     |
|       |  | Utility Solar+Storage - PV - Huntington | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 909   | -                  | 909     | 909   |
|       |  | Utility Solar+Storage - PV - Utah-N     | -     | -     | 159  | 64   | -    | 677   | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 900     | 900   |
|       |  | Total Solar                             | -     | -     | 159  | 64   | -    | 683   | -     | -    | -     | -     | -    | -     | 509  | -     | -     | 100  | -    | -     | 909   | -                  | 906     | 2,424 |
|       |  | Demand Response, ID-Cool/WH             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 2.6   | -                  | -       | 2.6   |
|       |  | Demand Response, ID-3rd Party Contracts | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 1.8   | -                  | -       | 1.8   |
|       |  | Demand Response, ID-Irrigate            | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | 5.2   | -     | -    | -    | -     | 3.7   | 1.8                | -       | 10.6  |
|       |  | Demand Response, ID-Thermostat          | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 8.3   | -                  | -       | 8.3   |
|       |  | Demand Response, UT-Cool/WH             | 4.1   | -     | 7.0  | -    | 9.9  | -     | -     | -    | 7.2   | -     | -    | 6.7   | -    | -     | 6.8   | -    | 7.0  | -     | -     | 7.2                | 28.1    | 55.9  |
|       |  | Demand Response, UT-3rd Party Contracts | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 74.1  | 2.6                | -       | 76.7  |
|       | Demand Response, UT-Irrigate                   | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | 1.9   | -     | -                  | 1.9     |       |
|       | Demand Response, UT-Thermostat                 | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | 116.7 | -     | 8.2  | -     | -    | -     | -     | -    | -    | -     | 8.3   | 5.1                | 116.7   | 138.3 |
|       | Demand Response, WY-Cool/WH                    | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 3.4     |       |
|       | Demand Response, WY-3rd Party Contracts        | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 39.4    |       |
|       | Demand Response, WY-Irrigate                   | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | 1.8   | -    | -    | -     | -     | -                  | 1.8     |       |
|       | Demand Response, WY-Thermostat                 | -                                       | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 18.7    |       |
|       | Demand Response, UT-Ancillary Services         | -                                       | -     | -     | -    | 8.3  | -    | 5.3   | -     | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 3.2   | -                  | 13.5    |       |
|       | Demand Response, WY-Ancillary Services         | -                                       | -     | -     | -    | -    | -    | -     | 3.0   | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 16.7    |       |
|       | Demand Response Total                          | 4.1                                     | -     | 7.0   | -    | 18.1 | -    | 8.2   | 7.2   | -    | 116.7 | 6.7   | 8.2  | -     | 12.0 | 1.8   | -     | 7.0  | -    | 163.7 | 18.6  | 31.2               | 379.2   |       |
|       | Energy Efficiency, ID                          | 6                                       | 6     | 6     | 7    | 7    | 7    | 7     | 7     | 7    | 7     | 7     | 6    | 6     | 6    | 4     | 4     | 3    | 3    | 3     | 3     | 68                 | 116     |       |
|       | Energy Efficiency, UT                          | 58                                      | 61    | 67    | 68   | 69   | 66   | 67    | 65    | 64   | 62    | 57    | 53   | 50    | 48   | 47    | 36    | 32   | 25   | 22    | 22    | 646                | 1,037   |       |
|       | Energy Efficiency, WY                          | 10                                      | 10    | 11    | 12   | 13   | 16   | 16    | 17    | 18</ |       |       |      |       |      |       |       |      |      |       |       |                    |         |       |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

|                         |  | Capacity (MW) |       |      |       |      |      |       |      |       |      |       |       |       |       |      |       |      |      |       |       | Resource Totals 1/ |         |       |       |
|-------------------------|--|---------------|-------|------|-------|------|------|-------|------|-------|------|-------|-------|-------|-------|------|-------|------|------|-------|-------|--------------------|---------|-------|-------|
| P-48C                   |  | 2019          | 2020  | 2021 | 2022  | 2023 | 2024 | 2025  | 2026 | 2027  | 2028 | 2029  | 2030  | 2031  | 2032  | 2033 | 2034  | 2035 | 2036 | 2037  | 2038  | 10-year            | 20-year |       |       |
| East                    | Existing Plant Retirements and PPA Termination | -             | -     | -    | -     | -    | -    | -     | -    | -     | (82) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)  |       |
|                         | Crnig 1 (Coal Early Retirement/Conversions)    | -             | -     | -    | -     | -    | -    | -     | -    | -     | (82) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)  |       |
|                         | Crnig 2 (Coal Early Retirement/Conversions)    | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -                  | (44)    | (44)  |       |
|                         | Hayden 1                                       | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -                  | (33)    | (33)  |       |
|                         | Hayden 2                                       | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -     |       |
|                         | Huntington 1                                   | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (459) | -                  | -       | (459) |       |
|                         | Huntington 2                                   | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | (450) | -                  | -       | (450) |       |
|                         | Colstrip 3 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (74)    | (74)  |       |
|                         | Colstrip 4 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (74)    | (74)  |       |
|                         | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -     | -    | (387) | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (387)   | (387) |       |
|                         | DaveJohnston 1                                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | (99)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (99)    | (99)  |       |
|                         | DaveJohnston 2                                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | (106) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (106)   | (106) |       |
|                         | DaveJohnston 3                                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | (220) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (220)   | (220) |       |
|                         | DaveJohnston 4                                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | (330) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (330)   | (330) |       |
|                         | Naughton 1 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -    | -     | -    | (156) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (156)   | (156) |       |
|                         | Naughton 2 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -    | -     | -    | (201) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (201)   | (201) |       |
|                         | Naughton 3 (Coal Early Retirement/Conversions) | -             | (280) | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (280)   | (280) |       |
|                         | Gadsby 1-6                                     | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -                  | (356)   | (356) |       |
|                         | Retire - Hydro                                 | -             | -     | -    | -     | -    | -    | (20)  | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (20)    | (20)  |       |
|                         | Retire - Wind                                  | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | (40)  | -    | -     | -    | -    | -     | -     | -                  | -       | (40)  |       |
|                         | Expire - Wind PPA                              | -             | -     | (27) | (17)  | (49) | (0)  | -     | -    | (65)  | (3)  | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -                  | (160)   | (924) |       |
|                         | Expire - Solar PPA                             | -             | -     | -    | -     | -    | (1)  | (1)   | -    | -     | -    | -     | -     | -     | -     | -    | -     | (1)  | (35) | (94)  | (849) | -                  | (1)     | (979) |       |
|                         | Retire - Other                                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (32)               | -       | (33)  |       |
|                         | Coal Ret. WY - Gas RePower                     | -             | -     | 247  | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | (247) | -    | -     | -    | -    | -     | -     | -                  | 247     | -     |       |
|                         | Expansion Resources                            |               |       |      |       |      |      |       |      |       |      |       |       |       |       |      |       |      |      |       |       |                    |         |       |       |
|                         | SCCT Frame NTN                                 | -             | -     | -    | -     | -    | -    | -     | -    | 185   | -    | -     | -     | 370   | -     | -    | -     | -    | 370  | -     | -     | -                  | 185     | 555   |       |
|                         | SCCT Frame WYSW                                | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | 370  | -    | -     | -     | -                  | -       | 370   |       |
|                         | Total SCCT                                     | -             | -     | -    | -     | -    | -    | -     | -    | 185   | -    | -     | -     | 370   | -     | -    | -     | 370  | -    | -     | -     | -                  | 185     | 925   |       |
|                         | Wind, Djohnston                                | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | 620   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 620   |       |
|                         | Wind, GO                                       | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | 1,100 | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 1,100 |       |
|                         | Wind, UT                                       | -             | -     | -    | -     | -    | 73   | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 73      | 73    |       |
|                         | Wind, WYAE                                     | -             | -     | -    | -     | -    | -    | 1,920 | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920 |       |
|                         | Total Wind                                     | -             | -     | -    | -     | -    | 73   | 1,920 | -    | -     | -    | -     | 620   | 1,100 | -     | -    | -     | -    | -    | -     | -     | -                  | 1,993   | 3,713 |       |
|                         | Utility Solar+Storage - PV - Utah-S            | -             | -     | -    | -     | -    | -    | 227   | -    | -     | -    | -     | -     | 195   | 305   | -    | -     | -    | -    | -     | -     | -                  | 227     | 727   |       |
|                         | Utility Solar+Storage - PV - WYSW              | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 100     | 100   |       |
|                         | Utility Solar+Storage - PV - Huntington        | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 909   | -                  | 909     | 909   |       |
|                         | Utility Solar+Storage - PV - Utah-N            | -             | -     | -    | 159   | 64   | -    | 677   | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 900     | 900   |       |
|                         | Total Solar                                    | -             | -     | -    | 159   | 64   | -    | 904   | -    | -     | -    | -     | -     | 195   | 305   | -    | -     | 100  | -    | -     | -     | 909                | -       | 1,127 | 2,636 |
|                         | Demand Response, ID-Cool/WH                    | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 2.6   | -                  | -       | 2.6   |       |
|                         | Demand Response, ID-3rd Party Contracts        | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.8   | -                  | -       | 1.8   |       |
|                         | Demand Response, ID-Irrigate                   | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | 5.2  | -     | -    | -    | 3.7   | -     | 1.8                | -       | 10.6  |       |
|                         | Demand Response, ID-Thermostat                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 8.3   | -                  | -       | 8.3   |       |
|                         | Demand Response, UT-Cool/WH                    | 4.1           | -     | -    | 7.0   | -    | 9.9  | -     | -    | 7.2   | -    | -     | 6.7   | -     | -     | 6.8  | -     | 7.0  | -    | -     | -     | 7.2                | 28.1    | 55.9  |       |
|                         | Demand Response, UT-3rd Party Contracts        | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 74.1  | -                  | -       | 74.1  |       |
|                         | Demand Response, UT-Irrigate                   | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 1.9   | -                  | 1.9     | 1.9   |       |
|                         | Demand Response, UT-Thermostat                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | 116.7 | 8.2   | -     | -    | -     | -    | 8.3  | -     | -     | 5.1                | -       | 138.3 |       |
|                         | Demand Response, WY-Cool/WH                    | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.4   | 1.8                | -       | 5.2   |       |
|                         | Demand Response, WY-3rd Party Contracts        | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 39.4  | -                  | -       | 39.4  |       |
|                         | Demand Response, WY-Irrigate                   | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | 1.8  | -    | -     | -     | -                  | -       | 1.8   |       |
|                         | Demand Response, WY-Thermostat                 | -             | -     | -    | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 18.7  | 1.2                | -       | 19.9  |       |
|                         | Demand Response, UT-Ancillary Services         | -             | -     | -    | -     | -    | 8.3  | -     | 5.3  | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.2   | -                  | 13.5    | 16.7  |       |
|                         | Demand Response, WY-Ancillary Services         | -             | -     | -    | -     | -    | 3.0  | -     | 3.0  | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 3.0     | 3.0   |       |
|                         | Demand Response Total                          | 4.1           | -     | 7.0  | -     | 18.1 | -    | 8.2   | 7.2  | -     | -    | 123.3 | 8.2   | -     | 12.0  | -    | 1.8   | 15.3 | 3.7  | 151.7 | 19.1  | 44.6               | 379.6   | 379.6 |       |
| Energy Efficiency, ID   | 6  | 6             | 6     | 7    | 7     | 7    | 7    | 7     | 7    | 7     | 7    | 6     | 6     | 6     | 6     | 4    | 4     | 3    | 3    | 3     | 3     | 68                 | 117     |       |       |
| Energy Efficiency, UT   | 58   | 67            | 67    | 68   | 69    | 66   | 67   | 65    | 65   | 62    | 57   | 56    | 54    | 52    | 52    | 36   | 32    | 26   | 25   | 26    | 654   | 1,070              | 1,070   |       |       |
| Energy Efficiency, WY   | 10   | 10            | 11    | 12   | 15    | 16   | 16   | 18    | 18   | 18    | 16   | 15    | 13    | 12    | 11    | 9    | 8     | 7    | 5    | 5     | 145   | 248                | 248     |       |       |
| Energy Efficiency Total | 74   | 83            | 85    | 86   | 91    | 89   | 91   | 90    | 90   | 87    | 80   | 77    | 74    | 70    | 70    | 49   | 45    | 37   | 33   | 35    | 866   | 1,435              | 1,435   |       |       |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.



1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average

|                          |   | Capacity (MW) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Resource Totals 1/ |         |
|--------------------------|---|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------------|---------|
|                          |   | 2019          | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038               | 10-year |
| East                     | P-54C   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Existing Plant Retirements and PPA Termination  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Crags 1 (Coal Early Retirement/Conversions)     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Crags 2 (Coal Early Retirement/Conversions)     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Hayden 1  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Hayden 2  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Huntington 1                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Huntington 2                                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Colstrip 3 (Coal Early Retirement/Conversions)  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Colstrip 4 (Coal Early Retirement/Conversions)  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Cholla 4 (Coal Early Retirement/Conversions)    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | DaveJohnston 1                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | DaveJohnston 2                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | DaveJohnston 3                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | DaveJohnston 4                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Naughton 1 (Coal Early Retirement/Conversions)  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Naughton 2 (Coal Early Retirement/Conversions)  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Naughton 3 (Coal Early Retirement/Conversions)  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Gadsby 1-6                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Retire - Hydro                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Retire - Wind                                   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Expire - Wind PPA                               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Expire - Solar PPA                              |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Retire - Other                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Coal Ret. WY - Gas RePower                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Expansion Resources                             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | SCCT Frame NTN                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | SCCT Frame WYSW                                 |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Total SCCT                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Wind, Dickinson                                 |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Wind, CO  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Wind, WYAE                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Total Wind                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - Utah-S             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - WYSW               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - CO                 |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - Huntington         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - Utah-N             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Total Solar                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, ID-Cool/WH                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, ID-3rd Party Contracts         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, ID-Irrigate                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, ID-Thermostat                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, UT-Cool/WH                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, UT-3rd Party Contracts         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, UT-Irrigate                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, UT-Thermostat                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WY-Cool/WH                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WY-3rd Party Contracts         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WY-Irrigate                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WY-Thermostat                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, UT-Ancillary Services          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WY-Ancillary Services          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response Total                           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Energy Efficiency, ID                           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| Energy Efficiency, UT    |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| Energy Efficiency, WY    |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| Energy Efficiency Total  |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| Battery Storage - Utah-N |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| Battery Storage - WYSW   |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| Battery Storage - Idaho  |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| FOT East - Summer        |   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
| West                     | Existing Plant Retirements and PPA Termination  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Jimbidger 1 (Coal Early Retirement/Conversions) |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Jimbidger 2 (Coal Early Retirement/Conversions) |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Jimbidger 3                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Jimbidger 4                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Hemiston  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Retire - Hydro                                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Expire - Wind PPA                               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Expire - Solar PPA                              |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Expansion Resources                             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | SCCT Frame WV                                   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Total SCCT                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Wind, YK  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Total Wind                                      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - Jbidger            |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - S-Oregon           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Utility Solar+Storage - PV - Yakima             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Total Solar                                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, OR-Ancillary Services          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WA-Ancillary Services          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, CA-Cool/WH                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, CA-3rd Party Contracts         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, CA-Irrigate                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, CA-Thermostat                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, OR-Cool/WH                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, OR-3rd Party Contracts         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, OR-Irrigate                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WA-Cool/WH                     |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WA-3rd Party Contracts         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WA-Irrigate                    |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response, WA-Thermostat                  |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Demand Response Total                           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Energy Efficiency, OR                           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Energy Efficiency, CA                           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Energy Efficiency, WA                           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Energy Efficiency Total                         |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Battery Storage - Oregon                        |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Battery Storage - Willamette Valley             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Battery Storage - Portland NC                   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Battery Storage - Walla Walla                   |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Battery Storage - Yakima                        |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | FOT West - Summer                               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | FOT West - Winter                               |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Existing Plant Retirements/Conversions          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Annual Additions, Long Term Resources           |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Annual Additions, Short Term Resources          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |
|                          | Total Annual Additions                          |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |

Table K.14 – CP-Cases, Detailed Capacity Expansion Portfolio

| East  | Capacity (MW) |      |       |      |      |       |      |      |      |       |      |       |       |      |       |      |      |      |       | Resource Totals 1/ |         |         |
|---|---------------|------|-------|------|------|-------|------|------|------|-------|------|-------|-------|------|-------|------|------|------|-------|--------------------|---------|---------|
|   | 2019          | 2020 | 2021  | 2022 | 2023 | 2024  | 2025 | 2026 | 2027 | 2028  | 2029 | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036 | 2037  | 2038               | 10-year | 20-year |
| <b>P-36CP</b>   |               |      |       |      |      |       |      |      |      |       |      |       |       |      |       |      |      |      |       |                    |         |         |
| <b>Existing Plant Retirements and PPA Termination</b> |               |      |       |      |      |       |      |      |      |       |      |       |       |      |       |      |      |      |       |                    |         |         |
| Conq 1 (Coal Early Retirement/Conversions)            | -             | -    | -     | -    | -    | -     | -    | -    | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (82)    | (82)    |
| Conq 2 (Coal Early Retirement/Conversions)            | -             | -    | -     | -    | -    | -     | -    | -    | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (82)    | (82)    |
| Hayden 1  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | (44)  | -    | -     | -    | -    | -    | -     | -                  | -       | (44)    |
| Hayden 2  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | (33)  | -    | -     | -    | -    | -    | -     | -                  | -       | (33)    |
| Huntington 1  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | -       |
| Huntington 2  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | (459) | -                  | -       | (459)   |
| Coktrip 3 (Coal Early Retirement/Conversions)         | -             | -    | -     | -    | -    | -     | -    | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    | (74)    |
| Coktrip 4 (Coal Early Retirement/Conversions)         | -             | -    | -     | -    | -    | -     | -    | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    | (74)    |
| Cholla 4 (Coal Early Retirement/Conversions)          | -             | -    | (387) | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | -       |
| DaveJohnston 1  | -             | -    | -     | -    | -    | -     | -    | -    | -    | (99)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (99)    | (99)    |
| DaveJohnston 2  | -             | -    | -     | -    | -    | -     | -    | -    | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (106)   | (106)   |
| DaveJohnston 3  | -             | -    | -     | -    | -    | -     | -    | -    | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (220)   | (220)   |
| DaveJohnston 4  | -             | -    | -     | -    | -    | -     | -    | -    | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (330)   | (330)   |
| Naughton 1 (Coal Early Retirement/Conversions)        | -             | -    | -     | -    | -    | -     | -    | -    | -    | (156) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (156)   | (156)   |
| Naughton 2 (Coal Early Retirement/Conversions)        | -             | -    | -     | -    | -    | -     | -    | -    | -    | (201) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (201)   | (201)   |
| Naughton 3 (Coal Early Retirement/Conversions)        | -             | -    | (280) | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (280)   | (280)   |
| Gadsby 1-6  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | (356) | -    | -    | -    | -     | -                  | -       | (356)   |
| Retire - Hydro  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | -       | -       |
| Retire - Wind   | -             | -    | -     | -    | -    | (20)  | -    | -    | -    | -     | -    | -     | (40)  | -    | -     | -    | -    | -    | -     | -                  | -       | (20)    |
| Expire - Wind PPA                                     | -             | (27) | (17)  | (49) | (0)  | -     | -    | (65) | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60) | (80)  | -                  | (160)   | (924)   |
| Expire - Solar PPA                                    | -             | -    | -     | -    | (1)  | (1)   | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | (35) | (94) | (849) | -                  | (1)     | (979)   |
| Retire - Other  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | (1)  | -    | -     | (32)               | -       | (33)    |
| Coal Ret. WY - Gas RePower                            | -             | 247  | -     | -    | -    | -     | -    | -    | -    | -     | -    | (247) | -     | -    | -     | -    | -    | -    | -     | -                  | 247     | -       |
| <b>Expansion Resources</b>                            |               |      |       |      |      |       |      |      |      |       |      |       |       |      |       |      |      |      |       |                    |         |         |
| SCCT Frame NTN  | -             | -    | -     | -    | -    | -     | -    | 185  | -    | -     | -    | 370   | -     | -    | -     | -    | -    | -    | -     | -                  | 185     | 555     |
| SCCT Frame WYSW                                       | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | 185  | -     | 185   | -    | -     | -    | -    | -    | -     | -                  | -       | 370     |
| <b>Total SCCT</b>                                     | -             | -    | -     | -    | -    | -     | -    | 185  | -    | -     | 185  | 370   | 185   | -    | -     | -    | -    | -    | -     | -                  | 185     | 925     |
| Wind, Dickinson                                       | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | 280  | 321   | 20    | -    | -     | -    | -    | -    | -     | -                  | -       | 620     |
| Wind, GO  | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | 1,097 | -     | -    | -     | -    | -    | -    | -     | -                  | -       | 1,097   |
| Wind, UT  | -             | -    | -     | -    | 151  | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 151     | 1,511   |
| Wind, WYAE  | -             | -    | -     | -    | -    | 1,920 | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 1,920   | 1,920   |
| <b>Total Wind</b>                                     | -             | -    | -     | -    | 151  | 1,920 | -    | -    | -    | -     | 280  | 1,417 | 20    | -    | -     | -    | -    | -    | -     | -                  | 2,071   | 3,788   |
| Utility Solar/Storage - PV - Utah-S                   | -             | -    | -     | -    | -    | 149   | -    | -    | -    | -     | -    | -     | -     | 500  | -     | -    | -    | -    | -     | -                  | 149     | 649     |
| Utility Solar/Storage - PV - GO                       | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | 3     | -    | -     | -    | -    | -    | -     | -                  | -       | 3       |
| Utility Solar/Storage - PV - Huntington               | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 909                | -       |         |
| Utility Solar/Storage - PV - Utah-N                   | -             | -    | 159   | 64   | -    | 677   | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 900     | 900     |
| <b>Total Solar</b>                                    | -             | -    | 159   | 64   | -    | 826   | -    | -    | -    | -     | -    | -     | 3     | 500  | -     | -    | -    | -    | -     | -                  | 909     | 2,461   |
| Demand Response, ID-Cool/WH                           | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 2.6   | -                  | -       | 2.6     |
| Demand Response, ID-3rd Party Contracts               | -             | -    | -     | -    | -    | -     | -    | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 1.8   | -                  | -       | 1.8     |
| Demand Response, ID-Irrigate                          | -             | -    | -     | -    |      |       |      |      |      |       |      |       |       |      |       |      |      |      |       |                    |         |         |

|      | P-45CP   | Capacity (MW) |       |       |      |      |       |      |       |      |      |       |       |       |      |       |      |      |       |       | Resource Totals 1/ |         |         |
|------|--|---------------|-------|-------|------|------|-------|------|-------|------|------|-------|-------|-------|------|-------|------|------|-------|-------|--------------------|---------|---------|
|      |  | 2019          | 2020  | 2021  | 2022 | 2023 | 2024  | 2025 | 2026  | 2027 | 2028 | 2029  | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038               | 10-year | 20-year |
| East | Existing Plant Retirements and PPA Termination | -             | -     | -     | -    | -    | -     | -    | (82)  | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Craig 1 (Coal Early Retirement/Conversions)    | -             | -     | -     | -    | -    | -     | -    | -     | (82) | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Hayden 1                                       | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -                  | (44)    | (44)    |
|      | Hayden 2                                       | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -                  | (33)    | (33)    |
|      | Huntington 1                                   | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | (459) | -                  | (459)   | (459)   |
|      | Huntington 2                                   | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | (450) | -                  | (450)   | (450)   |
|      | Colstrip 3 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -     | -    | -     | -    | (74) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (74)    | (74)    |
|      | Colstrip 4 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -     | -    | -     | -    | (74) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (74)    | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -     | (387) | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (387)   | (387)   |
|      | Dave Johnston 1                                | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | (99)  | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (99)    | (99)    |
|      | Dave Johnston 2                                | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | (106) | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (106)   | (106)   |
|      | Dave Johnston 3                                | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | (220) | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (220)   | (220)   |
|      | Dave Johnston 4                                | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | (330) | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (330)   | (330)   |
|      | Naughton 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -     | -    | (156) | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (156)   | (156)   |
|      | Naughton 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -     | -    | (201) | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (201)   | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -             | (280) | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (280)   | (280)   |
|      | Cadby 1-6                                      | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -                  | (356)   | (356)   |
|      | Retire - Hydro                                 | -             | -     | -     | -    | -    | (20)  | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (20)    | (20)    |
|      | Retire - Wind                                  | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | (40)  | -     | -    | -     | -    | -    | -     | -     | -                  | (40)    | (40)    |
|      | Expire - Wind PPA                              | -             | (27)  | (17)  | (49) | (0)  | -     | -    | (65)  | (3)  | -    | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -                  | (160)   | (924)   |
|      | Expire - Solar PPA                             | -             | -     | -     | -    | (1)  | (1)   | -    | -     | -    | -    | -     | -     | -     | -    | -     | (35) | (94) | (849) | -     | -                  | (1)     | (979)   |
|      | Retire - Other                                 | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | (1)  | -    | -     | -     | (32)               | -       | (33)    |
|      | Coal Ret. WY - Gas RePower                     | -             | 247   | -     | -    | -    | -     | -    | -     | -    | -    | -     | (247) | -     | -    | -     | -    | -    | -     | -     | -                  | 247     | -       |
|      | Expansion Resources                            | -             | -     | -     | -    | -    | -     | -    | 185   | -    | -    | -     | 370   | -     | -    | -     | -    | -    | -     | -     | -                  | 185     | 555     |
|      | SCCT Frame NTIS                                | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | 370   | -                  | -       | 370     |
|      | SCCT Frame WYSW                                | -             | -     | -     | -    | -    | -     | -    | 185   | -    | -    | -     | 370   | -     | -    | -     | -    | -    | -     | 370   | -                  | 185     | 925     |
|      | Total SCCT                                     | -             | -     | -     | -    | -    | -     | -    | 185   | -    | -    | -     | 370   | -     | -    | -     | -    | -    | -     | 370   | -                  | 185     | 925     |
|      | Wind, Dismston                                 | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | 620   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 620     |
|      | Wind, GO                                       | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | 1,045 | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 1,045   |
|      | Wind, UT                                       | -             | -     | -     | -    | 18   | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 18      | 18      |
|      | Wind, WYAE                                     | -             | -     | -     | -    | -    | 1,920 | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920   |
|      | Total Wind                                     | -             | -     | -     | -    | 18   | 1,920 | -    | -     | -    | -    | 620   | 1,045 | -     | -    | -     | -    | -    | -     | -     | -                  | 1,938   | 3,603   |
|      | Utility Solar/Storage - PV - Utah-S            | -             | -     | -     | -    | -    | 282   | -    | -     | -    | -    | -     | -     | 500   | -    | -     | -    | -    | -     | -     | -                  | 282     | 782     |
|      | Utility Solar/Storage - PV - WYSW              | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | 38    | -    | -    | -     | -     | -                  | -       | 38      |
|      | Utility Solar/Storage - PV - GO                | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | 55    | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 55      |
|      | Utility Solar/Storage - PV - Huntington        | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | 899   | 10    | -                  | 909     | 909     |
|      | Utility Solar/Storage - PV - Utah-N            | -             | -     | 159   | 64   | 54   | 623   | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 900     | 900     |
|      | Total Solar                                    | -             | -     | 159   | 64   | 54   | 904   | -    | -     | -    | -    | -     | 55    | 500   | -    | 38    | -    | -    | -     | 899   | 10                 | 1,182   | 2,684   |
|      | Demand Response, ID-Cool/WH                    | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | 2.6   | -     | -                  | 2.6     | 2.6     |
|      | Demand Response, ID-3rd Party Contracts        | -             | -     | -     | -    | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -    | -    | 1.8   | -     | -                  | 1.8     | 1.8     |
|      | Demand Response, ID-Irrigate                   | -             | -     | -     |      |      |       |      |       |      |      |       |       |       |      |       |      |      |       |       |                    |         |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

| Fast | P-46J23CP                                      | Capacity (MW)                                  |      |       |      |      |       |      |       |      |       |      |       |       |       |       |      |      |       |       | Resource Totals 1/ |         |         |
|------|--|--|------|-------|------|------|-------|------|-------|------|-------|------|-------|-------|-------|-------|------|------|-------|-------|--------------------|---------|---------|
|      |  | 2019   | 2020 | 2021  | 2022 | 2023 | 2024  | 2025 | 2026  | 2027 | 2028  | 2029 | 2030  | 2031  | 2032  | 2033  | 2034 | 2035 | 2036  | 2037  | 2038               | 10-year | 20-year |
|      |  | Existing Plant Retirements and PPA Termination |      |       |      |      |       |      |       |      |       |      |       |       |       |       |      |      |       |       |                    |         |         |
| Fast | Craig 1 (Coal Early Retirement/Conversions)    | -  | -    | -     | -    | -    | -     | -    | (82)  | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Craig 2 (Coal Early Retirement/Conversions)    | -  | -    | -     | -    | -    | -     | -    | -     | (82) | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (82)    | (82)    |
|      | Hayden 1                                       | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | (44)  | -     | -     | -    | -    | -     | -     | -                  | -       | (44)    |
|      | Hayden 2                                       | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | (33)  | -     | -     | -    | -    | -     | -     | -                  | -       | (33)    |
|      | Huntington 1                                   | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | (459) | -                  | (459)   |         |
|      | Huntington 2                                   | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | (450) | -                  | (450)   |         |
|      | Coktrip 3 (Coal Early Retirement/Conversions)  | -  | -    | -     | -    | -    | -     | -    | -     | -    | (74)  | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (74)    | (74)    |
|      | Coktrip 4 (Coal Early Retirement/Conversions)  | -  | -    | -     | -    | -    | -     | -    | -     | -    | (74)  | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (74)    | (74)    |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -  | -    | (387) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (387)   | (387)   |
|      | DaveJohnston 1                                 | -  | -    | -     | -    | -    | -     | -    | -     | -    | (99)  | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (99)    | (99)    |
|      | DaveJohnston 2                                 | -  | -    | -     | -    | -    | -     | -    | -     | -    | (106) | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (106)   | (106)   |
|      | DaveJohnston 3                                 | -  | -    | -     | -    | -    | -     | -    | -     | -    | (220) | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (220)   | (220)   |
|      | DaveJohnston 4                                 | -  | -    | -     | -    | -    | -     | -    | -     | -    | (330) | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (330)   | (330)   |
|      | Naughton 1 (Coal Early Retirement/Conversions) | -  | -    | -     | -    | -    | -     | -    | (156) | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (156)   | (156)   |
|      | Naughton 2 (Coal Early Retirement/Conversions) | -  | -    | -     | -    | -    | -     | -    | (201) | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (201)   | (201)   |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -  | -    | (280) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (280)   | (280)   |
|      | Gadsby 1-6                                     | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | (356) | -     | -    | -    | -     | -     | -                  | (356)   | (356)   |
|      | Retire - Hydro                                 | -  | -    | -     | -    | -    | (20)  | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | (20)    | (20)    |
|      | Retire - Wind                                  | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | (40)  | -     | -     | -     | -    | -    | -     | -     | -                  | -       | (40)    |
|      | Expire - Wind PPA                              | -  | (27) | (17)  | (49) | (0)  | -     | -    | (65)  | (3)  | -     | (19) | (99)  | (200) | (45)  | (181) | (80) | -    | (60)  | (80)  | -                  | (160)   | (924)   |
|      | Expire - Solar PPA                             | -  | -    | -     | -    | (1)  | (1)   | -    | -     | -    | -     | -    | -     | -     | -     | -     | (35) | (94) | (849) | -     | -                  | (1)     | (979)   |
|      | Retire - Other                                 | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | (1)  | -    | -     | -     | (32)               | -       | (33)    |
|      | Coal Ret - WY - Gas RePower                    | -  | 247  | -     | -    | -    | -     | -    | -     | -    | -     | -    | (247) | -     | -     | -     | -    | -    | -     | -     | -                  | 247     | -       |
|      | Expansion Resources                            |  |      |       |      |      |       |      |       |      |       |      |       |       |       |       |      |      |       |       |                    |         |         |
|      | SCCT Frame NTN                                 | -  | -    | -     | -    | -    | -     | -    | 185   | -    | -     | -    | 370   | -     | -     | -     | -    | -    | -     | -     | -                  | 185     | 555     |
|      | SCCT Frame WYSW                                | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | 370  | -     | -     | -     | -     | -    | -    | -     | -     | -                  | -       | 370     |
|      | Total SCCT                                     | -  | -    | -     | -    | -    | -     | -    | 185   | -    | -     | 370  | 370   | -     | -     | -     | -    | -    | -     | -     | -                  | 185     | 925     |
|      | Wind, Ditchiston                               | -  | -    | -     | -    | -    | -     | -    | -     | -    | 620   | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | 620     | 620     |
|      | Wind, GO                                       | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | 1,096 | -     | -     | -     | -    | -    | -     | -     | -                  | -       | 1,096   |
|      | Wind, UT                                       | -  | -    | -     | -    | 294  | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | 294     | 294     |
|      | Wind, WYAE                                     | -  | -    | -     | -    | 294  | 1,920 | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920   |
|      | Total Wind                                     | -  | -    | -     | -    | 294  | 1,920 | -    | -     | -    | 620   | -    | 1,096 | -     | -     | -     | -    | -    | -     | -     | -                  | 2,834   | 3,930   |
|      | Utility Solar/Storage - PV - Utah-S            | -  | -    | -     | -    | -    | 6     | -    | -     | -    | -     | -    | -     | 500   | -     | -     | -    | -    | -     | -     | -                  | 6       | 506     |
|      | Utility Solar/Storage - PV - WYSW              | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | 100   | -     | -    | -    | -     | -     | -                  | -       | 100     |
|      | Utility Solar/Storage - PV - GO                | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | 4     | -     | -     | -     | -    | -    | -     | -     | -                  | -       | 4       |
|      | Utility Solar/Storage - PV - Huntington        | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | 909   | -     | -                  | 909     | 909     |
|      | Utility Solar/Storage - PV - Utah-N            | -  | -    | 159   | 64   | -    | 677   | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | 909   | -                  | 900     | 909     |
|      | Total Solar                                    | -  | -    | 159   | 64   | -    | 683   | -    | -     | -    | -     | -    | 4     | 500   | 100   | -     | -    | -    | -     | 909   | -                  | 906     | 2,419   |
|      | Demand Response, ID-Cool/WH                    | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | 2.6   | -                  | 2.6     | 2.6     |
|      | Demand Response, ID-3rd Party Contracts        | -  | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -    | -     | 1.8   | -                  | 1.8     | 1.8     |
|      |  |  |      |       |      |      |       |      |       |      |       |      |       |       |       |       |      |      |       |       |                    |         |         |

|       |  | Capacity (MW) |       |      |       |      |       |      |       |      |      |       |       |       |      |       |       |      |      |       |      | Resource Totals 1/ |         |       |
|-------|--|---------------|-------|------|-------|------|-------|------|-------|------|------|-------|-------|-------|------|-------|-------|------|------|-------|------|--------------------|---------|-------|
| P-47C |  | 2019          | 2020  | 2021 | 2022  | 2023 | 2024  | 2025 | 2026  | 2027 | 2028 | 2029  | 2030  | 2031  | 2032 | 2033  | 2034  | 2035 | 2036 | 2037  | 2038 | 10-year            | 20-year |       |
| East  | Existing Plant Retirements and PPA Termination |               |       |      |       |      |       |      |       |      |      |       |       |       |      |       |       |      |      |       |      |                    |         |       |
|       | Craig 1 (Coal Early Retirement/Conversions)    | -             | -     | -    | -     | -    | -     | -    | (82)  | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | (82)               | (82)    |       |
|       | Craig 2 (Coal Early Retirement/Conversions)    | -             | -     | -    | -     | -    | -     | -    | -     | (82) | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | (82)               | (82)    |       |
|       | Hayden 1                                       | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | (44)  | -    | -     | -     | -    | -    | -     | -    | -                  | (44)    |       |
|       | Hayden 2                                       | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | (33)  | -    | -     | -     | -    | -    | -     | -    | -                  | (33)    |       |
|       | Huntington 1                                   | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | (459) | -    | -                  | (459)   |       |
|       | Huntington 2                                   | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | (450) | -    | -                  | (450)   |       |
|       | Colstrip 3 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | (74)  | -     | -     | -    | -     | -     | -    | -    | -     | -    | (74)               | (74)    |       |
|       | Colstrip 4 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | (74)  | -     | -     | -    | -     | -     | -    | -    | -     | -    | (74)               | (74)    |       |
|       | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -     | -    | (387) | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | (387)              | (387)   |       |
|       | DaveJohnston 1                                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | (99)  | -     | -     | -    | -     | -     | -    | -    | -     | -    | (99)               | (99)    |       |
|       | DaveJohnston 2                                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | (106) | -     | -     | -    | -     | -     | -    | -    | -     | -    | (106)              | (106)   |       |
|       | DaveJohnston 3                                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | (220) | -     | -     | -    | -     | -     | -    | -    | -     | -    | (220)              | (220)   |       |
|       | DaveJohnston 4                                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | (330) | -     | -     | -    | -     | -     | -    | -    | -     | -    | (330)              | (330)   |       |
|       | Naughton 1 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -     | -    | (156) | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | (156)              | (156)   |       |
|       | Naughton 2 (Coal Early Retirement/Conversions) | -             | -     | -    | -     | -    | -     | -    | (201) | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | (201)              | (201)   |       |
|       | Naughton 3 (Coal Early Retirement/Conversions) | -             | (280) | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | (280)              | (280)   |       |
|       | Gadsby 1-6                                     | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | (356) | -    | -    | -     | -    | -                  | (356)   |       |
|       | Retire - Hydro                                 | -             | -     | -    | -     | -    | (20)  | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | (20)               | (20)    |       |
|       | Retire - Wind                                  | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | (40)  | -     | -     | -    | -     | -     | -    | -    | -     | -    | -                  | (40)    |       |
|       | Expire - Wind PPA                              | -             | (27)  | (17) | (49)  | (0)  | -     | -    | (65)  | (3)  | -    | (19)  | (99)  | (200) | (45) | (181) | (80)  | -    | (60) | (80)  | -    | (160)              | (924)   |       |
|       | Expire - Solar PPA                             | -             | -     | -    | -     | (1)  | (1)   | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | (35) | (94) | (849) | -    | (1)                | (979)   |       |
|       | Retire - Other                                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | (1)  | -    | -     | (32) | -                  | (33)    |       |
|       | Coal Ret. WY - Gas RePower                     | -             | 247   | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | (247) | -    | -     | -     | -    | -    | -     | -    | 247                | -       |       |
|       | Expansion Resources                            |               |       |      |       |      |       |      |       |      |      |       |       |       |      |       |       |      |      |       |      |                    |         |       |
|       | SCCT Frame NTN                                 | -             | -     | -    | -     | -    | -     | -    | -     | 185  | -    | -     | -     | 370   | -    | -     | -     | -    | -    | -     | -    | -                  | 185     | 555   |
|       | SCCT Frame WYSW                                | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | 370   | -    | -     | -     | -    | -    | 370   | -    | -                  | -       | 370   |
|       | Total SCCT                                     | -             | -     | -    | -     | -    | -     | -    | -     | 185  | -    | -     | -     | 370   | -    | -     | -     | -    | -    | -     | -    | -                  | 185     | 925   |
|       | Wind, Djohnston                                | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | 620   | -     | -    | -     | -     | -    | -    | -     | -    | -                  | -       | 620   |
|       | Wind, GO                                       | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | 968   | -    | -     | -     | -    | -    | -     | -    | -                  | -       | 968   |
|       | Wind, UT                                       | -             | -     | -    | -     | 73   | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | -                  | 73      | 73    |
|       | Wind, WVAE                                     | -             | -     | -    | -     | -    | 1,920 | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | -                  | 1,920   | 1,920 |
|       | Total Wind                                     | -             | -     | -    | -     | 73   | 1,920 | -    | -     | -    | -    | -     | 620   | 968   | -    | -     | -     | -    | -    | -     | -    | -                  | 1,993   | 3,580 |
|       | Utility Solar+Storage - PV - Utah-S            | -             | -     | -    | -     | -    | 227   | -    | -     | -    | -    | -     | -     | -     | 500  | -     | -     | -    | -    | -     | -    | -                  | 227     | 727   |
|       | Utility Solar+Storage - PV - WYSW              | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | 100   | -    | -    | -     | -    | -                  | -       | 100   |
|       | Utility Solar+Storage - PV - GO                | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | 132   | -    | -     | -     | -    | -    | -     | -    | -                  | -       | 132   |
|       | Utility Solar+Storage - PV - Huntington        | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 909  | -                  | 909     |       |
|       | Utility Solar+Storage - PV - Utah-N            | -             | -     | 159  | 64    | -    | 677   | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | -                  | 900     | 900   |
|       | Total Solar                                    | -             | -     | 159  | 64    | -    | 904   | -    | -     | -    | -    | -     | -     | 632   | -    | -     | 100   | -    | -    | -     | 909  | -                  | 1,127   | 2,769 |
|       | Demand Response, ID-Cool/WH                    | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 2.6  | -                  | -       | 2.6   |
|       | Demand Response, ID-3rd Party Contracts        | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 1.8  | -                  | -       | 1.8   |
|       | Demand Response, ID-Irrigate                   | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | 5.2   | -    | -    | 3.7   | -    | 1.8                | -       | 10.6  |
|       | Demand Response, ID-Thermostat                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 8.3  | -                  | -       | 8.3   |
|       | Demand Response, UT-Cool/WH                    | 4.1           | -     | 7.0  | -     | 9.9  | -     | -    | 7.2   | -    | -    | 6.7   | -     | -     | 6.8  | -     | -     | 7.0  | -    | -     | -    | 7.2                | 28.1    | 55.9  |
|       | Demand Response, UT-3rd Party Contracts        | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 74.1 | -                  | -       | 74.1  |
|       | Demand Response, UT-Irrigate                   | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 1.9  | -                  | -       | 1.9   |
|       | Demand Response, UT-Thermostat                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | 116.7 | 8.2   | -    | -     | -     | -    | 8.3  | -     | -    | 5.1                | -       | 138.3 |
|       | Demand Response, WY-Cool/WH                    | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 3.4  | -                  | -       | 3.4   |
|       | Demand Response, WY-3rd Party Contracts        | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 39.4 | -                  | -       | 39.4  |
|       | Demand Response, WY-Irrigate                   | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 1.8  | -                  | -       | 1.8   |
|       | Demand Response, WY-Thermostat                 | -             | -     | -    | -     | -    | -     | -    | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 18.7 | 1.2                | -       | 19.9  |
|       | Demand Response, UT-Ancillary Services         | -             | -     | -    | -     | 8.3  | -     | 5.3  | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | 3.2  | -                  | 13.5    | 16.7  |
|       | Demand Response, WY-Ancillary Services         | -             | -     | -    | -     | -    | -     | 3.0  | -     | -    | -    | -     | -     | -     | -    | -     | -     | -    | -    | -     | -    | -                  | 3.0     | 3.0   |
|       | Demand Response Total                          | 4.1           | -     | 7.0  | -     | 18.1 | -     | 8.2  | 7.2   | -    | -    | 123.3 | 8.2   | -     | 6.8  | 5.2   | -     | 15.3 | 3.7  | 153.4 | 17.3 | 44.6               | 377.8   |       |
|       | Energy Efficiency, ID                          | 6             | 5     | 5    | 7     | 7    | 7     | 7    | 7     | 7    | 7    | 7     | 6     | 6     | 6    | 5     | 4     | 4    | 3    | 3     | 3    | 3                  | 66      | 114   |
|       | Energy Efficiency, UT                          | 58            | 61    | 62   | 68    | 69   | 66    | 65   | 65    | 62   | 62   | 57    | 53    | 52    | 50   | 49    | 36    | 32   | 26   | 22    | 26   | 637                | 1,0     |       |

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1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.



1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average

| P-45CNW |  | Capacity (MW) |       |       |      |      |      |      |      |       |       |      |       |       |      |       |      |      |       |       |      | Resource Totals 1/ |         |       |
|---------|--|---------------|-------|-------|------|------|------|------|------|-------|-------|------|-------|-------|------|-------|------|------|-------|-------|------|--------------------|---------|-------|
|         |  | 2019          | 2020  | 2021  | 2022 | 2023 | 2024 | 2025 | 2026 | 2027  | 2028  | 2029 | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037  | 2038 | 10-year            | 20-year |       |
| East    | Existing Plant Retirements and PPA Termination |               |       |       |      |      |      |      |      |       |       |      |       |       |      |       |      |      |       |       |      |                    |         |       |
|         | Chug 1 (Coal Early Retirement/Conversions)     | -             | -     | -     | -    | -    | -    | -    | (82) | -     | (82)  | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | (82)               | (82)    |       |
|         | Chug 2 (Coal Early Retirement/Conversions)     | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | (82)               | (82)    |       |
|         | Hayden 1                                       | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | (44)  | -    | -     | -    | -    | -     | -     | -    | -                  | (44)    | (44)  |
|         | Hayden 2                                       | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | (33)  | -    | -     | -    | -    | -     | -     | -    | -                  | (33)    | (33)  |
|         | Huntington 1                                   | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | (450) | -    | -                  | (450)   | (450) |
|         | Huntington 2                                   | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | (450) | -    | -                  | (450)   | (450) |
|         | Colstrip 3 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -    | -    | -     | (74)  | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (74)    | (74)  |
|         | Colstrip 4 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -    | -    | -     | (74)  | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (74)    | (74)  |
|         | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -     | (387) | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (387)   | (387) |
|         | DaveJohnston 1                                 | -             | -     | -     | -    | -    | -    | -    | -    | -     | (99)  | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (99)    | (99)  |
|         | DaveJohnston 2                                 | -             | -     | -     | -    | -    | -    | -    | -    | -     | (106) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (106)   | (106) |
|         | DaveJohnston 3                                 | -             | -     | -     | -    | -    | -    | -    | -    | -     | (220) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (220)   | (220) |
|         | DaveJohnston 4                                 | -             | -     | -     | -    | -    | -    | -    | -    | -     | (330) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (330)   | (330) |
|         | Naughton 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -    | -    | (156) | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (156)   | (156) |
|         | Naughton 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -    | -    | (201) | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (201)   | (201) |
|         | Naughton 3 (Coal Early Retirement/Conversions) | -             | (280) | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (280)   | (280) |
|         | Gadsby 1-6                                     | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | (356) | -    | -    | -     | -     | -    | -                  | -       | (356) |
|         | Retire - Hydro                                 | -             | -     | -     | -    | -    | -    | (20) | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -    | -                  | (20)    | (20)  |
|         | Retire - Wind                                  | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | (40)  | -    | -     | -    | -    | -     | -     | -    | -                  | (40)    | (40)  |
|         | Esper - Wind PPA                               | -             | (27)  | (17)  | (49) | (0)  | -    | -    | (65) | (3)   | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -    | (160)              | (924)   | (924) |
|         | Esper - Solar PPA                              | -             | -     | -     | -    | (1)  | (1)  | -    | -    | -     | -     | -    | -     | -     | -    | -     | (35) | (94) | (849) | -     | -    | (1)                | (979)   | (979) |
|         | Retire - Other                                 | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | (1)  | -    | -     | -     | -    | (32)               | -       | (33)  |
|         | Coal Ret. WY, Gas RePower                      | -             | 247   | -     | -    | -    | -    | -    | -    | -     | -     | -    | (247) | -     | -    | -     | -    | -    | -     | -     | -    | -                  | 247     | -     |
|         | Expansion Resources                            |               |       |       |      |      |      |      |      |       |       |      |       |       |      |       |      |      |       |       |      |                    |         |       |
|         | CCCT - Diggins - J 1st                         | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | 505   | -    | -                  | 505     | 505   |
|         | Total CCCT                                     | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | -     | -    | -     | -    | -    | -     | 505   | -    | -                  | 505     | 505   |
|         | SCCT Frame NTN                                 | -             | -     | -     | -    | -    | -    | -    | 185  | -     | -     | -    | 370   | -     | -    | -     | -    | -    | -     | -     | -    | 185                | 555     | 555   |
|         | SCCT Frame WYSW                                | -             | -     | -     | -    | -    | -    | -    | -    | -     | -     | -    | -     | 370   | -    | -     | -    | -    | -     | 370   | -    | -                  | 370     | 370   |
|         | Total SCCT                                     |               |       |       |      |      |      |      |      |       |       |      |       |       |      |       |      |      |       |       |      |                    |         |       |

| P-45CP-FOT                                     | Capacity (MW) |      |       |      |      |       |      |       |      |       |      |       |       |      |       |      |      |       |      | Resource Totals 1/ |         |         |       |     |
|--|---------------|------|-------|------|------|-------|------|-------|------|-------|------|-------|-------|------|-------|------|------|-------|------|--------------------|---------|---------|-------|-----|
|  | 2019          | 2020 | 2021  | 2022 | 2023 | 2024  | 2025 | 2026  | 2027 | 2028  | 2029 | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036  | 2037 | 2038               | 10-year | 20-year |       |     |
| Existing Plant Retirements and PPA Termination |               |      |       |      |      |       |      |       |      |       |      |       |       |      |       |      |      |       |      |                    |         |         |       |     |
| Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -     | -    | -    | -     | -    | -     | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (82)    | (82)  |     |
| Craig 2 (Coal Early Retirement/Conversions)    | -             | -    | -     | -    | -    | -     | -    | -     | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (82)    | (82)  |     |
| Hayden 1                                       | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | (44)  | -    | -     | -    | -    | -     | -    | -                  | -       | -       | (44)  |     |
| Hayden 2                                       | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | (33)  | -    | -     | -    | -    | -     | -    | -                  | -       | -       | (33)  |     |
| Huntington 1                                   | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | (459)   | (459)   |       |     |
| Huntington 2                                   | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | (450)   | (450)   |       |     |
| Colstrip 3 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -    | -     | -    | -     | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (74)    | (74)  |     |
| Colstrip 4 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -    | -     | -    | -     | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (74)    | (74)  |     |
| Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -    | (387) | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (387)   | (387) |     |
| DaveJohnston 1                                 | -             | -    | -     | -    | -    | -     | -    | -     | -    | (99)  | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (99)    | (99)  |     |
| DaveJohnston 2                                 | -             | -    | -     | -    | -    | -     | -    | -     | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (106)   | (106) |     |
| DaveJohnston 3                                 | -             | -    | -     | -    | -    | -     | -    | -     | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (220)   | (220) |     |
| DaveJohnston 4                                 | -             | -    | -     | -    | -    | -     | -    | -     | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (330)   | (330) |     |
| Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -    | -     | -    | (156) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (156)   | (156) |     |
| Naughton 2 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -    | -     | -    | (201) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (201)   | (201) |     |
| Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | (280) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (280)   | (280) |     |
| Gadsby 1-6                                     | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | (356) | -    | -    | -     | -    | -                  | -       | (356)   | (356) |     |
| Retire - Hydro                                 | -             | -    | -     | -    | -    | (20)  | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | (20)    | (20)    | (20)  |     |
| Retire - Wind                                  | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | (40)  | -     | -    | -     | -    | -    | -     | -    | -                  | -       | (40)    | (40)  |     |
| Expire - Wind PPA                              | -             | (27) | (17)  | (49) | (0)  | -     | -    | (65)  | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80) | -                  | (160)   | (924)   | (924) |     |
| Expire - Solar PPA                             | -             | -    | -     | -    | (1)  | (1)   | -    | -     | -    | -     | -    | -     | -     | -    | -     | (35) | (94) | (849) | -    | -                  | (1)     | (979)   | (979) |     |
| Retire - Other                                 | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -    | -                  | (32)    | (32)    | (32)  |     |
| Coal Ret. WY - Gas RePower                     | -             | -    | 247   | -    | -    | -     | -    | -     | -    | -     | -    | (247) | -     | -    | -     | (1)  | -    | -     | -    | -                  | -       | -       | 247   | 247 |
| Expansion Resources                            |               |      |       |      |      |       |      |       |      |       |      |       |       |      |       |      |      |       |      |                    |         |         |       |     |
| SCCT Frame N/N                                 | -             | -    | -     | -    | -    | -     | -    | 185   | -    | -     | -    | 185   | 185   | -    | -     | -    | -    | -     | -    | -                  | -       | 185     | 555   |     |
| SCCT Frame W/Y/W                               | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | 185   | -    | -     | -    | -    | -     | 185  | -                  | -       | -       | 370   |     |
| Total SCCT                                     | -             | -    | -     | -    | -    | -     | -    | 185   | -    | -     | -    | 185   | 370   | -    | -     | -    | -    | -     | 185  | -                  | -       | 185     | 925   |     |
| Wind, Dickinson                                | -             | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | 620   | -     | -    | -     | -    | -    | -     | -    | -                  | -       | 620     | 620   |     |
| Wind, GO                                       | -             | -    | -     | -    |      |       |      |       |      |       |      |       |       |      |       |      |      |       |      |                    |         |         |       |     |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

| P-46CP-FOT                              |   | Capacity (MW) |       |       |      |      |      |       |       |      |       |       |       |       |      |       |       |      |       |       |       | Resource Totals 1/ |         |      |
|---|---|---------------|-------|-------|------|------|------|-------|-------|------|-------|-------|-------|-------|------|-------|-------|------|-------|-------|-------|--------------------|---------|------|
|   |   | 2019          | 2020  | 2021  | 2022 | 2023 | 2024 | 2025  | 2026  | 2027 | 2028  | 2029  | 2030  | 2031  | 2032 | 2033  | 2034  | 2035 | 2036  | 2037  | 2038  | 10-year            | 20-year |      |
| East                                    | Existing Plant Retirements and PPA Termination    | -             | -     | -     | -    | -    | -    | -     | (82)  | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (82)               | (82)    |      |
|   | Craig 1 (Coal Early Retirement/Conversions)       | -             | -     | -     | -    | -    | -    | -     | -     | (82) | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (82)               | (82)    |      |
|   | Craig 2 (Coal Early Retirement/Conversions)       | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | (44)  | -    | -     | -     | -    | -     | -     | -     | (44)               | (44)    |      |
|   | Hayden 1  | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | (33)  | -    | -     | -     | -    | -     | -     | -     | (33)               | (33)    |      |
|   | Hayden 2  | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | (459) | -     | (459)              | (459)   |      |
|   | Huntington 1                                      | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | (450) | -     | (450)              | (450)   |      |
|   | Huntington 2                                      | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | (450) | -     | (450)              | (450)   |      |
|   | Colstrip 3 (Coal Early Retirement/Conversions)    | -             | -     | -     | -    | -    | -    | -     | -     | -    | (74)  | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (74)               | (74)    |      |
|   | Colstrip 4 (Coal Early Retirement/Conversions)    | -             | -     | -     | -    | -    | -    | -     | -     | -    | (74)  | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (74)               | (74)    |      |
|   | Cholla 4 (Coal Early Retirement/Conversions)      | -             | -     | (387) | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (387)              | (387)   |      |
|   | Dave Johnston 1                                   | -             | -     | -     | -    | -    | -    | -     | -     | -    | (99)  | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (99)               | (99)    |      |
|   | Dave Johnston 2                                   | -             | -     | -     | -    | -    | -    | -     | -     | -    | (106) | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (106)              | (106)   |      |
|   | Dave Johnston 3                                   | -             | -     | -     | -    | -    | -    | -     | -     | -    | (220) | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (220)              | (220)   |      |
|   | Dave Johnston 4                                   | -             | -     | -     | -    | -    | -    | -     | -     | -    | (330) | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (330)              | (330)   |      |
|   | Naughton 1 (Coal Early Retirement/Conversions)    | -             | -     | -     | -    | -    | -    | -     | (156) | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (156)              | (156)   |      |
|   | Naughton 2 (Coal Early Retirement/Conversions)    | -             | -     | -     | -    | -    | -    | -     | (201) | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (201)              | (201)   |      |
|   | Naughton 3 (Coal Early Retirement/Conversions)    | -             | (280) | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (280)              | (280)   |      |
|   | Gadsby 1-6  | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | (356) | -     | -    | -     | -     | -     | (356)              | (356)   |      |
|   | Retire - Hydro                                    | -             | -     | -     | -    | -    | (20) | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | (20)               | (20)    |      |
|   | Retire - Wind                                     | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | (40)  | -     | -    | -     | -     | -    | -     | -     | -     | -                  | (40)    | (40) |
|   | Expire - Wind PPA                                 | -             | (27)  | (17)  | (49) | (0)  | -    | -     | (65)  | (3)  | -     | (19)  | (99)  | (200) | (45) | (181) | (80)  | -    | (60)  | (80)  | -     | (160)              | (924)   |      |
|   | Expire - Solar PPA                                | -             | -     | -     | -    | -    | (1)  | (1)   | -     | -    | -     | -     | -     | -     | -    | -     | -     | (35) | (94)  | (849) | -     | (1)                | (979)   |      |
|   | Retire - Other                                    | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | (1)  | -     | -     | (32)  | -                  | (33)    |      |
|   | Coal Ret. W.V. - Gas RePower                      | -             | 247   | -     | -    | -    | -    | -     | -     | -    | -     | -     | (247) | -     | -    | -     | -     | -    | -     | -     | -     | 247                | -       |      |
|   | Expansion Resources                               | -             | -     | -     | -    | -    | -    | -     | -     | 185  | -     | -     | -     | 370   | -    | -     | -     | -    | -     | -     | -     | 185                | 555     |      |
|   | SCCT Frame NTN                                    | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | 370   | -     | -    | -     | -     | -    | -     | -     | -     | -                  | 370     |      |
|   | SCCT Frame WYSW                                   | -             | -     | -     | -    | -    | -    | -     | -     | 185  | -     | -     | -     | 370   | -    | -     | -     | -    | -     | -     | -     | 185                | 925     |      |
|   | Total SCCT  | -             | -     | -     | -    | -    | -    | -     | -     | 185  | -     | -     | -     | 370   | -    | -     | -     | -    | -     | -     | -     | 185                | 925     |      |
|   | Wind, Ditchman                                    | -             | -     | -     | -    | -    | -    | -     | -     | -    | 33    | 587   | -     | -     | -    | -     | -     | -    | -     | -     | -     | 33                 | 620     |      |
|   | Wind, GO  | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | 1,010 | -     | -    | -     | -     | -    | -     | -     | -     | -                  | 1,010   |      |
|   | Wind, UT  | -             | -     | -     | -    | -    | 145  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 145                | 145     |      |
|   | Wind, WYAE  | -             | -     | -     | -    | -    | -    | 1,920 | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 1,920              | 1,920   |      |
|   | Total Wind  | -             | -     | -     | -    | -    | 145  | 1,920 | -     | -    | 33    | 587   | 1,010 | -     | -    | -     | -     | -    | -     | -     | -     | 2,097              | 3,695   |      |
|   | Utility Solar+Storage - PV - Utah-S               | -             | -     | -     | -    | -    | -    | 155   | -     | -    | -     | -     | -     | -     | 500  | -     | -     | -    | -     | -     | -     | 155                | 655     |      |
|   | Utility Solar+Storage - PV - GO                   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | 90    | -    | -     | -     | -    | -     | -     | -     | -                  | 90      |      |
|   | Utility Solar+Storage - PV - Huntington           | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | 909   | -     | 909                |         |      |
|   | Utility Solar+Storage - PV - Utah-N               | -             | -     | 159   | 64   | -    | 677  | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | 900                | 900     |      |
|   | Total Solar                                       | -             | -     | 159   | 64   | -    | 832  | -     | -     | -    | -     | -     | 90    | -     | 500  | -     | -     | -    | -     | 909   | -     | 1,055              | 2,554   |      |
|   | Demand Response, ID-Cool/WH                       | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | 909   | -     | 2.6                | 2.6     |      |
|   | Demand Response, ID-3rd Party Contracts           | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | 1.8   | -     | 1.8                | 1.8     |      |
|   | Demand Response, ID-Irrigate                      | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | 3.7   | -     | 1.8   | -                  | 10.6    |      |
|   | Demand Response, ID-Thermostat                    | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | 8.3   | -     | 8.3                | 8.3     |      |
|   | Demand Response, UT-Cool/WH                       | 4.1           | -     | 7.0   | -    | 9.9  | -    | -     | 7.2   | -    | -     | 6.7   | -     | -     | 6.8  | -     | 7.0   | -    | -     | -     | 7.2   | 28.1               | 55.9    |      |
| Demand Response, UT-3rd Party Contracts | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | 74.1  | 2.6   | -     | 76.7               |         |      |
| Demand Response, UT-Irrigate            | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | 1.9   | -     | 1.9   | 1.9                |         |      |
| Demand Response, UT-Thermostat          | -   | -             | -     | -     | -    | -    | -    | -     | 116.7 | -    | -     | -     | 8.2   | -     | -    | -     | 8.3   | -    | -     | 5.1   | 116.7 | 138.3              |         |      |
| Demand Response, WY-Cool/WH             | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | 3.4   | 1.8   | -     | 5.2                |         |      |
| Demand Response, WY-3rd Party Contracts | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | 39.4  | -     | -     | 39.4               |         |      |
| Demand Response, WY-Irrigate            | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | 1.8   | -     | -     | -    | -     | -     | -    | -     | -     | -     | 1.8                |         |      |
| Demand Response, WY-Thermostat          | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | 18.7  | -     | -    | -     | 1.2   | -     | 19.9               |         |      |
| Demand Response, UT-Ancillary Services  | -   | -             | -     | -     | -    | -    | -    | 13.5  | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | 3.2   | -     | 13.5  | 16.7               |         |      |
| Demand Response, WY-Ancillary Services  | -   | -             | -     | -     | -    | -    | -    | 3.0   | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | 3.0   | 3.0                |         |      |
| Demand Response Total                   | 4.1   | -             | 7.0   | -     | 9.9  | -    | 16.5 | 123.8 | -     | -    | 6.7   | 10.0  | -     | 12.0  | 18.7 | -     | 15.3  | 3.7  | 133.0 | 21.6  | 161.2 | 382.2              |         |      |
| Energy Efficiency, ID                   | -   | 6             | 6     | 7     | 7    | 7    | 7    | 7     | 7     | 7    | 7     | 6     | 6     | 6     | 4    | 4     | 4     | 3    | 3     | 3     | 69    | 118                |         |      |
| Energy Efficiency, UT                   | 58  | 67            | 67    | 68    | 71   | 68   | 71   | 68    | 65    | 62   | 57    | 56    | 52    | 52    | 53   | 36    | 32    | 25   | 22    | 24    | 665   | 1,074              |         |      |
| Energy Efficiency, WY                   | 10  | 10            | 11    | 12    | 15   | 16   | 16   | 17    | 17    | 16   | 14    | 14    | 12    | 11    | 11   | 9     | 8     | 7    | 5     | 5     | 140   | 237                |         |      |
| Energy Efficiency Total                 | 74  | 83            | 85    | 86    | 94   | 92   | 95   | 92    | 89    | 85   | 78    | 76    | 71    | 69    | 69   | 49    | 44    | 35   | 30    | 33    | 875   | 1,428              |         |      |
| Battery Storage - Utah-S                | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -                  |         |      |
| Battery Storage - WYWS                  | -   | -             | -     | -     | -    | -    | -    | 15.0  | -     | -    | -     | 30.0  | -     | -     | -    | -     | 120.0 | -    | -     | 540.0 | 90    | 630.0              |         |      |
| Battery Storage - Idaho                 | -   | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | 15.0  | 345.0              |         |      |
| FOT East - Summer                       | 42  | 42            | -     | -     | -    | -    | -    | -     | 144   | 150  | 150   | 150   | 150   | 150   | 150  | 216   | 218   | 214  | 223   | 299   | 295   | 53                 | 130     |      |
| West                                    | Existing Plant Retirements and PPA Termination    | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | (351) | -     | -     | -    | -     | -     | -    | -     | -     | -     | -                  | (351)   |      |
|   | Jim Bridger 1 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | -     | -    | -     | -     | -     | -                  | (351)   |      |
|   | Jim Bridger 2 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -     | -     | -    | -     | -     | -     | -     | -    | -     | (356) | -    | -     | -     | -     | -                  | (356    |      |

|   |  | Capacity (MW) |      |      |       |      |       |       |      |      |       |       |      |       |      |       |       |      |      |       |       | Resource Totals 1/ |         |       |
|---|--|---------------|------|------|-------|------|-------|-------|------|------|-------|-------|------|-------|------|-------|-------|------|------|-------|-------|--------------------|---------|-------|
| P-47CP-FOT                              |  | 2019          | 2020 | 2021 | 2022  | 2023 | 2024  | 2025  | 2026 | 2027 | 2028  | 2029  | 2030 | 2031  | 2032 | 2033  | 2034  | 2035 | 2036 | 2037  | 2038  | 10-year            | 20-year |       |
| East                                    | Existing Plant Retirements and PPA Termination   | -             | -    | -    | -     | -    | -     | -     | -    | (82) | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (82)               | (82)    |       |
|   | Craig 1 (Coal Early Retirement/Conversions)      | -             | -    | -    | -     | -    | -     | -     | -    | (82) | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (82)               | (82)    |       |
|   | Craig 2 (Coal Early Retirement/Conversions)      | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | (44)  | -    | -     | -     | -    | -    | -     | -     | (44)               | (44)    |       |
|   | Hayden 1   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | (33)  | -    | -     | -     | -    | -    | -     | -     | (33)               | (33)    |       |
|   | Hayden 2   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | -       |       |
|   | Huntington 1                                     | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | (459) | -                  | (459)   |       |
|   | Huntington 2                                     | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | (450) | -                  | (450)   |       |
|   | Colstrip 3 (Coal Early Retirement/Conversions)   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | (74)  | -    | -     | -    | -     | -     | -    | -    | -     | -     | (74)               | (74)    |       |
|   | Colstrip 4 (Coal Early Retirement/Conversions)   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | (74)  | -    | -     | -    | -     | -     | -    | -    | -     | -     | (74)               | (74)    |       |
|   | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -    | -    | (387) | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (387)              | (387)   |       |
|   | DaveJohnston 1                                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | (99)  | -    | -     | -    | -     | -     | -    | -    | -     | -     | (99)               | (99)    |       |
|   | DaveJohnston 2                                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | (106) | -    | -     | -    | -     | -     | -    | -    | -     | -     | (106)              | (106)   |       |
|   | DaveJohnston 3                                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | (220) | -    | -     | -    | -     | -     | -    | -    | -     | -     | (220)              | (220)   |       |
|   | DaveJohnston 4                                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | (330) | -    | -     | -    | -     | -     | -    | -    | -     | -     | (330)              | (330)   |       |
|   | Naughton 1 (Coal Early Retirement/Conversions)   | -             | -    | -    | -     | -    | -     | -     | -    | -    | (156) | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (156)              | (156)   |       |
|   | Naughton 2 (Coal Early Retirement/Conversions)   | -             | -    | -    | -     | -    | -     | -     | -    | -    | (201) | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (201)              | (201)   |       |
|   | Naughton 3 (Coal Early Retirement/Conversions)   | -             | -    | -    | (280) | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (280)              | (280)   |       |
|   | Gadsby 1-6                                       | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | (356) | -    | -    | -     | -     | (356)              | (356)   |       |
|   | Retire - Hydro                                   | -             | -    | -    | -     | -    | -     | (20)  | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (20)               | (20)    |       |
|   | Retire - Wind                                    | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | (40) | -     | -    | -     | -     | -    | -    | -     | -     | -                  | (40)    | (40)  |
|   | Expire - Wind PPA                                | -             | (27) | (17) | (49)  | (0)  | -     | -     | (65) | (3)  | -     | (19)  | (99) | (200) | (45) | (181) | (80)  | -    | (60) | (80)  | -     | (160)              | (924)   |       |
|   | Expire - Solar PPA                               | -             | -    | -    | -     | (1)  | (1)   | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | (35) | (94) | (849) | -     | (1)                | (979)   |       |
|   | Retire - Other                                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | (1)  | -    | -     | -     | (32)               | -       |       |
|   | Coal Ret. WY - Gas RePower                       | -             | 247  | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | (247) | -    | -     | -     | -    | -    | -     | -     | -                  | 247     | -     |
|   | Expansion Resources                              |               | -    | -    | -     | -    | -     | -     | -    | 185  | -     | -     | -    | 370   | -    | -     | -     | -    | -    | -     | -     | -                  | 185     | 555   |
|   | SCCT Frame NTN                                   |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | 370   | -    | -     | -     | -    | -    | -     | -     | -                  | -       | 370   |
|   | SCCT Frame WYSW                                  |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | 370   | 370  | -     | -     | -    | -    | -     | -     | -                  | 185     | 925   |
|   | Total SCCT                                       |               | -    | -    | -     | -    | -     | -     | -    | 185  | -     | -     | -    | 370   | 370  | -     | -     | -    | -    | -     | -     | -                  | -       | -     |
|   | Wind, Djohnston                                  |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | 620  | -     | -    | -     | -     | -    | -    | -     | -     | -                  | -       | 620   |
|   | Wind, GO   |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | 1,009 | 66   | -     | -     | -    | -    | -     | -     | -                  | -       | 1,075 |
|   | Wind, UT   |               | -    | -    | -     | -    | 73    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 73      | 73    |
|   | Wind, WYAE                                       |               | -    | -    | -     | -    | -     | 1,920 | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920 |
|   | Total Wind                                       |               | -    | -    | -     | 73   | 1,920 | -     | -    | -    | -     | -     | 620  | 1,009 | 66   | -     | -     | -    | -    | -     | -     | -                  | 1,993   | 3,688 |
|   | Utility Solar+Storage - PV - Utah-S              |               | -    | -    | -     | -    | 227   | -     | -    | -    | -     | -     | -    | -     | -    | 500   | -     | -    | -    | -     | -     | -                  | 227     | 727   |
|   | Utility Solar+Storage - PV - GO                  |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | 25   | -     | -    | -     | -     | -    | -    | -     | -     | -                  | -       | 25    |
|   | Utility Solar+Storage - PV - Huntington          |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 909   | -                  | 909     |       |
|   | Utility Solar+Storage - PV - Utah-N              |               | -    | -    | 159   | 64   | -     | 677   | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 900     | 900   |
|   | Total Solar                                      |               | -    | -    | 159   | 64   | -     | 904   | -    | -    | -     | -     | -    | 25    | -    | 500   | -     | -    | -    | -     | 909   | -                  | 1,127   | 2,561 |
|   | Demand Response, ID-Cool/WH                      |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 2.6   | -                  | -       | 2.6   |
|   | Demand Response, ID-3rd Party Contracts          |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 1.8   | -                  | -       | 1.8   |
|   | Demand Response, ID-Irrigate                     |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | 5.2  | -     | -     | -    | -    | 3.7   | -     | 1.8                | -       | 10.6  |
|   | Demand Response, ID-Thermostat                   |               | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 8.3   | -                  | -       | 8.3   |
| Demand Response, UT-Cool/WH             |  | 4.1           | -    | 7.0  | -     | 9.9  | -     | -     | 7.2  | -    | -     | 6.7   | -    | -     | -    | -     | -     | 7.0  | -    | -     | 7.2   | 28.1               | 55.9    |       |
| Demand Response, UT-3rd Party Contracts |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | 74.1  | 2.6   | -                  | 76.7    |       |
| Demand Response, UT-Irrigate            |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 1.9   | -                  | 1.9     |       |
| Demand Response, UT-Thermostat          |  | -             | -    | -    | -     | -    | -     | -     | 33.5 | 59.0 | 24.1  | -     | 8.2  | -     | -    | -     | -     | 8.3  | -    | -     | 5.1   | 116.7              | 138.3   |       |
| Demand Response, WY-Cool/WH             |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | 3.4   | 1.8   | -                  | 5.2     |       |
| Demand Response, WY-3rd Party Contracts |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | 39.4  | -     | -                  | 39.4    |       |
| Demand Response, WY-Irrigate            |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | 1.8  | -     | -    | -     | -     | -    | -    | -     | -     | -                  | 1.8     |       |
| Demand Response, WY-Thermostat          |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | -                  | -       |       |
| Demand Response, UT-Ancillary Services  |  | -             | -    | -    | -     | -    | -     | -     | 13.5 | -    | -     | -     | -    | -     | -    | 18.7  | -     | -    | -    | -     | 1.2   | -                  | 19.9    |       |
| Demand Response, WA-Ancillary Services  |  | -             | -    | -    | -     | -    | -     | -     | 3.0  | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | 3.2   | -     | 13.5               | 16.7    |       |
| Demand Response Total                   |  | 4.1           | -    | 7.0  | -     | 9.9  | -     | 16.5  | 40.7 | 59.0 | 24.1  | 6.7   | 10.0 | -     | 12.0 | 18.7  | -     | 15.3 | 3.7  | 133.0 | 21.6  | 161.2              | 382.2   |       |
| Energy Efficiency, ID                   |  | 6             | 6    | 6    | 7     | 7    | 7     | 7     | 7    | 7    | 7     | 6     | 6    | 6     | 6    | 5     | 4     | 4    | 3    | 3     | 3     | 68                 | 115     |       |
| Energy Efficiency, UT                   |  | 58            | 65   | 67   | 68    | 69   | 66    | 65    | 65   | 62   | 62    | 54    | 53   | 50    | 48   | 47    | 36    | 32   | 26   | 22    | 22    | 646                | 1,035   |       |
| Energy Efficiency, WY                   |  | 10            | 10   | 11   | 12    | 15   | 16    | 16    | 17   | 17   | 17    | 15    | 14   | 12    | 12   | 11    | 9     | 8    | 7    | 5     | 5     | 141                | 239     |       |
| Energy Efficiency Total                 |  | 74            | 81   | 85   | 86    | 91   | 89    | 89    | 88   | 85   | 86    | 76    | 73   | 68    | 65   | 63    | 49    | 44   | 36   | 30    | 30    | 855                | 1,389   |       |
| Battery Storage - Utah-S                |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | 255.0 | -    | -     | -    | -     | -     | -    | -    | -     | 330.0 | 120                | 705.0   |       |
| Battery Storage - WYSW                  |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | 315.0 | -                  | 315.0   |       |
| Battery Storage - Idaho                 |  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | 45.0  | 240.0 | 60.0               | 345.0   |       |
| FOT East - Summer                       |  | 42            | 42   | -    | -     | -    | -     | -     | 48   | 37   | 150   | 173   | 150  | 150   | 150  | 150   | 150   | 150  | 150  | 173   | 300   | 292                | 32      | 108   |
| West                                    | Existing Plant Retirements and PPA Termination   | -             | -    | -    | -     | -    | (351) | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (351)              | (351)   |       |
|   | JimBridger 1 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | (351) | -     | -    | -    | -     | -     | -    | -     | -    | -     | -     | -    | -    | -     | -     | (351)              | (351)   |       |
|   | JimBridger 2 (Coal Early Retirement/Conversions) | -             |      |      |       |      |       |       |      |      |       |       |      |       |      |       |       |      |      |       |       |                    |         |       |

|  |  | Capacity (MW) |      |       |      |      |       |       |      |       |      |       |      |      |       |      |       |       |       |      |       | Resource Totals 1/ |         |       |
|--|--|---------------|------|-------|------|------|-------|-------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|-------|--------------------|---------|-------|
| P-48CP-FOT                             |  | 2019          | 2020 | 2021  | 2022 | 2023 | 2024  | 2025  | 2026 | 2027  | 2028 | 2029  | 2030 | 2031 | 2032  | 2033 | 2034  | 2035  | 2036  | 2037 | 2038  | 10-year            | 20-year |       |
| East                                   | Existing Plant Retirements and PPA Termination   | -             | -    | -     | -    | -    | -     | -     | -    | (82)  | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (82)               | (82)    |       |
|  | Craig 1 (Coal Early Retirement/Conversions)      | -             | -    | -     | -    | -    | -     | -     | -    | (82)  | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (82)               | (82)    |       |
|  | Craig 2 (Coal Early Retirement/Conversions)      | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | -                  | -       |       |
|  | Hayden 1   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | (44) | -     | -    | -     | -     | -     | -    | -     | -                  | (44)    |       |
|  | Hayden 2   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | (33) | -     | -    | -     | -     | -     | -    | -     | -                  | (33)    |       |
|  | Huntington 1                                     | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | (459) | -                  | (459)   |       |
|  | Huntington 2                                     | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | (450) | -                  | (450)   |       |
|  | Colstrip 3 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -    | -     | -     | -    | -     | (74) | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (74)               | (74)    |       |
|  | Colstrip 4 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -    | -     | -     | -    | -     | (74) | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (74)               | (74)    |       |
|  | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -    | (387) | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (387)              | (387)   |       |
|  | DaveJohnston 1                                   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | (99)  | -    | -    | -     | -    | -     | -     | -     | -    | -     | (99)               | (99)    |       |
|  | DaveJohnston 2                                   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | (106) | -    | -    | -     | -    | -     | -     | -     | -    | -     | (106)              | (106)   |       |
|  | DaveJohnston 3                                   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | (220) | -    | -    | -     | -    | -     | -     | -     | -    | -     | (220)              | (220)   |       |
|  | DaveJohnston 4                                   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | (330) | -    | -    | -     | -    | -     | -     | -     | -    | -     | (330)              | (330)   |       |
|  | Naughton 1 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -    | -     | -     | -    | (156) | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (156)              | (156)   |       |
|  | Naughton 2 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -    | -     | -     | -    | (201) | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (201)              | (201)   |       |
|  | Naughton 3 (Coal Early Retirement/Conversions)   | -             | -    | (280) | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (280)              | (280)   |       |
|  | Gadsby 1.6                                       | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | (356) | -     | -     | -    | -     | -                  | (356)   |       |
|  | Retire - Hydro                                   | -             | -    | -     | -    | -    | -     | (20)  | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (20)               | (20)    |       |
|  | Retire - Wind                                    | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | (40) | -     | -    | -     | -     | -     | -    | -     | -                  | (40)    |       |
|  | Expire - Wind PPA                                | -             | -    | (27)  | (17) | (49) | (0)   | -     | -    | (65)  | (3)  | -     | (19) | (99) | (200) | (45) | (181) | (80)  | -     | (60) | (80)  | -                  | (160)   | (924) |
|  | Expire - Solar PPA                               | -             | -    | -     | -    | -    | (1)   | (1)   | -    | -     | -    | -     | -    | -    | -     | -    | -     | (35)  | -     | (94) | (849) | -                  | (1)     | (979) |
|  | Retire - Other                                   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (32)               | -       | (33)  |
|  | Coal Ret. WY - Gas RePower                       | -             | -    | 247   | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | (247) | -    | -     | -     | (1)   | -    | -     | -                  | 247     | -     |
|  | Expansion Resources                              |               |      |       |      |      |       |       |      |       |      |       |      |      |       |      |       |       |       |      |       |                    |         |       |
|  | SCCT Frame NTN                                   | -             | -    | -     | -    | -    | -     | -     | -    | 185   | -    | -     | -    | -    | 370   | -    | -     | -     | -     | -    | -     | -                  | 185     | 555   |
|  | SCCT Frame WYSW                                  | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | 370   | -    | -     | -     | -     | -    | -     | -                  | -       | 370   |
|  | Total SCCT                                       | -             | -    | -     | -    | -    | -     | -     | -    | 185   | -    | -     | -    | -    | 370   | 370  | -     | -     | -     | -    | -     | -                  | 185     | 925   |
|  | Wind, DJohnston                                  | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | 620  | -     | -    | -     | -     | -     | -    | -     | -                  | -       | 620   |
|  | Wind, GO   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | 1,055 | 45   | -     | -     | -     | -    | -     | -                  | -       | 1,100 |
|  | Wind, UT   | -             | -    | -     | -    | -    | 261   | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | -                  | 261     | 261   |
|  | Wind, WYAE                                       | -             | -    | -     | -    | -    | -     | 1,920 | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | -                  | 1,920   | 1,920 |
|  | Total Wind                                       | -             | -    | -     | -    | -    | 261   | 1,920 | -    | -     | -    | -     | -    | 620  | 1,055 | 45   | -     | -     | -     | -    | -     | -                  | 2,181   | 3,901 |
|  | Utility Solar+Storage - PV - Utah-S              | -             | -    | -     | -    | -    | -     | 39    | -    | -     | -    | -     | -    | -    | 500   | -    | -     | -     | -     | -    | -     | -                  | 39      | 539   |
|  | Utility Solar+Storage - PV - Huntington          | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | 909   | -                  | 909     | 909   |
|  | Utility Solar+Storage - PV - Utah-N              | -             | -    | -     | 159  | 64   | -     | 677   | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | -                  | 900     | 900   |
|  | Total Solar                                      | -             | -    | -     | 159  | 64   | -     | 716   | -    | -     | -    | -     | -    | -    | 500   | -    | -     | -     | -     | -    | -     | 909                | 939     | 2,348 |
|  | Demand Response, ID-Cool/WH                      | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | 2.6   | -                  | -       | 2.6   |
|  | Demand Response, ID-3rd Party Contracts          | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | 1.8   | -     | -     | -    | -     | -                  | -       | 1.8   |
|  | Demand Response, ID-Irrigate                     | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | 3.7   | -    | 1.8   | -                  | 10.6    |       |
|  | Demand Response, ID-Thermostat                   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | 8.3   | -                  | -       | 8.3   |
|  | Demand Response, UT-Cool/WH                      | 4.1           | -    | -     | 7.0  | -    | 9.9   | -     | -    | 7.2   | -    | -     | 6.7  | -    | -     | 6.8  | -     | -     | 7.0   | -    | -     | 7.2                | 28.1    | 55.9  |
|  | Demand Response, UT-3rd Party Contracts          | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | 55.2  | -     | -    | 18.9  | 2.6                | -       | 76.7  |
|  | Demand Response, UT-Irrigate                     | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | 1.9                | -       | 1.9   |
|  | Demand Response, UT-Thermostat                   | -             | -    | -     | -    | -    | -     | -     | -    | 33.5  | 59.0 | 24.1  | -    | 8.2  | -     | -    | -     | -     | 8.3   | -    | -     | 5.1                | 116.7   | 138.3 |
|  | Demand Response, WY-Cool/WH                      | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | 3.4   | 1.8                | -       | 5.2   |
|  | Demand Response, WY-3rd Party Contracts          | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | 39.4  | -                  | -       | 39.4  |
|  | Demand Response, WY-Irrigate                     | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | 1.8  | -     | -    | -     | -     | -     | -    | -     | -                  | -       | 1.8   |
|  | Demand Response, WY-Thermostat                   | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | 18.7  | -     | -    | -     | 1.2                | -       | 19.9  |
|  | Demand Response, UT-Ancillary Services           | -             | -    | -     | -    | -    | -     | -     | 13.5 | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | 3.2                | -       | 13.5  |
| Demand Response, WY-Ancillary Services | -  | -             | -    | -     | -    | -    | -     | 3.0   | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | 3.0                | 3.0     |       |
| Demand Response Total                  | 4.1  | -             | -    | 7.0   | -    | 9.9  | -     | 16.5  | 40.7 | 59.0  | 24.1 | 6.7   | 10.0 | -    | 12.0  | 20.5 | 55.2  | 15.3  | 3.7   | 75.9 | 21.6  | 161.2              | 382.2   |       |
| Energy Efficiency, ID                  | -  | 6             | 6    | 6     | 7    | 7    | 7     | 7     | 7    | 7     | 6    | 6     | 6    | 6    | 6     | 5    | 4     | 3     | 3     | 3    | 69    | 117                |         |       |
| Energy Efficiency, UT                  | 58   | 67            | 67   | 68    | 69   | 67   | 67    | 66    | 65   | 62    | 54   | 53    | 52   | 50   | 49    | 39   | 36    | 26    | 24    | 31   | 655   | 1,069              |         |       |
| Energy Efficiency, WY                  | 10   | 10            | 11   | 14    | 15   | 16   | 16    | 18    | 19   | 17    | 14   | 14    | 13   | 12   | 11    | 9    | 8     | 7     | 5     | 6    | 147   | 247                |         |       |
| Energy Efficiency Total                | 74   | 83            | 85   | 88    | 91   | 90   | 91    | 92    | 91   | 86    | 75   | 74    | 71   | 67   | 66    | 53   | 48    | 37    | 32    | 40   | 871   | 1,433              |         |       |
| Battery Storage - Utah-S               | -  | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | 75.0  | -     | 765.0 | 60   | -     | 900.0              |         |       |
| Battery Storage - WYSW                 | -  | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | 255.0 | -     | -    | -     | 255.0              |         |       |
| Battery Storage - Idaho                | -  | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | 60.0  | 180.0 | -    | 120.0 | -                  | 360.0   |       |
| FOT East - Summer                      | 42   | 42            | -    | -     | -    | -    | -     | -     | 118  | 106   | 150  | 150   | 150  | 150  | 150   | 150  | 270   | 242   | 251   | 298  | 300   | 46                 | 129     |       |
| West                                   | Existing Plant Retirements and PPA Termination   | -             | -    | -     | -    | -    | (351) | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | (351)              | (351)   |       |
|  | JimBridger 1 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | -                  | (351)   |       |
|  | JimBridger 2 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | (356) | -    | -    | -     | -    | -     | -     | -     | -    | -     | -                  | (356)   |       |
|  | JimBridger 3 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -    | -     | -     | -    | -     | -    | -     | -    | -    | -     | -    | -     | -     | -     | -    | -     | -                  | (349)   |       |
|  | JimBridger 4 (Coal Early Retirement/Conversions) | -             | -    | -     |      |      |       |       |      |       |      |       |      |      |       |      |       |       |       |      |       |                    |         |       |

|                          |  | Capacity (MW) |      |       |       |      |      |       |       |      |       |       |       |       |       |      |       |      |      |       |       | Resource Totals 1/ |         |       |
|--------------------------|--|---------------|------|-------|-------|------|------|-------|-------|------|-------|-------|-------|-------|-------|------|-------|------|------|-------|-------|--------------------|---------|-------|
| P-53CP-FOT               |  | 2019          | 2020 | 2021  | 2022  | 2023 | 2024 | 2025  | 2026  | 2027 | 2028  | 2029  | 2030  | 2031  | 2032  | 2033 | 2034  | 2035 | 2036 | 2037  | 2038  | 10-year            | 20-year |       |
| East                     | Existing Plant Retirements and PPA Termination | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       |       |
|                          | Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -     | -     | -    | -    | -     | -     | (82) | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)  |
|                          | Craig 2 (Coal Early Retirement/Conversions)    | -             | -    | -     | -     | -    | -    | -     | -     | -    | (82)  | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (82)    | (82)  |
|                          | Hayden 1                                       | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | (44)  | -    | -     | -    | -    | -     | -     | -                  | -       | (44)  |
|                          | Hayden 2                                       | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | (33)  | -    | -     | -    | -    | -     | -     | -                  | -       | (33)  |
|                          | Huntington 1                                   | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | (459) | -                  | -       | (459) |
|                          | Huntington 2                                   | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | (450) | -                  | -       | (450) |
|                          | Cokstrip 3 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (74)    | (74)  |
|                          | Cokstrip 4 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | (74)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (74)    | (74)  |
|                          | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -     | (387) | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (387)   | (387) |
|                          | DaveJohnston 1                                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | (99)  | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (99)    | (99)  |
|                          | DaveJohnston 2                                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | (106) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (106)   | (106) |
|                          | DaveJohnston 3                                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | (220) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (220)   | (220) |
|                          | DaveJohnston 4                                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | (330) | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (330)   | (330) |
|                          | Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -     | -    | (156) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (156)   | (156) |
|                          | Naughton 2 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -     | -    | (201) | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (201)   | (201) |
|                          | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | -     |
|                          | Cash by 1-6                                    | -             | -    | (280) | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | (356) | -    | -    | -     | -     | -                  | (280)   | (280) |
|                          | Retire - Hydro                                 | -             | -    | -     | -     | -    | (20) | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (20)    | (20)  |
|                          | Retire - Wind                                  | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | (40)  | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (40)  |
|                          | Expire - Wind PPA                              | -             | -    | (27)  | (17)  | (49) | (0)  | -     | -     | (65) | (3)   | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -                  | (160)   | (924) |
|                          | Expire - Solar PPA                             | -             | -    | -     | -     | -    | (1)  | (1)   | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | (35) | (94)  | (849) | -                  | (1)     | (979) |
|                          | Retire - Other                                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | (32)               | -       | (33)  |
|                          | Coal Ret. WY - Gas RePower                     | -             | -    | 247   | -     | -    | -    | -     | -     | -    | -     | -     | -     | (247) | -     | -    | -     | -    | (1)  | -     | -     | -                  | 247     | -     |
|                          | Expansion Resources                            |               |      |       |       |      |      |       |       |      |       |       |       |       |       |      |       |      |      |       |       |                    |         |       |
|                          | SCCT Frame NTN                                 | -             | -    | -     | -     | -    | -    | -     | -     | 185  | -     | -     | -     | 370   | -     | -    | -     | -    | -    | -     | -     | -                  | 185     | 555   |
|                          | SCCT Frame WYSW                                | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | 370   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 370   |
|                          | Total SCCT                                     | -             | -    | -     | -     | -    | -    | -     | -     | 185  | -     | -     | 370   | 370   | -     | -    | -     | -    | -    | -     | -     | -                  | 185     | 925   |
|                          | Wind, Dohnston                                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | 33    | 587   | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 33      | 620   |
|                          | Wind, GO                                       | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | 1,010 | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 1,010 |
|                          | Wind, UT                                       | -             | -    | -     | -     | -    | 145  | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 145     | 145   |
|                          | Wind, WYAE                                     | -             | -    | -     | -     | -    | -    | 1,920 | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920 |
|                          | Total Wind                                     | -             | -    | -     | -     | -    | 145  | 1,920 | -     | -    | -     | 33    | 587   | 1,010 | -     | -    | -     | -    | -    | -     | -     | -                  | 2,097   | 3,695 |
|                          | Utility Solar+Storage - PV - Utah-S            | -             | -    | -     | -     | -    | -    | 155   | -     | -    | -     | -     | -     | -     | -     | 500  | -     | -    | -    | -     | -     | -                  | 155     | 655   |
|                          | Utility Solar+Storage - PV - GO                | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | 90    | -     | -    | -     | -    | -    | -     | -     | -                  | 90      | 90    |
|                          | Utility Solar+Storage - PV - Huntington        | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 909   | -                  | 909     | 909   |
|                          | Utility Solar+Storage - PV - Utah-N            | -             | -    | -     | 159   | 64   | -    | 677   | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 900                | 900     | 900   |
|                          | Total Solar                                    | -             | -    | -     | 159   | 64   | -    | 832   | -     | -    | -     | -     | -     | 90    | -     | 500  | -     | -    | -    | -     | -     | 909                | 1,055   | 2,554 |
|                          | Demand Response, ID-Cool/WH                    | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 2.6                | -       | 2.6   |
|                          | Demand Response, ID-3rd Party Contracts        | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 1.8                | -       | 1.8   |
|                          | Demand Response, ID-Irrigate                   | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 3.7   | -                  | 1.8     | -     |
|                          | Demand Response, ID-Thermostat                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 8.3                | -       | 8.3   |
|                          | Demand Response, UT-Cool/WH                    | 4.1           | -    | -     | 7.0   | -    | 9.9  | -     | -     | -    | 7.2   | -     | 6.7   | -     | -     | 6.8  | -     | -    | 7.0  | -     | -     | 7.2                | 28.1    | 55.9  |
|                          | Demand Response, UT-3rd Party Contracts        | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | 74.1  | 2.6                | -       | 76.7  |
|                          | Demand Response, UT-Irrigate                   | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 1.9                | -       | 1.9   |
|                          | Demand Response, UT-Thermostat                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | 116.7 | -     | -     | -     | 8.2   | -    | -     | -    | -    | -     | -     | 5.1                | 116.7   | 138.3 |
|                          | Demand Response, WY-Cool/WH                    | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 3.4                | 1.8     | -     |
|                          | Demand Response, WY-3rd Party Contracts        | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 39.4               | -       | 39.4  |
|                          | Demand Response, WY-Irrigate                   | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | 1.8   | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 1.8   |
|                          | Demand Response, WY-Thermostat                 | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | 18.7  | -    | -    | -     | -     | 1.2                | -       | 19.9  |
|                          | Demand Response, UT-Ancillary Services         | -             | -    | -     | -     | -    | -    | -     | 13.5  | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | 3.2                | -       | 13.5  |
|                          | Demand Response, WY-Ancillary Services         | -             | -    | -     | -     | -    | -    | -     | 3.0   | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 3.0     | 3.0   |
|                          | Demand Response Total                          | 4.1           | -    | 7.0   | -     | 9.9  | -    | 16.5  | 123.8 | -    | -     | -     | 6.7   | 10.0  | -     | 12.0 | 18.7  | -    | 15.3 | 3.7   | 133.0 | 21.6               | 161.2   | 382.2 |
|                          | Energy Efficiency, ID                          | 6             | 6    | 6     | 7     | 7    | 7    | 7     | 7     | 7    | 7     | 7     | 6     | 6     | 6     | 4    | 4     | 4    | 3    | 3     | 3     | 69                 | 118     | 180   |
|                          | Energy Efficiency, UT                          | 58            | 67   | 67    | 68    | 71   | 68   | 71    | 68    | 65   | 62    | 57    | 56    | 52    | 52    | 53   | 36    | 32   | 25   | 22    | 24    | 665                | 1,074   | 1,415 |
|                          | Energy Efficiency, WY                          | 10            | 10   | 11    | 12    | 15   | 16   | 16    | 17    | 17   | 16    | 14    | 14    | 12    | 11    | 11   | 9     | 8    | 7    | 5     | 5     | 140                | 237     | 311   |
|                          | Energy Efficiency Total                        | 74            | 83   | 85    | 86    | 94   | 92   | 95    | 92    | 89   | 85    | 78    | 76    | 71    | 69    | 69   | 49    | 44   | 35   | 30    | 33    | 875                | 1,428   | 1,891 |
| Battery Storage - Utah-S | -  | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | 540.0 | 90    | -                  | 630.0   |       |
| Battery Storage - WYSW   | -  | -             | -    | -     | -     | -    | -    | -     | 15.0  | -    | -     | 30.0  | -     | -     | -     | -    | 120.0 | -    | -    | 180.0 | -     | 15.0               | 345.0   |       |
| Battery Storage - Idaho  | -  | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | 105.0 | 45.0  | -     | -    | -     | -    | -    | 135.0 | 30.0  | -                  | 315.0   |       |
| FOT East - Summer        | 42   | 42            | -    | -     | -     | -    | -    | -     | 144   | 150  | 150   | 150   | 150   | 150   | 150   | 216  | 218   | 214  | 223  | 299   | 295   | 53                 | 130     |       |
| West                     | Existing Plant Retirements and PPA Termination | -             | -    | -     | -     | -    | -    | -     | -     | -    | -     | -     | -     | -     | -     | -    | -     | -    | -    | -     | -     | -                  | -       |       |

220 1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.



| P-22  |  | Capacity (MW) |       |       |      |      |      |      |      |      |       |      |      |       |      |       |      |       |      |       | Resource Totals 1/ |         |         |
|---|--|---------------|-------|-------|------|------|------|------|------|------|-------|------|------|-------|------|-------|------|-------|------|-------|--------------------|---------|---------|
| East  |  | 2019          | 2020  | 2021  | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028  | 2029 | 2030 | 2031  | 2032 | 2033  | 2034 | 2035  | 2036 | 2037  | 2038               | 10-year | 20-year |
| Existing Plant Retirements and PPA Termination  |  |               |       |       |      |      |      |      |      |      |       |      |      |       |      |       |      |       |      |       |                    |         |         |
| Craig 1 (Coal Early Retirement/Conversions)     |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (82)  | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (82)    | (82)    |
| Craig 2 (Coal Early Retirement/Conversions)     |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (82)  | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (82)    | (82)    |
| Hayden 1  |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | (44)  | -    | -     | -    | -     | -    | -     | -                  | -       | (44)    |
| Huntington 1                                    |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | (33)  | -    | -     | -    | -     | -    | -     | -                  | -       | (33)    |
| Huntington 2                                    |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | (450) | -                  | -       | (450)   |
| Cokestrip 3 (Coal Early Retirement/Conversions) |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (74)  | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (74)    | (74)    |
| Cokestrip 4 (Coal Early Retirement/Conversions) |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (74)  | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (74)    | (74)    |
| Cholla 4 (Coal Early Retirement/Conversions)    |  | -             | -     | (387) | -    | -    | -    | -    | -    | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (387)   | (387)   |
| DaveJohnson 1                                   |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (99)  | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (99)    | (99)    |
| DaveJohnson 2                                   |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (106) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (106)   | (106)   |
| DaveJohnson 3                                   |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (230) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (230)   | (230)   |
| DaveJohnson 4                                   |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (330) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (330)   | (330)   |
| Naughton 1 (Coal Early Retirement/Conversions)  |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (156) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (156)   | (156)   |
| Naughton 2 (Coal Early Retirement/Conversions)  |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | (201) | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (201)   | (201)   |
| Naughton 3 (Coal Early Retirement/Conversions)  |  | -             | (280) | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (280)   | (280)   |
| Gadsby 1-6                                      |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | -     | -    | (356) | -    | -     | -    | -     | -                  | -       | (356)   |
| Retire - Hydro                                  |  | -             | -     | -     | -    | -    | (20) | -    | -    | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (20)    | (20)    |
| Retire - Wind                                   |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | (40) | -     | -    | -     | -    | -     | -    | -     | -                  | -       | (40)    |
| Equip - Wind PPA                                |  | -             | (27)  | (17)  | (49) | (0)  | -    | -    | -    | -    | (65)  | (3)  | -    | (19)  | (99) | (200) | (45) | (181) | (80) | -     | -                  | (160)   | (924)   |
| Equip - Solar PPA                               |  | -             | -     | -     | -    | (1)  | (1)  | -    | -    | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | -     | -                  | (1)     | (1)     |
| Retire - Other                                  |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | -     | -    | -     | (1)  | (35)  | (60) | (80)  | -                  | (32)    | -       |
| Coal Ret. WY - Cus RePower                      |  | -             | 247   | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | (247) | -    | -     | -    | -     | -    | -     | -                  | -       | 247     |
| Expansion Resources                             |  |               |       |       |      |      |      |      |      |      |       |      |      |       |      |       |      |       |      |       |                    |         |         |
| CCCT - Dohms - J 1st                            |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | 505   | -                  | -       | 505     |
| Total CCCT                                      |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | -     | -    | -     | -    | -     | -    | 505   | -                  | -       | 505     |
| SCCT Frame N2N                                  |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | 555   | -    | -     | -    | -     | -    | -     | -                  | -       | 555     |
| SCCT Frame WYSW                                 |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | 555   | -    | -     | -    | -     | -    | 185   | 185                | -       | 370     |
| Total SCCT                                      |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | 1,033 | -    | -     | -    | -     | -    | 185   | 185                | -       | 925     |
| Wind, GO  |  | -             | -     | -     | -    | -    | -    | -    | -    | -    | -     | -    | -    | 1,033 | -    | -     | -    | -     |      |       |                    |         |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.



|                         |  | Capacity (MW) |      |       |       |      |       |       |      |      |       |      |       |       |      |       |      |      |      |       |      | Resource Totals 1/ |         |
|-------------------------|--|---------------|------|-------|-------|------|-------|-------|------|------|-------|------|-------|-------|------|-------|------|------|------|-------|------|--------------------|---------|
|                         |  | 2019          | 2020 | 2021  | 2022  | 2023 | 2024  | 2025  | 2026 | 2027 | 2028  | 2029 | 2030  | 2031  | 2032 | 2033  | 2034 | 2035 | 2036 | 2037  | 2038 | 10-year            | 20-year |
| East                    | P-26   |               |      |       |       |      |       |       |      |      |       |      |       |       |      |       |      |      |      |       |      |                    |         |
|                         | Existing Plant Retirements and PPA Termination   |               |      |       |       |      |       |       |      |      |       |      |       |       |      |       |      |      |      |       |      |                    |         |
|                         | Craig 1 (Coal Early Retirement/Conversions)      | -             | -    | -     | -     | -    | -     | -     | (82) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (82)               | (82)    |
|                         | Craig 2 (Coal Early Retirement/Conversions)      | -             | -    | -     | -     | -    | -     | -     | -    | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (82)               | (82)    |
|                         | Hayden 1   | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | (44)  | -    | -     | -    | -    | -    | -     | -    | -                  | (44)    |
|                         | Hayden 2   | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | (33)  | -    | -     | -    | -    | -    | -     | -    | -                  | (33)    |
|                         | Huntington 1                                     | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | (459) | -    | -                  | (459)   |
|                         | Huntington 2                                     | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | (450) | -    | -                  | (450)   |
|                         | Colstrip 3 (Coal Early Retirement/Conversions)   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (74)               | (74)    |
|                         | Colstrip 4 (Coal Early Retirement/Conversions)   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (74)               | (74)    |
|                         | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -    | -     | (387) | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | -                  | (387)   |
|                         | DaveJohnston 1                                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (99)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (99)               | (99)    |
|                         | DaveJohnston 2                                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (106)              | (106)   |
|                         | DaveJohnston 3                                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (220)              | (220)   |
|                         | DaveJohnston 4                                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (330)              | (330)   |
|                         | Naughton 1 (Coal Early Retirement/Conversions)   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (156) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (156)              | (156)   |
|                         | Naughton 2 (Coal Early Retirement/Conversions)   | -             | -    | -     | -     | -    | -     | -     | -    | -    | (201) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (201)              | (201)   |
|                         | Naughton 3 (Coal Early Retirement/Conversions)   | -             | -    | (280) | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (280)              | (280)   |
|                         | Gadsby 1-6                                       | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | (356) | -    | -    | -    | -     | -    | -                  | (356)   |
|                         | Retire - Hydro                                   | -             | -    | -     | -     | -    | -     | (20)  | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (20)               | (20)    |
|                         | Retire - Wind                                    | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | (40)  | -     | -    | -     | -    | -    | -    | -     | -    | -                  | (40)    |
|                         | Expire - Wind PPA                                | -             | -    | (27)  | -     | (17) | (49)  | (0)   | -    | -    | (65)  | (3)  | -     | (19)  | (99) | (200) | -    | (45) | -    | (80)  | (60) | (80)               | (160)   |
|                         | Expire - Solar PPA                               | -             | -    | -     | -     | -    | -     | (1)   | -    | -    | (1)   | -    | -     | -     | -    | -     | -    | (35) | (94) | (849) | -    | -                  | (1)     |
|                         | Retire - Other                                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | (1)  | -    | -     | -    | (32)               | -       |
|                         | Coal Ret. WY - Gas RePower                       | -             | -    | 247   | -     | -    | -     | -     | -    | -    | -     | -    | -     | (247) | -    | -     | -    | -    | -    | -     | -    | -                  | 247     |
|                         | Expansion Resources                              |               |      |       |       |      |       |       |      |      |       |      |       |       |      |       |      |      |      |       |      |                    |         |
|                         | SCCT - DJohns - J 1st                            | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 505  | -                  | 505     |
|                         | Total SCCT                                       | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 505  | -                  | 505     |
|                         | SCCT Frame NTN                                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | 185   | -    | -     | -     | 370  | -     | -    | -    | -    | -     | -    | 185                | 555     |
|                         | SCCT Frame WYSW                                  | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 370  | -                  | 370     |
|                         | Total SCCT                                       | -             | -    | -     | -     | -    | -     | -     | -    | -    | 185   | -    | -     | -     | 370  | -     | -    | -    | -    | -     | 370  | -                  | 185     |
|                         | Wind, GO   | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | 1,100 | -    | -     | -    | -    | -    | -     | -    | -                  | 1,100   |
|                         | Wind, UT   | -             | -    | -     | -     | -    | 73    | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | 73                 | 73      |
|                         | Wind, WYAE                                       | -             | -    | -     | -     | -    | -     | 1,920 | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | 1,920              | 1,920   |
|                         | Total Wind                                       | -             | -    | -     | -     | 73   | 1,920 | -     | -    | -    | -     | -    | -     | 1,100 | -    | -     | -    | -    | -    | -     | -    | 1,993              | 3,093   |
|                         | Utility Solar+Storage - PV - Utah-S              | -             | -    | -     | -     | -    | 227   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | 227                | 727     |
|                         | Utility Solar+Storage - PV - WYSW                | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | 100  | -    | -    | -     | -    | -                  | 100     |
|                         | Utility Solar+Storage - PV - Huntington          | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 898   | 11   | -                  | 909     |
|                         | Utility Solar+Storage - PV - Utah-N              | -             | -    | 159   | 64    | -    | 677   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | 900                | 900     |
|                         | Total Solar                                      | -             | -    | 159   | 64    | -    | 904   | -     | -    | -    | -     | -    | -     | 500   | -    | -     | 100  | -    | -    | 898   | 11   | 1,127              | 2,636   |
|                         | Demand Response, ID-3rd Party Contracts          | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 1.8   | -    | -                  | 1.8     |
|                         | Demand Response, ID-Irrigate                     | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | 5.2  | -     | -    | -    | 3.7  | -     | 1.8  | -                  | 10.6    |
|                         | Demand Response, UT-Cool/WH                      | 4.1           | -    | -     | 7.0   | -    | 9.9   | -     | -    | 7.2  | -     | -    | 6.7   | -     | 6.8  | -     | -    | 7.0  | -    | -     | -    | 28.1               | 55.9    |
|                         | Demand Response, UT-3rd Party Contracts          | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 76.7 | -                  | 76.7    |
|                         | Demand Response, UT-Irrigate                     | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 1.9  | -                  | 1.9     |
|                         | Demand Response, UT-Thermostat                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | 116.7 | 8.2   | -    | -     | -    | -    | 8.3  | -     | 5.1  | -                  | 138.3   |
|                         | Demand Response, WY-3rd Party Contracts          | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 2.1   | -    | -                  | 2.1     |
|                         | Demand Response, WY-Irrigate                     | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 1.8   | -    | -                  | 1.8     |
|                         | Demand Response, WY-Thermostat                   | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 18.7  | 1.2  | -                  | 19.9    |
|                         | Demand Response, UT-Ancillary Services           | -             | -    | -     | -     | -    | 8.3   | -     | -    | 5.3  | -     | -    | -     | -     | -    | -     | -    | -    | -    | 3.2   | -    | -                  | 13.5    |
|                         | Demand Response, WY-Ancillary Services           | -             | -    | -     | -     | -    | -     | -     | -    | 3.0  | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | -                  | 3.0     |
|                         | Demand Response Total                            | 4.1           | -    | 7.0   | -     | 18.1 | -     | 8.2   | 7.2  | -    | 123.3 | 8.2  | -     | 12.0  | -    | -     | 7.0  | 12.0 | 27.6 | 94.0  | 44.6 | 328.7              |         |
|                         | Energy Efficiency, ID                            | 6             | 5    | 8     | 7     | 7    | 7     | 7     | 7    | 7    | 7     | 6    | 6     | 6     | 6    | 6     | 4    | 4    | 3    | 3     | 3    | 66                 | 114     |
|                         | Energy Efficiency, UT                            | 58            | 61   | 66    | 68    | 69   | 66    | 67    | 65   | 62   | 62    | 57   | 56    | 52    | 50   | 51    | 36   | 32   | 25   | 22    | 26   | 642                | 1,049   |
|                         | Energy Efficiency, WY                            | 10            | 10   | 11    | 12    | 13   | 16    | 17    | 18   | 17   | 16    | 15   | 13    | 12    | 11   | 9     | 8    | 7    | 5    | 5     | 140  | 242                |         |
|                         | Energy Efficiency Total                          | 74            | 76   | 82    | 86    | 89   | 89    | 91    | 88   | 86   | 86    | 79   | 77    | 72    | 68   | 68    | 49   | 45   | 35   | 30    | 35   | 848                | 1,404   |
|                         | Battery Storage - Utah-S                         | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 150  | -                  | 150.0   |
|                         | Battery Storage - WYSW                           | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 30.0 | -                  | 30.0    |
| Battery Storage - Idaho | -  | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     | -    | 45.0  | -     | -    | -     | -    | -    | -    | 150.0 | -    | 195.0              |         |
| FOT East - Summer       | -  | -             | -    | -     | -     | -    | -     | -     | -    | -    | 82    | 300  | 295   | 151   | 153  | 201   | 203  | 208  | 300  | 300   | 300  | 8                  | 125     |
| West                    | Existing Plant Retirements and PPA Termination   |               |      |       |       |      |       |       |      |      |       |      |       |       |      |       |      |      |      |       |      |                    |         |
|                         | JimBridger 1 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | (351) | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -    | (351)              |         |
|                         | JimBridger 2 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -     | -     | -    | -    | -     |      |       |       |      |       |      |      |      |       |      |                    |         |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

Table 18 – Sensitivity Cases, Detailed Capacity Expansion Portfolio

|   |  | Capacity (MW) |      |       |      |       |       |      |      |       |      |       |       |       |       |       |       |      |      | Resource Totals 1/ |       |         |         |       |
|---|--|---------------|------|-------|------|-------|-------|------|------|-------|------|-------|-------|-------|-------|-------|-------|------|------|--------------------|-------|---------|---------|-------|
| S-01                                    |  | 2019          | 2020 | 2021  | 2022 | 2023  | 2024  | 2025 | 2026 | 2027  | 2028 | 2029  | 2030  | 2031  | 2032  | 2033  | 2034  | 2035 | 2036 | 2037               | 2038  | 10-year | 20-year |       |
| East                                    | Existing Plant Retirements and PPA Termination   | -             | -    | -     | -    | -     | -     | -    | (82) | -     | (82) | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (82)    | (82)    |       |
|   | Craig 1 (Coal Early Retirement/Conversions)      | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (82)    | (82)    |       |
|   | Craig 2 (Coal Early Retirement/Conversions)      | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | (44)  | -     | -     | -    | -    | -                  | -     | -       | (44)    |       |
|   | Hayden 1   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | (33)  | -     | -     | -    | -    | -                  | -     | -       | (33)    |       |
|   | Hayden 2   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | (459)   |       |
|   | Huntington 1                                     | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | (459) | -       | (459)   |       |
|   | Huntington 2                                     | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | (450) | -       | (450)   |       |
|   | Colstrip 3 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (74)  | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | (74)    | (74)  |
|   | Colstrip 4 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (74)  | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | (74)    | (74)  |
|   | Cholla 4 (Coal Early Retirement/Conversions)     | -             | -    | (387) | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (387)   | (387)   |       |
|   | DaveJohnston 1                                   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (99)  | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (99)    | (99)    |       |
|   | DaveJohnston 2                                   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (106) | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (106)   | (106)   |       |
|   | DaveJohnston 3                                   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (220) | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (220)   | (220)   |       |
|   | DaveJohnston 4                                   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (330) | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (330)   | (330)   |       |
|   | Naughton 1 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -     | -     | -    | -    | (156) | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (156)   | (156)   |       |
|   | Naughton 2 (Coal Early Retirement/Conversions)   | -             | -    | -     | -    | -     | -     | -    | -    | (201) | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (201)   | (201)   |       |
|   | Naughton 3 (Coal Early Retirement/Conversions)   | -             | -    | (280) | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (280)   | (280)   |       |
|   | Gadsby 1-6                                       | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | (356) | -    | -    | -                  | -     | -       | (356)   |       |
|   | Retire - Hydro                                   | -             | -    | -     | -    | -     | -     | (20) | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (20)    | (20)    |       |
|   | Retire - Wind                                    | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | (40)  | -     | -     | -     | -    | -    | -                  | -     | -       | (40)    |       |
|   | Expire - Wind PPA                                | -             | (27) | (17)  | (49) | (0)   | -     | -    | -    | (65)  | (3)  | -     | (19)  | (99)  | (200) | (45)  | (181) | (80) | -    | (60)               | (80)  | -       | (160)   | (924) |
|   | Expire - Solar PPA                               | -             | -    | -     | -    | -     | (1)   | (1)  | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | (35) | (94)               | (849) | -       | (1)     | (979) |
|   | Retire - Other                                   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | (1)  | -    | -                  | -     | (32)    | -       | (33)  |
|   | Coal Ret. W.Y. - Gas RePower                     | -             | 247  | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | (247) | -     | -     | -     | -    | -    | -                  | -     | -       | 247     | -     |
|   | Expansion Resources                              |               | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | -       | -     |
|   | CCCT - Dillons - 11st                            | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | 505   | -       | -       | 505   |
|   | Total CCCT                                       | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | 505   | -       | -       | 505   |
|   | SCCT Frame NTN                                   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | 555   | -     | -     | -     | -    | -    | -                  | -     | -       | -       | 555   |
|   | SCCT Frame WYSW                                  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | 370   | -       | -       | 370   |
|   | Total SCCT                                       | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | 555   | -     | -     | -     | -    | -    | -                  | 370   | -       | -       | 925   |
|   | Wind, CO   | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | 1,100 | -     | -     | -     | -    | -    | -                  | -     | -       | -       | 1,100 |
|   | Wind, UT   | -             | -    | -     | -    | 70    | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | 70      | 70    |
| Wind, WYAE                              | -  | -             | -    | -     | -    | 1,920 | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | 1,920   | 1,920   |       |
| Total Wind                              | -  | -             | -    | -     | 70   | 1,920 | -     | -    | -    | -     | -    | -     | 1,100 | -     | -     | -     | -     | -    | -    | -                  | -     | 1,990   | 3,090   |       |
| Utility Solar+Storage - PV - Utah-S     | -  | -             | -    | -     | -    | 230   | -     | -    | -    | -     | -    | -     | -     | -     | 500   | -     | -     | -    | -    | -                  | -     | 230     | 730     |       |
| Utility Solar+Storage - PV - WYSW       | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | 100   | -     | -    | -    | -                  | -     | -       | 100     |       |
| Utility Solar+Storage - PV - Huntington | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | 899                | 10    | -       | 909     |       |
| Utility Solar+Storage - PV- Utah-N      | -  | -             | 155  | 62    | -    | 683   | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | 900   | -       | 900     |       |
| Total Solar                             | -  | -             | 155  | 62    | -    | 913   | -     | -    | -    | -     | -    | -     | -     | -     | 500   | 100   | -     | -    | -    | 899                | 10    | 1,130   | 2,639   |       |
| Demand Response, ID-Irrigate            | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | 5.2   | -    | -    | 3.7                | 1.8   | -       | 10.6    |       |
| Demand Response, UT-Cool/WH             | 4.1  | -             | 7.0  | -     | 9.9  | -     | -     | -    | 7.2  | -     | -    | 6.7   | -     | -     | 6.8   | -     | -     | 7.0  | -    | -                  | 7.2   | 28.1    | 55.9    |       |
| Demand Response, UT-Irrigate            | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | 1.9                | -     | -       | 1.9     |       |
| Demand Response, UT-Thermostat          | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | 100.7 | 24.1  | 8.3   | -    | -    | 5.1                | -     | -       | 138.3   |       |
| Demand Response, UT-Ancillary Services  | -  | -             | -    | -     | 8.3  | -     | 5.3   | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | 3.2                | -     | 13.5    | 16.7    |       |
| Demand Response, WY-Ancillary Services  | -  | -             | -    | -     | -    | -     | 3.0   | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | 3.0     | 3.0     |       |
| Demand Response Total                   | 4.1  | -             | 7.0  | -     | 18.1 | -     | 8.2   | 7.2  | -    | -     | 6.7  | -     | -     | -     | 6.8   | 100.7 | 29.3  | 15.3 | -    | 6.9                | 16.1  | 44.6    | 226.4   |       |
| Energy Efficiency, ID                   | 6  | 5             | 6    | 7     | 7    | 7     | 7     | 7    | 6    | 7     | 6    | 6     | 6     | 6     | 5     | 4     | 3     | 3    | 3    | 3                  | 64    | 111     |         |       |
| Energy Efficiency, UT                   | 58   | 61            | 60   | 60    | 69   | 66    | 65    | 63   | 59   | 59    | 54   | 56    | 50    | 48    | 49    | 36    | 32    | 26   | 22   | 23                 | 620   | 1,017   |         |       |
| Energy Efficiency, WY                   | 10   | 10            | 11   | 12    | 13   | 15    | 16    | 17   | 17   | 16    | 15   | 14    | 13    | 12    | 11    | 9     | 8     | 7    | 5    | 5                  | 137   | 237     |         |       |
| Energy Efficiency Total                 | 74   | 76            | 77   | 78    | 89   | 88    | 88    | 86   | 83   | 82    | 76   | 76    | 69    | 65    | 65    | 49    | 45    | 37   | 30   | 32                 | 821   | 1,365   |         |       |
| Battery Storage - WYSW                  | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | -       |       |
| Battery Storage - Idaho                 | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | 165.0              | -     | 165.0   |         |       |
| POT East - Summer                       | -  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | 126   | 258   | 13    | 300   | 296   | 300  | 300  | 300                | 300   | -       | 110     |       |
| West                                    | Existing Plant Retirements and PPA Termination   | -             | -    | -     | -    | -     | (351) | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (351)   | (351)   |       |
|   | JimBridger 1 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -     | (351) | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | (351)   | (351)   |       |
|   | JimBridger 2 (Coal Early Retirement/Conversions) | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (356) | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | (356)   |       |
|   | JimBridger 3                                     | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | (349) | -       | (349)   |       |
|   | JimBridger 4                                     | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | (353) | -       | (353)   |       |
|   | Hermiston  | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | (237) | -       | (237)   |       |
|   | Retire - Hydro                                   | -             | (1)  | (169) | -    | (1)   | -     | -    | -    | (1)   | -    | (7)   | -     | -     | (6)   | -     | -     | (75) | -    | (1)                | -     | (179)   | (262)   |       |
|   | Expire - Wind PPA                                | -             | -    | -     | -    | (175) | -     | (41) | -    | -     | -    | -     | (75)  | (10)  | -     | (20)  | (20)  | -    | -    | (10)               | -     | (216)   | (360)   |       |
|   | Expire - Solar PPA                               | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | (2)   | -     | -     | (67)  | (49)  | -     | -    | (1)  | (115)              | (175) | (11)    | (2)     | (420) |
|   | Expansion Resources                              |               | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | -     | -       | -       |       |
|   | SCCT Frame WV                                    | -             | -    | -     | -    | -     | -     | -    | -    | -     | -    | -     | -     | -     | -     | -     | -     | -    | -    | -                  | 221   | -       | 221     |       |
|   | Total SCCT                                       | -             | -    |       |      |       |       |      |      |       |      |       |       |       |       |       |       |      |      |                    |       |         |         |       |

| S-02 |  | Capacity (MW)    |      |       |      |      |      |       |       |      |      |       |      |       |       |      |       |      |      | Resource Totals 1/ |       |         |         |       |       |
|------|--|------------------|------|-------|------|------|------|-------|-------|------|------|-------|------|-------|-------|------|-------|------|------|--------------------|-------|---------|---------|-------|-------|
|      |  | 2019             | 2020 | 2021  | 2022 | 2023 | 2024 | 2025  | 2026  | 2027 | 2028 | 2029  | 2030 | 2031  | 2032  | 2033 | 2034  | 2035 | 2036 | 2037               | 2038  | 10-year | 20-year |       |       |
| East | Existing Plant Retirements and PPA Termination | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       |       |       |
|      | Crane 1 (Coal Early Retirement/Conversions)    | -                | -    | -     | -    | -    | -    | -     | -     | (82) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | (82)    | (82)  |       |
|      | Crane 2 (Coal Early Retirement/Conversions)    | -                | -    | -     | -    | -    | -    | -     | -     | -    | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | (82)    | (82)  |       |
|      | Hayden 1                                       | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | (44)  | -    | -     | -    | -    | -                  | -     | -       | -       | (44)  |       |
|      | Hayden 2                                       | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | (33)  | -    | -     | -    | -    | -                  | -     | -       | -       | (33)  |       |
|      | Huntington 1                                   | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | (459) | -       | -       | (459) |       |
|      | Huntington 2                                   | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | (450) | -       | -       | (450) |       |
|      | Colstrip 3 (Coal Early Retirement/Conversions) | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | (74)  |       |
|      | Colstrip 4 (Coal Early Retirement/Conversions) | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | (74)  |       |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | (387) | (387) |
|      | DaveJohnston 1                                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (99)  | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (99)  |
|      | DaveJohnston 2                                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (106) |
|      | DaveJohnston 3                                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (220) |
|      | DaveJohnston 4                                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (330) |
|      | Naughton 1 (Coal Early Retirement/Conversions) | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (156) | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (156) |
|      | Naughton 2 (Coal Early Retirement/Conversions) | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | (201) | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (201) |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -                | -    | (280) | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (280) |
|      | Gasby 1-6                                      | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | (356) | -    | -    | -                  | -     | -       | -       | -     | (356) |
|      | Retire - Hydro                                 | -                | -    | -     | -    | -    | -    | (20)  | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (20)  |
|      | Retire - Wind                                  | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | (40)  | -    | -     | -    | -    | -                  | -     | -       | -       | -     | (40)  |
|      | Expire - Wind PPA                              | -                | -    | (27)  | (17) | (49) | (0)  | -     | -     | (65) | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60)               | (80)  | -       | -       | -     | (160) |
|      | Expire - Solar PPA                             | -                | -    | -     | -    | -    | (1)  | (1)   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | (35) | (94)               | (849) | -       | -       | -     | (1)   |
|      | Retire - Other                                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | (1)  | -    | -                  | -     | -       | (32)    | -     | -     |
|      | Coal Ret. WY - Gas RePower                     | -                | -    | 247   | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | (247) | -    | -     | -    | -    | -                  | -     | -       | -       | -     | -     |
|      | Expansion Resources                            |                  | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | -     |
|      |  | SCCT Frame DJ    | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | 389  | -     | -     | -    | -     | 195  | -    | -                  | -     | -       | -       | -     | 584   |
|      |  | SCCT Frame NTN   | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | 370   | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | 185   |
|      |  | SCCT Frame WYSW  | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | 370   | -    | -     | -    | -    | -                  | -     | -       | -       | -     | 370   |
|      |  | Total SCCT       | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | 389  | -     | 370   | -    | -     | 195  | -    | -                  | -     | -       | -       | -     | -     |
|      |  | Wind, GO         | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | 1,096 | -    | -     | -    | -    | -                  | -     | -       | -       | -     | -     |
|      |  | Wind, UT         | -    | -     | -    | -    | -    | 75    | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | 75    |
|      |  | Wind, WYAE       | -    | -     | -    | -    | -    | -     | 1,920 | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     | 1,920 |
|      |  | Wind+Storage, GO | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | 4    | -     | -    | -    | -                  | -     | -       | -       | -     | 4     |
|      | Total Wind                                     | -                | -    | -     | -    | -    | 75   | 1,920 | -     | -    | -    | -     | -    | 1,096 | 4     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Utility Solar+Storage - PV - Utah-S            | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | 500   | -     | -    | -     | -    | -    | -                  | -     | -       | -       | 225   |       |
|      | Utility Solar+Storage - PV - WYSW              | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | 100   |       |
|      | Utility Solar+Storage - PV - Huntington        | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | 909   |       |
|      | Utility Solar+Storage - PV - Utah-N            | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | 900   |       |
|      | Total Solar                                    | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, ID-Cool/WH                    | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, ID-3rd Party Contracts        | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, ID-Irrigate                   | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, ID-Thermostat                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, UT-Cool/WH                    | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, UT-3rd Party Contracts        | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, UT-Irrigate                   | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, UT-Thermostat                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, WY-Cool/WH                    | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, WY-3rd Party Contracts        | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, WY-Irrigate                   | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, WY-Thermostat                 | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, UT-Ancillary Services         | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response, WY-Ancillary Services         | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Demand Response Total                          | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Energy Efficiency, ID                          | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Energy Efficiency, UT                          | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Energy Efficiency, WY                          | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Energy Efficiency Total                        | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Battery Storage - Utah-S                       | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Battery Storage - WYSW                         | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -                  | -     | -       | -       | -     |       |
|      | Battery Storage - Idaho                        | -                | -    | -     | -    | -    | -    | -     | -     | -    | -    | -     |      |       |       |      |       |      |      |                    |       |         |         |       |       |



1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

|                        |       |       |       |     |       |       |     |     |     |       |       |       |       |       |       |       |       |       |       |       |
|------------------------|-------|-------|-------|-----|-------|-------|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Total Annual Additions | 1,277 | 1,016 | 1,038 | 990 | 1,030 | 4,463 | 372 | 528 | 642 | 1,903 | 2,375 | 3,493 | 1,851 | 2,443 | 1,810 | 1,426 | 1,503 | 1,793 | 3,567 | 2,736 |
|------------------------|-------|-------|-------|-----|-------|-------|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

|      |  | Capacity (MW) |      |       |       |      |      |       |      |       |      |       |       |       |       |      |       |      |      |      |       | Resource Totals 1/ |         |       |
|------|--|---------------|------|-------|-------|------|------|-------|------|-------|------|-------|-------|-------|-------|------|-------|------|------|------|-------|--------------------|---------|-------|
| S-05 |  | 2019          | 2020 | 2021  | 2022  | 2023 | 2024 | 2025  | 2026 | 2027  | 2028 | 2029  | 2030  | 2031  | 2032  | 2033 | 2034  | 2035 | 2036 | 2037 | 2038  | 10-year            | 20-year |       |
| East | Existing Plant Retirements and PPA Termination | -             | -    | -     | -     | -    | -    | -     | -    | (82)  | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | (82)               | (82)    |       |
|      | Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | (82)               | (82)    |       |
|      | Craig 2 (Coal Early Retirement/Conversions)    | -             | -    | -     | -     | -    | -    | -     | -    | -     | (82) | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | (82)               | (82)    |       |
|      | Hayden 1                                       | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | (44)  | -     | -    | -     | -    | -    | -    | -     | -                  | (44)    |       |
|      | Hayden 2                                       | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | (33)  | -     | -    | -     | -    | -    | -    | -     | -                  | (33)    |       |
|      | Huntington 1                                   | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | (459) | -                  | (459)   |       |
|      | Huntington 2                                   | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | (450) | -                  | (450)   |       |
|      | Colstrip 3 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    | (74)  |
|      | Colstrip 4 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | (74)  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    | (74)  |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -     | (387) | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (387)   | (387) |
|      | DaveJohnston 1                                 | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | (99)  | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (99)    | (99)  |
|      | DaveJohnston 2                                 | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | (106) | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (106)   | (106) |
|      | DaveJohnston 3                                 | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | (230) | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (230)   | (230) |
|      | DaveJohnston 4                                 | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | (330) | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (330)   | (330) |
|      | Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -    | (156) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (156)   | (156) |
|      | Naughton 2 (Coal Early Retirement/Conversions) | -             | -    | -     | -     | -    | -    | -     | -    | (201) | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (201)   | (201) |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | (280) | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (280)   | (280) |
|      | Gadsby 1-6                                     | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | (356) | -    | -    | -    | -     | -                  | -       | (356) |
|      | Retire - Hydro                                 | -             | -    | -     | -     | -    | -    | (20)  | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (20)    | (20)  |
|      | Retire - Wind                                  | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | (40)  | -     | -    | -     | -    | -    | -    | -     | -                  | -       | (40)  |
|      | Expire - Wind PPA                              | -             | -    | (27)  | (17)  | (49) | (0)  | -     | -    | (65)  | (3)  | -     | (19)  | (99)  | (200) | (45) | (181) | (80) | -    | (60) | (80)  | -                  | (160)   | (924) |
|      | Expire - Solar PPA                             | -             | -    | -     | -     | -    | (1)  | (1)   | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | (35) | (94) | (849) | -                  | (1)     | (979) |
|      | Retire - Other                                 | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | (1)  | -    | -    | -     | (32)               | -       | (33)  |
|      | Coal Ret. WY - Gas RePower                     | -             | -    | 247   | -     | -    | -    | -     | -    | -     | -    | -     | -     | (247) | -     | -    | -     | -    | -    | -    | -     | -                  | 247     | -     |
|      | Expansion Resources                            |               |      |       |       |      |      |       |      |       |      |       |       |       |       |      |       |      |      |      |       |                    |         |       |
|      | CCCT - Dlohus - J 1x1                          | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | 505   | -                  | -       | 505   |
|      | Total CCCT                                     | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | 505   | -                  | -       | 505   |
|      | SCCT Frame NTN                                 | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | 555   | -     | -    | -     | -    | -    | -    | -     | -                  | 555     | 555   |
|      | SCCT Frame WYSW                                | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | 370   | -                  | -       | 370   |
|      | Total SCCT                                     | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | 555   | -     | -    | -     | -    | -    | -    | -     | 370                | -       | 925   |
|      | Wind, GO                                       | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | 994   | -     | -    | -     | -    | -    | -    | -     | -                  | -       | 994   |
|      | Wind, WYAE                                     | -             | -    | -     | -     | -    | -    | 1,920 | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 1,920   | 1,920 |
|      | Wind+Storage, GO                               | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | 30    | -     | 76    | -    | -     | -    | -    | -    | -     | -                  | -       | 106   |
|      | Total Wind                                     | -             | -    | -     | -     | -    | -    | 1,920 | -    | -     | -    | -     | 1,024 | -     | 76    | -    | -     | -    | -    | -    | -     | -                  | -       | 3,020 |
|      | Utility Solar+Storage - PV - Utah-S            | -             | -    | -     | -     | -    | -    | 300   | -    | -     | -    | -     | -     | 500   | -     | -    | -     | -    | -    | -    | -     | -                  | 300     | 800   |
|      | Utility Solar+Storage - PV - WYSW              | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | 100   | -    | -    | -    | -     | -                  | 100     |       |
|      | Utility Solar+Storage - PV - Huntington        | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | 904   | 5                  | 909     |       |
|      | Utility Solar+Storage - PV - Utah-N            | -             | -    | -     | 159   | 64   | 73   | 604   | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 900     | 900   |
|      | Total Solar                                    | -             | -    | -     | 159   | 64   | 73   | 904   | -    | -     | -    | -     | -     | 500   | -     | -    | 100   | -    | -    | -    | 904   | 5                  | 1,200   | 2,709 |
|      | Demand Response, ID-3rd Party Contracts        | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 1.8                | -       | 1.8   |
|      | Demand Response, ID-Irrigate                   | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | 5.2  | -     | -    | -    | -    | 3.7   | 1.8                | -       | 10.6  |
|      | Demand Response, UT-Cool/WH                    | 4.1           | -    | 7.0   | -     | 9.9  | -    | -     | -    | 7.2   | -    | -     | 6.7   | -     | 6.8   | -    | -     | 7.0  | -    | -    | -     | 7.2                | 28.1    | 55.9  |
|      | Demand Response, UT-3rd Party Contracts        | -             | -    | -     | -     | -    | -    | -     | -    | -     | -    | -     | -     | -     | -     | -    | -     | -    | -    | -    | -     | 48.4</             |         |       |

|      |  | Capacity (MW) |      |      |      |      |      |       |       |      |      |       |      |       |       |      |       |      |      |      |       | Resource Totals 1/ |         |       |
|------|--|---------------|------|------|------|------|------|-------|-------|------|------|-------|------|-------|-------|------|-------|------|------|------|-------|--------------------|---------|-------|
| S-06 |  | 2019          | 2020 | 2021 | 2022 | 2023 | 2024 | 2025  | 2026  | 2027 | 2028 | 2029  | 2030 | 2031  | 2032  | 2033 | 2034  | 2035 | 2036 | 2037 | 2038  | 10-year            | 20-year |       |
| East | Existing Plant Retirements and PPA Termination | -             | -    | -    | -    | -    | -    | -     | -     | (82) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | (82)               | (82)    |       |
|      | Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -    | -    | -    | -    | -     | -     | -    | (82) | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | (82)               | (82)    |       |
|      | Craig 2 (Coal Early Retirement/Conversions)    | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | (44)  | -    | -     | -    | -    | -    | -     | -                  | (44)    |       |
|      | Hayden 1                                       | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (33)    |       |
|      | Hayden 2                                       | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | (33)  | -    | -     | -    | -    | -    | -     | -                  | (33)    |       |
|      | Huntington 1                                   | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | (459) | -                  | (459)   |       |
|      | Huntington 2                                   | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | (450) | -                  | (450)   |       |
|      | Colstrip 3 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    |       |
|      | Colstrip 4 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (74)    |       |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -    | -    | -    | -    | -     | (387) | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (387)   |       |
|      | DaveJohnston 1                                 | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (99)  | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (99)    |       |
|      | DaveJohnston 2                                 | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (106)   |       |
|      | DaveJohnston 3                                 | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (220)   |       |
|      | DaveJohnston 4                                 | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (330)   |       |
|      | Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (156) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (156)   |       |
|      | Naughton 2 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | (201) | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (201)   |       |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (280)   |       |
|      | Gadsby 1-6                                     | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | (356) | -    | -    | -    | -     | -                  | (280)   |       |
|      | Retire - Hydro                                 | -             | -    | -    | -    | -    | -    | -     | (20)  | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (20)    | (20)  |
|      | Retire - Wind                                  | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | (40)    |       |
|      | Expire - Wind PPA                              | -             | -    | (27) | (17) | (49) | (0)  | -     | -     | (65) | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60) | (80)  | -                  | (160)   | (924) |
|      | Expire - Solar PPA                             | -             | -    | -    | -    | -    | (1)  | (1)   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | (35) | (94) | (849) | -                  | (1)     | (979) |
|      | Retire - Other                                 | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | (1)  | -    | -     | (32)               | -       | (33)  |
|      | Expansion Resources                            |               |      |      |      |      |      |       |       |      |      |       |      |       |       |      |       |      |      |      |       |                    |         |       |
|      | CCCT - Dlohus - J 1x1                          | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 505   | -                  | 505     |       |
|      | Total CCCT                                     | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 505   | -                  | 505     |       |
|      | SCCT Frame NTN                                 | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | 185   | 370  | -     | -     | -    | -     | -    | -    | -    | -     | 185                | 555     |       |
|      | SCCT Frame WYSW                                | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 370   | -                  | 370     |       |
|      | Total SCCT                                     | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | 185   | 370  | -     | -     | -    | -     | -    | -    | -    | 370   | -                  | 185     | 925   |
|      | Wind, GO                                       | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | 1,100 | -     | -    | -     | -    | -    | -    | -     | -                  | 1,100   |       |
|      | Wind, WYAE                                     | -             | -    | -    | -    | -    | -    | 1,920 | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | -                  | 1,920   |       |
|      | Total Wind                                     | -             | -    | -    | -    | -    | -    | 1,920 | -     | -    | -    | -     | -    | 1,100 | -     | -    | -     | -    | -    | -    | -     | -                  | 1,920   |       |
|      | Utility Solar+Storage - PV - Utah-S            | -             | -    | -    | -    | -    | -    | 300   | -     | -    | -    | -     | -    | -     | 500   | -    | -     | -    | -    | -    | -     | -                  | 300     |       |
|      | Utility Solar+Storage - PV - WYSW              | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | 100   | -    | -    | -    | -     | -                  | 100     |       |
|      | Utility Solar+Storage - PV - Huntington        | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 909   | -                  | 909     |       |
|      | Utility Solar+Storage - PV - Utah-N            | -             | -    | -    | 159  | 64   | 73   | 604   | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 900                | 900     |       |
|      | Total Solar                                    | -             | -    | -    | 159  | 64   | 73   | 904   | -     | -    | -    | -     | -    | -     | 500   | -    | 100   | -    | -    | -    | 909   | -                  | 1,200   |       |
|      | Demand Response, ID-Cool/WH                    | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 2.6                | 2.6     |       |
|      | Demand Response, ID-3rd Party Contracts        | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | 1.8   | -                  | 1.8     |       |
|      | Demand Response, ID-Irrigate                   | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | 5.2  | -     | -    | -    | 3.7  | -     | 1.8                | 10.6    |       |
|      | Demand Response, UT-Cool/WH                    | 4.1           | -    | -    | 7.0  | -    | 9.9  | -     | -     | -    | 7.2  | -     | 6.7  | -     | -     | -    | 6.8   | -    | 7.0  | -    | -     | 7.2                | 28.1    |       |
|      | Demand Response, UT-3rd Party Contracts        | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    | -    | -     | 76.7               | 76.7    |       |
|      | Demand Response, UT-Irrigate                   | -             | -    | -    | -    | -    | -    | -     | -     | -    | -    | -     | -    | -     | -     | -    | -     | -    | -    |      |       |                    |         |       |

|      |   | Capacity (MW) |       |       |      |      |      |       |      |       |      |       |      |       |       |      |       |      |      |       |       | Resource Totals 1/ |         |       |       |
|------|---|---------------|-------|-------|------|------|------|-------|------|-------|------|-------|------|-------|-------|------|-------|------|------|-------|-------|--------------------|---------|-------|-------|
| S-07 |   | 2019          | 2020  | 2021  | 2022 | 2023 | 2024 | 2025  | 2026 | 2027  | 2028 | 2029  | 2030 | 2031  | 2032  | 2033 | 2034  | 2035 | 2036 | 2037  | 2038  | 10-year            | 20-year |       |       |
| East | Existing Plant Retirements and PPA Termination  |               |       |       |      |      |      |       |      |       |      |       |      |       |       |      |       |      |      |       |       |                    |         |       |       |
|      | Craig 1 (Coal Early Retirement/Conversions)     | -             | -     | -     | -    | -    | -    | -     | (82) | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | (82)               | (82)    |       |       |
|      | Craig 2 (Coal Early Retirement/Conversions)     | -             | -     | -     | -    | -    | -    | -     | -    | (82)  | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | (82)               | (82)    |       |       |
|      | Hayden 1  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | (44)  | -     | -    | -     | -    | -    | -     | -     | (44)               | (44)    |       |       |
|      | Hayden 2  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | (33)  | -     | -    | -     | -    | -    | -     | -     | (33)               | (33)    |       |       |
|      | Huntington 1                                    | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | (459) | -     | -                  | (459)   |       |       |
|      | Huntington 2                                    | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | (450) | -     | -                  | (450)   |       |       |
|      | Colestrip 3 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -     | -     | (74)               | (74)    |       |       |
|      | Colestrip 4 (Coal Early Retirement/Conversions) | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | (74)  | -    | -     | -     | -    | -     | -    | -    | -     | -     | (74)               | (74)    |       |       |
|      | Cholla 4 (Coal Early Retirement/Conversions)    | -             | -     | (387) | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | (387)              | (387)   |       |       |
|      | DaveJohnston 1                                  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | (99)               | (99)    |       |       |
|      | DaveJohnston 2                                  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | (106) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (106)   | (106) |       |
|      | DaveJohnston 3                                  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | (220) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (220)   | (220) |       |
|      | DaveJohnston 4                                  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | (330) | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (330)   | (330) |       |
|      | Naughton 1 (Coal Early Retirement/Conversions)  | -             | -     | -     | -    | -    | -    | -     | -    | (156) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (156)   | (156) |       |
|      | Naughton 2 (Coal Early Retirement/Conversions)  | -             | -     | -     | -    | -    | -    | -     | -    | (201) | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (201)   | (201) |       |
|      | Naughton 3 (Coal Early Retirement/Conversions)  | -             | (280) | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (280)   | (280) |       |
|      | Gadsby 1-6                                      | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | (356) | -    | -    | -     | -     | -                  | (356)   | (356) |       |
|      | Retire - Hydro                                  | -             | -     | -     | -    | -    | (20) | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | (20)    | (20)  |       |
|      | Retire - Wind                                   | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | (40)  | -     | -    | -     | -    | -    | -     | -     | -                  | -       | (40)  |       |
|      | Equire - Wind PPA                               | -             | (27)  | (17)  | (49) | (0)  | -    | -     | -    | (65)  | (3)  | -     | (19) | (99)  | (200) | (45) | (181) | (80) | -    | (60)  | (80)  | -                  | (160)   | (924) |       |
|      | Equire - Solar PPA                              | -             | -     | -     | -    | -    | (1)  | (1)   | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | (35) | (94)  | (849) | -                  | (1)     | (979) |       |
|      | Retire - Other                                  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | (1)  | -     | -     | (32)               | -       | (33)  |       |
|      | Coal Ret. WY, Gas RePower                       | -             | 247   | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | (247) | -     | -    | -     | -    | -    | -     | -     | -                  | 247     | -     |       |
|      | Expansion Resources                             |               |       |       |      |      |      |       |      |       |      |       |      |       |       |      |       |      |      |       |       |                    |         |       |       |
|      | CCCT - Dlohnns - J 1st                          | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 505   | -                  | -       | 505   |       |
|      | Total CCCT                                      | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 505   | -                  | -       | 505   |       |
|      | SCCT Frame NTN                                  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | 555   | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 555   |       |
|      | SCCT Frame WYSW                                 | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 370   | -                  | -       | 370   |       |
|      | Total SCCT                                      | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | 555   | -     | -    | -     | -    | -    | -     | -     | 370                | -       | -     | 925   |
|      | Wind, GO  | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | 947   | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 947   |       |
|      | Wind, WYAE                                      | -             | -     | -     | -    | -    | -    | 1,920 | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 1,920   | 1,920 |       |
|      | Wind-Storage, GO                                | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | 66    | -     | 83   | -     | -    | -    | -     | -     | -                  | -       | 149   |       |
|      | Total Wind                                      | -             | -     | -     | -    | -    | -    | 1,920 | -    | -     | -    | -     | -    | 1,013 | -     | 83   | -     | -    | -    | -     | -     | -                  | 1,920   | 3,016 |       |
|      | Utility Solar+Storage - PV - Utah-S             | -             | -     | -     | -    | -    | -    | 300   | -    | -     | -    | -     | -    | 500   | -     | -    | -     | -    | -    | -     | -     | -                  | 300     | 800   |       |
|      | Utility Solar+Storage - PV - GO                 | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | 4     | -     | -    | -     | -    | -    | -     | -     | -                  | -       | 4     |       |
|      | Utility Solar+Storage - PV - Huntington         | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | 909   | -                  | -       | 909   |       |
|      | Utility Solar+Storage - PV - Utah-N             | -             | -     | -     | -    | -    | -    | 900   | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | -                  | 900     | 900   |       |
|      | Total Solar                                     | -             | -     | -     | -    | -    | -    | 1,200 | -    | -     | -    | -     | -    | -     | 504   | -    | -     | -    | -    | -     | -     | 909                | -       | 1,200 | 2,613 |
|      | Demand Response, ID-Cool/WH                     | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 2.6                | -       | 2.6   |       |
|      | Demand Response, ID-3rd Party Contracts         | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 1.8                | -       | 1.8   |       |
|      | Demand Response, ID-Irrigate                    | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | 3.7   | -     | -                  | 10.6    |       |       |
|      | Demand Response, UT-Cool/WH                     | 4.1           | -     | -     | 7.0  | -    | 9.9  | -     | -    | 7.2   | -    | -     | -    | 6.7   | -     | 6.8  | -     | -    | 7.0  | -     | -     | 7.2                | 28.1    | 55.9  |       |
|      | Demand Response, UT-3rd Party Contracts         | -             | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -    | -     | -     | -    | -     | -    | -    | -     | -     | 76.7               | -       | 76.7  |       |
|      | Demand Response, UT-Irrigate                    | -             | -     | -     | -    | -    | -    | -     | -    | -     |      |       |      |       |       |      |       |      |      |       |       |                    |         |       |       |

1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

|      | P-45DP   | Capacity (MW) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Resource Totals 1/ |         |         |       |       |
|------|--|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------------|---------|---------|-------|-------|
|      |  | 2019          | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038               | 10-year | 20-year |       |       |
| East | Existing Plant Retirements and PPA Termination | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                  | -       | (82)    | (82)  |       |
|      | Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -    | -    | -    | -    | -    | -    | -    | (82) | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                  | -       | (82)    | (82)  |       |
|      | Craig 2 (Coal Early Retirement/Conversions)    | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                  | -       | -       | (44)  | (44)  |
|      | Hayden 1                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | (44) | -    | -    | -    | -    | -    | -                  | -       | -       | (33)  | (33)  |
|      | Hayden 2                                       | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | (33) | -    | -    | -    | -    | -    | -                  | -       | -       | (459) | (459) |
|      | Huntington 1                                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | (450)              | -       | -       | (450) | (450) |
|      | Huntington 2                                   | -             | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -                  | -       | -       | (74)  | (74)  |
|      | Culstrip 3 (Coal Early Retirement/Conversions) | -             | -    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |         |       |       |

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236 1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.



1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average

Table K.21 – P70 Cases, Detailed Capacity Expansion Portfolio

|                     |  | P-70 | Capacity (MW) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Resource Totals 1/ |         |  |
|---------------------|--|------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------------|---------|--|
|                     |  |      | 2019          | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 10-year            | 20-year |  |
| East                | Existing Plant Retirements and PPA Termination |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Crnig 1 (Coal Early Retirement/Conversions)    |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (82)   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Crnig 2  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (82)   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Hayden 1                                       |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (44)   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Hayden 2                                       |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (33)   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Huntington 1                                   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (459)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Huntington 2                                   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (450)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Cholla 4 (Coal Early Retirement/Conversions)   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (387)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | DaveJohnston 1                                 |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (99)   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | DaveJohnston 2                                 |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (106)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | DaveJohnston 3                                 |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (220)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | DaveJohnston 4                                 |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (330)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Naughton 1                                     |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (156)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Naughton 2                                     |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (201)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Naughton 3 (Coal Early Retirement/Conversions) |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (280)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Cadeby 1-6                                     |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (356)  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | Retire - Hydro                                 |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     | (20)   |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| Retire - Wind       |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (40)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| Equire - Wind PPA   |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (27)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (17)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (49)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (0)                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (1)                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (65)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (3)                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (19)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (99)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (200)               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (45)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (181)               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (80)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (35)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (94)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (849)               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (160)               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (979)               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| Retire - Other      |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (32)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| (33)                |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| Expansion Resources |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| SCCT Frame NTN      |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 185                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 370                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 370                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 370                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 925                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| Wind, Dohnston      |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 119                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 501                 |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,083               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
| 1,920               |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |
|                     |  |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                    |         |  |

|      |  | Capacity (MW) |      |      |       |      |       |       |      |      |      |       |      |       |      |       |       |       |      |      |       | Resource Totals 1/ |         |       |       |
|------|--|---------------|------|------|-------|------|-------|-------|------|------|------|-------|------|-------|------|-------|-------|-------|------|------|-------|--------------------|---------|-------|-------|
| P-71 |  | 2019          | 2020 | 2021 | 2022  | 2023 | 2024  | 2025  | 2026 | 2027 | 2028 | 2029  | 2030 | 2031  | 2032 | 2033  | 2034  | 2035  | 2036 | 2037 | 2038  | 10-year            | 20-year |       |       |
| East | Existing Plant Retirements and PPA Termination | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | (82)               | (82)    |       |       |
|      | Craig 1 (Coal Early Retirement/Conversions)    | -             | -    | -    | -     | -    | -     | -     | -    | (82) | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (82)    | (82)  |       |
|      | Craig 2  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | (82)  | -    | -    | -     | -                  | (82)    | (82)  |       |
|      | Hayden 1                                       | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | (44) | -     | -     | -     | -    | -    | -     | -                  | (44)    | (44)  |       |
|      | Hayden 2                                       | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | (33) | -     | -     | -     | -    | -    | -     | -                  | (33)    | (33)  |       |
|      | Huntington 1                                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | (459) | -                  | (459)   | (459) |       |
|      | Huntington 2                                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | (450) | -                  | (450)   | (450) |       |
|      | Cholla 4 (Coal Early Retirement/Conversions)   | -             | -    | -    | (387) | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (387)   | (387) |       |
|      | DaveJohnston 1                                 | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | (99)  | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (99)    | (99)  |       |
|      | DaveJohnston 2                                 | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | (106) | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (106)   | (106) |       |
|      | DaveJohnston 3                                 | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | (220) | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (220)   | (220) |       |
|      | DaveJohnston 4                                 | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | (330) | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (330)   | (330) |       |
|      | Naughton 1 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | (156) | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (156)   | (156) |       |
|      | Naughton 2                                     | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | (201) | -    | -     | -     | -     | -    | -    | -     | -                  | (201)   | (201) |       |
|      | Naughton 3 (Coal Early Retirement/Conversions) | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (280)   | (280) |       |
|      | Cadby 1-6                                      | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | (356) | -     | -    | -    | -     | -                  | (280)   | (280) |       |
|      | Retire - Hydro                                 | -             | -    | -    | -     | -    | -     | (20)  | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | (20)    | (20)  |       |
|      | Retire - Wind                                  | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | (40) | -     | -     | -     | -    | -    | -     | -                  | (20)    | (40)  |       |
|      | Expire - Wind PPA                              | -             | -    | (27) | (17)  | (49) | (0)   | -     | -    | -    | (65) | (3)   | -    | (19)  | (99) | (200) | (45)  | (181) | (80) | -    | (60)  | (80)               | -       | (160) | (924) |
|      | Expire - Solar PPA                             | -             | -    | -    | -     | -    | (1)   | (1)   | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | (35) | (94) | (849) | -                  | (1)     | (979) |       |
|      | Retire - Other                                 | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | (1)   | -    | (94) | -     | (32)               | -       | (33)  | (33)  |
|      | Expansion Resources                            |               | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | -       | -     | -     |
|      | SCCT Frame NTN                                 | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | 185   | -     | -    | -    | -     | -                  | -       | 185   |       |
|      | SCCT Frame WYSW                                | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | 370   | -                  | -       | 370   |       |
|      | Total SCCT                                     | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | 185   | -     | -    | -    | -     | 370                | -       | 555   |       |
|      | Wind, DJohnston                                | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | 620  | -     | -    | -     | -     | -     | -    | -    | -     | -                  | -       | 620   |       |
|      | Wind, GO                                       | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | 1,077 | 23   | -     | -     | -     | -    | -    | -     | -                  | -       | 1,100 |       |
|      | Wind, WYAE                                     | -             | -    | -    | -     | -    | -     | 1,920 | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | -       | 1,920 |       |
|      | Total Wind                                     | -             | -    | -    | -     | -    | -     | 1,920 | -    | -    | -    | -     | 620  | 1,077 | 23   | -     | -     | -     | -    | -    | -     | -                  | -       | 1,920 |       |
|      | Utility Solar - PV - Utah-S                    | -             | -    | -    | 146   | 59   | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | 400  | -     | -                  | -       | 205   |       |
|      | Utility Solar - PV - WYSW                      | -             | -    | -    | -     | -    | -     | 100   | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | -       | 100   |       |
|      | Utility Solar/Storage - PV - Utah-S            | -             | -    | -    | -     | -    | -     | 95    | -    | -    | -    | -     | -    | -     | -    | 500   | -     | -     | -    | -    | -     | -                  | -       | 95    |       |
|      | Utility Solar - PV - Naughton                  | -             | -    | -    | -     | -    | 156   | 156   | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | -                  | -       | 312   |       |
|      | Utility Solar/Storage - PV - Huntington        | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | -     | 909                | -       | 909   |       |
|      | Utility Solar - PV - Utah-N                    | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | 862  | -     | -     | -     | -    | -    | -     | -                  | -       | 862   |       |
|      | Utility Solar/Storage - PV - Utah-N            | -             | -    | -    | -     | -    | -     | 38    | -    | -    | -    | -     | -    | -     | 862  | -     | -     | -     | -    | -    | -     | -                  | -       | 38    |       |
|      | Total Solar                                    | -             | -    | -    | 146   | 59   | 156   | 389   | -    | -    | -    | -     | -    | -     | 862  | -     | 500   | -     | -    | 400  | -     | 909                | 750     | 3,421 |       |
|      | Demand Response, ID-Cool/WH                    | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | 2.6   | -                  | -       | 2.6   |       |
|      | Demand Response, ID-3rd Party Contracts        | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | 1.8   | -                  | -       | 1.8   |       |
|      | Demand Response, ID-Irrigate                   | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | 5.2   | -    | -    | 3.7   | 1.8                | -       | 10.6  |       |
|      | Demand Response, ID-Thermostat                 | -             | -    | -    | -     | -    | -     | -     | -    | -    | -    | -     | -    | -     | -    | -     | -     | -     | -    | -    | 8.3</ |                    |         |       |       |

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1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.



242 1/ Front office transaction amounts reflect one-year transaction periods, are not additive, and are reported as a 10/20-year annual average.

## APPENDIX L – STOCHASTIC SIMULATION RESULTS

### Introduction

This appendix reports additional results for the Monte Carlo production cost simulations conducted with the Planning and Risk (PaR) model for the core, sensitivity and final screening cases. These results supplement the data presented in Volume I, Chapter 8 (Modeling and Portfolio Selection Results) of the IRP document. The results presented include the following:

- Statistics of the stochastic simulation results
- Components of portfolios' present value revenue requirements (PVRR)
- Energy-not-served
- Customer rate impact of portfolios in the final screen as compared with the preferred portfolio
- Loss of Load Probability of portfolios in the final screen as compared with the preferred portfolio

There are thirty Initial Development cases, ten C cases, eight CP cases, six FOT Risk Assessment cases, six Gateway and No Gas cases, eight Sensitivity cases, three Rebundled DSM cases, and five P-70 cases.

**Table L.1 – Stochastic Mean PVRR, Initial Development Cases**

| Med Gas, Med CO <sub>2</sub> |            |            |            |            |            |
|------------------------------|------------|------------|------------|------------|------------|
| Name                         | PVRR (\$m) | Name       | PVRR (\$m) | Name       | PVRR (\$m) |
| <b>P01</b>                   | 24,106     | <b>P12</b> | 23,678     | <b>P30</b> | 23,733     |
| <b>P02</b>                   | 24,919     | <b>P13</b> | 24,016     | <b>P31</b> | 23,484     |
| <b>P03</b>                   | 23,822     | <b>P14</b> | 23,786     | <b>P32</b> | 23,750     |
| <b>P04</b>                   | 23,775     | <b>P15</b> | 24,285     | <b>P33</b> | 23,809     |
| <b>P06</b>                   | 23,932     | <b>P16</b> | 23,889     | <b>P34</b> | 23,938     |
| <b>P07</b>                   | 23,819     | <b>P17</b> | 24,182     | <b>P35</b> | 23,666     |
| <b>P08</b>                   | 23,875     | <b>P18</b> | 24,376     | <b>P45</b> | 23,525     |
| <b>P09</b>                   | 23,760     | <b>P19</b> | 24,000     | <b>P46</b> | 23,413     |
| <b>P10</b>                   | 23,655     | <b>P20</b> | 25,118     | <b>P53</b> | 23,468     |
| <b>P11</b>                   | 23,768     | <b>P28</b> | 23,686     | <b>P54</b> | 23,616     |

**Table L.2 – Stochastic Mean PVRR by Price Scenario, Initial Development Cases**

| Name       | PVRR (\$m)                  |                              |                                |                       |
|------------|-----------------------------|------------------------------|--------------------------------|-----------------------|
|            | Low Gas, No CO <sub>2</sub> | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| <b>P16</b> | 19,448                      | 23,889                       | 29,847                         | 39,712                |
| <b>P17</b> | 21,013                      | 24,182                       | 28,858                         | 36,415                |
| <b>P18</b> | 22,456                      | 24,376                       | 27,785                         | 35,276                |
| <b>P19</b> | 20,194                      | 24,000                       | 29,224                         | 38,396                |
| <b>P20</b> | 20,833                      | 25,118                       | 28,397                         | 37,527                |

**Table L.3 – Stochastic Mean PVRR, C Cases**

| Name           | Med Gas, Med CO <sub>2</sub><br>PVRR (\$m) |
|----------------|--|
| <b>P31C</b>    | 23,374                                     |
| <b>P36C</b>    | 23,430                                     |
| <b>P45C</b>    | 23,283                                     |
| <b>P46C</b>    | 23,278                                     |
| <b>P46J23C</b> | 23,312                                     |
| <b>P47C</b>    | 23,198                                     |
| <b>P48C</b>    | 23,221                                     |
| <b>P53C</b>    | 23,340                                     |
| <b>P53J23C</b> | 23,391                                     |
| <b>P54C</b>    | 23,381                                     |

**Table L.4 – Stochastic Mean PVRR by Price Scenario, CP Cases**

| Name            | PVRR (\$m)                  |                              |                                |                       |
|-----------------|-----------------------------|------------------------------|--------------------------------|-----------------------|
|                 | Low Gas, No CO <sub>2</sub> | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| <b>P36CP</b>    | 20,377                      | 23,413                       | 27,881                         | 36,561                |
| <b>P45CP</b>    | 20,094                      | 23,192                       | 27,786                         | 36,934                |
| <b>P46CP</b>    | 20,285                      | 23,292                       | 27,814                         | 36,703                |
| <b>P46J23CP</b> | 20,306                      | 23,303                       | 27,812                         | 36,555                |
| <b>P47CP</b>    | 20,130                      | 23,219                       | 27,805                         | 36,936                |
| <b>P48CP</b>    | 20,173                      | 23,205                       | 27,736                         | 36,798                |
| <b>P53CP</b>    | 20,327                      | 23,348                       | 27,889                         | 36,829                |
| <b>P45CNW</b>   | 19,965                      | 23,207                       | 27,946                         | 37,095                |



**Table L.5 – Stochastic Mean PVRR, FOT Risk Assessment Cases**

| <b>Name</b>       | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|-------------------|---|
| <b>P45CNW-FOT</b> | 24,075  |
| <b>P45CP-FOT</b>  | 24,024  |
| <b>P46CP-FOT</b>  | 24,099  |
| <b>P47CP-FOT</b>  | 24,001  |
| <b>P48CP-FOT</b>  | 24,098  |
| <b>P53CP-FOT</b>  | 24,164  |

**Table L.6 – Stochastic Mean PVRR, Gateway and No Gas Cases**

| <b>Name</b>    | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|----------------|---|
| <b>P-22CNW</b> | 23,603  |
| <b>P-23CNW</b> | 24,184  |
| <b>P-25CNW</b> | 24,239  |
| <b>P-26CNW</b> | 23,307  |
| <b>P29</b>     | 23,328  |
| <b>P29PS</b>   | 23,616  |

**Table L.7 – Stochastic Mean PVRR, Sensitivity Cases**

| <b>Name</b> | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|-------------|---|
| <b>S01</b>  | 22,080  |
| <b>S02</b>  | 24,346  |
| <b>S03</b>  | 23,388  |
| <b>S04</b>  | 23,308  |
| <b>S05</b>  | 22,970  |
| <b>S06</b>  | 24,038  |
| <b>S07</b>  | 23,126  |
| <b>S08</b>  | 23,186  |

**Table L.8 – Stochastic Mean PVRR, DSM Rebundled Cases**

| <b>Name</b>  | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|--------------|---|
| <b>P45DP</b> | 23,281  |
| <b>P46DP</b> | 23,350  |
| <b>P53DP</b> | 23,409  |

**Table L.9 – Stochastic Mean PVRR, P70 Cases**

| <b>Name</b> | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|-------------|---|
| <b>P70</b>  | 24,041  |
| <b>P71</b>  | 24,010  |
| <b>P72</b>  | 24,121  |
| <b>P73</b>  | 24,261  |
| <b>P74</b>  | 24,230  |

**Table L.10 – Stochastic Risk Results, Initial Development Cases – Medium Gas, Medium CO<sub>2</sub>**

| PVRR (\$m) | Initial Cases Medium Gas, Medium CO <sub>2</sub> |                |                 |                 |   |
|------------|--|----------------|-----------------|-----------------|---|
|            | Standard Deviation                               | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| P01        | 95   | 23,952         | 24,228          | 24,258          | 10,521  |
| P02        | 97   | 24,759         | 25,056          | 25,089          | 10,723  |
| P03        | 98   | 23,672         | 23,945          | 23,996          | 10,395  |
| P04        | 142  | 23,558         | 23,909          | 23,978          | 9,758   |
| P06        | 133  | 23,724         | 24,061          | 24,149          | 10,436  |
| P07        | 133  | 23,610         | 23,950          | 24,038          | 10,396  |
| P08        | 134  | 23,664         | 24,006          | 24,115          | 10,600  |
| P09        | 131  | 23,562         | 23,882          | 23,996          | 10,514  |
| P10        | 133  | 23,451         | 23,778          | 23,875          | 9,874   |
| P11        | 98   | 23,617         | 23,886          | 23,941          | 10,415  |
| P12        | 132  | 23,469         | 23,796          | 23,907          | 10,225  |
| P13        | 94   | 23,872         | 24,133          | 24,185          | 10,532  |
| P14        | 185  | 23,547         | 23,921          | 24,025          | 10,238  |
| P15        | 93   | 24,129         | 24,387          | 24,422          | 10,127  |
| P16        | 159  | 23,648         | 24,045          | 24,153          | 13,505  |
| P17        | 110  | 24,021         | 24,303          | 24,370          | 10,953  |
| P18        | 131  | 24,191         | 24,515          | 24,531          | 8,803   |
| P19        | 143  | 23,784         | 24,154          | 24,225          | 11,377  |
| P20        | 143  | 24,903         | 25,272          | 25,343          | 11,377  |
| P28        | 98   | 23,540         | 23,811          | 23,859          | 10,438  |
| P30        | 99   | 23,588         | 23,850          | 23,909          | 10,355  |
| P31        | 98   | 23,340         | 23,607          | 23,658          | 10,252  |
| P32        | 101  | 23,605         | 23,875          | 23,940          | 10,405  |
| P33        | 134  | 23,607         | 23,938          | 24,034          | 10,168  |
| P34        | 138  | 23,727         | 24,061          | 24,159          | 10,143  |
| P35        | 106  | 23,499         | 23,795          | 23,851          | 9,818   |
| P45        | 101  | 23,373         | 23,647          | 23,703          | 10,284  |
| P46        | 108  | 23,258         | 23,565          | 23,594          | 9,951   |
| P53        | 109  | 23,312         | 23,622          | 23,644          | 10,002  |
| P54        | 102  | 23,471         | 23,738          | 23,792          | 10,305  |

**Table L.11 – Stochastic Risk Results, Initial Development Cases – Low Gas, No CO<sub>2</sub>**

| PVRR (\$m) | Initial Cases Low Gas, No CO <sub>2</sub> |                |                 |                 |   |
|------------|---|----------------|-----------------|-----------------|---|
|            | Standard Deviation                        | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P16</b> | 19,448                                    | 19,295         | 19,555          | 19,593          | 19,743  |
| <b>P17</b> | 21,013                                    | 20,892         | 21,102          | 21,161          | 21,198  |
| <b>P18</b> | 22,456                                    | 22,315         | 22,592          | 22,623          | 22,693  |
| <b>P19</b> | 20,194                                    | 20,052         | 20,296          | 20,318          | 20,465  |
| <b>P20</b> | 20,833                                    | 20,702         | 20,913          | 20,952          | 21,080  |

**Table L.12 – Stochastic Risk Results, Initial Development Cases – High Gas, High CO<sub>2</sub>**

| PVRR (\$m) | Initial Cases High Gas, High CO <sub>2</sub> |                |                 |                 |   |
|------------|--|----------------|-----------------|-----------------|---|
|            | Standard Deviation                           | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P16</b> | 29,847                                       | 29,555         | 30,056          | 30,202          | 30,322  |
| <b>P17</b> | 28,858                                       | 28,652         | 29,014          | 29,069          | 29,114  |
| <b>P18</b> | 27,785                                       | 27,575         | 27,947          | 28,030          | 28,084  |
| <b>P19</b> | 29,224                                       | 28,970         | 29,407          | 29,539          | 29,659  |
| <b>P20</b> | 28,397                                       | 28,151         | 28,575          | 28,700          | 28,794  |

**Table L.13 – Stochastic Risk Results, Initial Development Cases – Social Cost of Carbon**

| PVRR (\$m) | Initial Cases Social Cost of Carbon |                |                 |                 |   |
|------------|-------------------------------------|----------------|-----------------|-----------------|---|
|            | Standard Deviation                  | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P16</b> | 19,448                              | 19,295         | 19,555          | 19,593          | 19,743  |
| <b>P17</b> | 21,013                              | 20,892         | 21,102          | 21,161          | 21,198  |
| <b>P18</b> | 22,456                              | 22,315         | 22,592          | 22,623          | 22,693  |
| <b>P19</b> | 20,194                              | 20,052         | 20,296          | 20,318          | 20,465  |
| <b>P20</b> | 20,833                              | 20,702         | 20,913          | 20,952          | 21,080  |

**Table L.14 – Stochastic Risk Results, C Cases – Medium Gas, Medium CO<sub>2</sub>**

| PVRR (\$m)     | C Cases            |                |                 |                 |   |
|----------------|--------------------|----------------|-----------------|-----------------|---|
|                | Standard Deviation | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P31C</b>    | 23,374             | 23,233         | 23,507          | 23,536          | 23,580  |
| <b>P36C</b>    | 23,430             | 23,213         | 23,574          | 23,677          | 23,811  |
| <b>P45C</b>    | 23,283             | 23,131         | 23,409          | 23,449          | 23,491  |
| <b>P46C</b>    | 23,278             | 23,125         | 23,404          | 23,458          | 23,485  |
| <b>P46J23C</b> | 23,312             | 23,160         | 23,445          | 23,506          | 23,526  |
| <b>P47C</b>    | 23,198             | 23,045         | 23,333          | 23,371          | 23,411  |
| <b>P48C</b>    | 23,221             | 23,073         | 23,342          | 23,396          | 23,436  |
| <b>P53C</b>    | 23,340             | 23,185         | 23,466          | 23,518          | 23,558  |
| <b>P53J23C</b> | 23,391             | 23,235         | 23,525          | 23,580          | 23,612  |
| <b>P54C</b>    | 23,381             | 23,233         | 23,509          | 23,547          | 23,593  |

**Table L.15 – Stochastic Risk Results, CP Cases – Medium Gas, Medium CO<sub>2</sub>**

| PVRR (\$m)      | CP Cases Medium Gas, Medium CO <sub>2</sub> |                |                 |                 |   |
|-----------------|---|----------------|-----------------|-----------------|---|
|                 | Standard Deviation                          | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P36CP</b>    | 23,413                                      | 23,194         | 23,561          | 23,657          | 23,780  |
| <b>P45CP</b>    | 23,192                                      | 23,043         | 23,322          | 23,367          | 23,397  |
| <b>P46CP</b>    | 23,292                                      | 23,143         | 23,426          | 23,464          | 23,499  |
| <b>P46J23CP</b> | 23,303                                      | 23,144         | 23,456          | 23,492          | 23,534  |
| <b>P47CP</b>    | 23,219                                      | 23,067         | 23,349          | 23,393          | 23,435  |
| <b>P48CP</b>    | 23,205                                      | 23,051         | 23,327          | 23,374          | 23,421  |
| <b>P53CP</b>    | 23,348                                      | 23,199         | 23,476          | 23,521          | 23,565  |
| <b>P45CNW</b>   | 23,207                                      | 23,062         | 23,348          | 23,372          | 23,409  |

**Table L.16 – Stochastic Risk Results, CP Cases – Low Gas, Low CO<sub>2</sub>**

| PVRR (\$m)      | CP Cases Low Gas, No CO <sub>2</sub> |                |                 |                 |   |
|-----------------|--------------------------------------|----------------|-----------------|-----------------|---|
|                 | Standard Deviation                   | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P36CP</b>    | 20,377                               | 20,229         | 20,485          | 20,515          | 20,643  |
| <b>P45CP</b>    | 20,094                               | 20,001         | 20,187          | 20,216          | 20,232  |
| <b>P46CP</b>    | 20,285                               | 20,187         | 20,387          | 20,409          | 20,427  |
| <b>P46J23CP</b> | 20,306                               | 20,195         | 20,412          | 20,427          | 20,487  |
| <b>P47CP</b>    | 20,130                               | 20,030         | 20,223          | 20,264          | 20,279  |
| <b>P48CP</b>    | 20,173                               | 20,070         | 20,268          | 20,293          | 20,320  |
| <b>P53CP</b>    | 20,327                               | 20,228         | 20,428          | 20,450          | 20,474  |
| <b>P45CPNW</b>  | 19,965                               | 19,878         | 20,052          | 20,085          | 20,101  |

**Table L.17 – Stochastic Risk Results, CP Cases – High Gas, High CO<sub>2</sub>**

| PVRR (\$m)      | CP Cases High Gas, High CO <sub>2</sub> |                |                 |                 |   |
|-----------------|---|----------------|-----------------|-----------------|---|
|                 | Standard Deviation                      | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P36CP</b>    | 27,881                                  | 27,612         | 28,091          | 28,193          | 28,321  |
| <b>P45CP</b>    | 27,786                                  | 27,585         | 27,947          | 28,039          | 28,069  |
| <b>P46CP</b>    | 27,814                                  | 27,596         | 27,971          | 28,067          | 28,097  |
| <b>P46J23CP</b> | 27,812                                  | 27,595         | 28,008          | 28,059          | 28,093  |
| <b>P47CP</b>    | 27,805                                  | 27,596         | 27,957          | 28,060          | 28,091  |
| <b>P48CP</b>    | 27,736                                  | 27,528         | 27,893          | 27,990          | 28,028  |
| <b>P53CP</b>    | 27,889                                  | 27,672         | 28,051          | 28,144          | 28,180  |
| <b>P45CPNW</b>  | 27,946                                  | 27,748         | 28,121          | 28,190          | 28,222  |

**Table L.18 – Stochastic Risk Results, CP– Social Cost of Carbon**

| PVRR (\$m)      | CP Cases Social Cost of Carbon |                |                 |                 |   |
|-----------------|--------------------------------|----------------|-----------------|-----------------|---|
|                 | Standard Deviation             | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P36CP</b>    | 36,561                         | 36,278         | 36,808          | 36,887          | 36,953  |
| <b>P45CP</b>    | 36,934                         | 36,713         | 37,137          | 37,141          | 37,207  |
| <b>P46CP</b>    | 36,703                         | 36,451         | 36,897          | 36,923          | 36,982  |
| <b>P46J23CP</b> | 36,555                         | 36,296         | 36,755          | 36,784          | 36,835  |
| <b>P47CP</b>    | 36,936                         | 36,699         | 37,139          | 37,150          | 37,215  |
| <b>P48CP</b>    | 36,798                         | 36,567         | 37,007          | 37,020          | 37,078  |
| <b>P53CP</b>    | 36,829                         | 36,576         | 37,025          | 37,043          | 37,109  |
| <b>P45CPNW</b>  | 37,095                         | 36,877         | 37,292          | 37,303          | 37,373  |

**Table L.19 – Stochastic Risk Results, FOT Risk Assessment Cases – Medium Gas, Medium CO<sub>2</sub>**

| PVRR (\$m)    | FOT Cases          |                |                 |                 |   |
|---------------|--------------------|----------------|-----------------|-----------------|---|
|               | Standard Deviation | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P45CNW</b> | 24,075             | 23,917         | 24,212          | 24,258          | 24,298  |
| <b>P45CP</b>  | 24,024             | 23,867         | 24,160          | 24,193          | 24,264  |
| <b>P46CP</b>  | 24,099             | 23,924         | 24,239          | 24,296          | 24,314  |
| <b>P47CP</b>  | 24,001             | 23,835         | 24,130          | 24,156          | 24,236  |
| <b>P48CP</b>  | 24,098             | 23,927         | 24,241          | 24,293          | 24,333  |
| <b>P53CP</b>  | 24,164             | 23,986         | 24,305          | 24,357          | 24,399  |

**Table L.20 – Stochastic Risk Results, Gateway and No Gas Cases – Medium Gas, Medium CO<sub>2</sub>**

| PVRR (\$m)     | Gateway and No Gas Studies |                |                 |                 |   |
|----------------|----------------------------|----------------|-----------------|-----------------|---|
|                | Standard Deviation         | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P-22CNW</b> | 23,603                     | 23,470         | 23,733          | 23,772          | 23,805  |
| <b>P-23CNW</b> | 24,184                     | 24,037         | 24,307          | 24,358          | 24,390  |
| <b>P-25CNW</b> | 24,239                     | 24,093         | 24,372          | 24,414          | 24,446  |
| <b>P-26CNW</b> | 23,307                     | 23,162         | 23,454          | 23,479          | 23,518  |
| <b>P29</b>     | 23,328                     | 23,182         | 23,467          | 23,503          | 23,536  |
| <b>P29PS</b>   | 23,616                     | 23,439         | 23,777          | 23,803          | 23,874  |

**Table L.21 – Stochastic Risk Results, Sensitivity Cases – Medium Gas, Medium CO<sub>2</sub>**

| PVRR (\$m)     | Sensitivity Studies |                |                 |                 |   |
|----------------|---------------------|----------------|-----------------|-----------------|---|
|                | Standard Deviation  | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>S01</b>     | 22,080              | 21,939         | 22,208          | 22,248          | 22,282  |
| <b>S02</b>     | 24,346              | 24,182         | 24,475          | 24,527          | 24,601  |
| <b>S03</b>     | 23,388              | 23,235         | 23,514          | 23,550          | 23,615  |
| <b>S04</b>     | 23,308              | 23,161         | 23,442          | 23,480          | 23,519  |
| <b>S05</b>     | 22,970              | 22,827         | 23,102          | 23,134          | 23,177  |
| <b>S06</b>     | 24,038              | 23,902         | 24,183          | 24,207          | 24,229  |
| <b>S07</b>     | 23,126              | 22,992         | 23,254          | 23,301          | 23,334  |
| <b>S08</b>     | 23,186              | 23,039         | 23,313          | 23,350          | 23,386  |
| <b>P45CPNW</b> | 23,207              | 23,062         | 23,348          | 23,372          | 23,409  |

**Table L.22 – Stochastic Risk Results, DSM Rebundled Cases – Medium Gas Medium CO<sub>2</sub>**

| PVRR (\$m)   | DP Studies         |                |                 |                 |   |
|--------------|--------------------|----------------|-----------------|-----------------|---|
|              | Standard Deviation | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P45DP</b> | 23,104             | 22,956         | 23,248          | 23,268          | 23,312  |
| <b>P46DP</b> | 23,174             | 23,012         | 23,321          | 23,344          | 23,378  |
| <b>P53DP</b> | 23,232             | 23,070         | 23,381          | 23,401          | 23,444  |



**Table L.23 – Stochastic Risk Results, P70 Cases – Medium Gas, Medium CO<sub>2</sub>**

| PVRR (\$m) | P70 Studies        |                |                 |                 |   |
|------------|--------------------|----------------|-----------------|-----------------|---|
|            | Standard Deviation | 5th percentile | 90th percentile | 95th percentile | Upper Tail (mean of 3 Highest) No Fixed Costs |
| <b>P70</b> | 24,041             | 23,882         | 24,161          | 24,204          | 24,248  |
| <b>P71</b> | 24,010             | 23,859         | 24,139          | 24,165          | 24,206  |
| <b>P72</b> | 24,121             | 23,969         | 24,238          | 24,275          | 24,317  |
| <b>P73</b> | 24,261             | 24,100         | 24,391          | 24,426          | 24,465  |
| <b>P74</b> | 24,230             | 24,075         | 24,364          | 24,381          | 24,423  |

**Table L.24 – Stochastic Risk Adjusted PVRR, Initial Cases**

| Med Gas, Med CO <sub>2</sub> |            |            |            |            |            |
|------------------------------|------------|------------|------------|------------|------------|
| Name                         | PVRR (\$m) | Name       | PVRR (\$m) | Name       | PVRR (\$m) |
| <b>P01</b>                   | 25,319     | <b>P12</b> | 24,873     | <b>P30</b> | 24,928     |
| <b>P02</b>                   | 26,174     | <b>P13</b> | 25,226     | <b>P31</b> | 24,667     |
| <b>P03</b>                   | 25,022     | <b>P14</b> | 24,987     | <b>P32</b> | 24,947     |
| <b>P04</b>                   | 24,974     | <b>P15</b> | 25,506     | <b>P33</b> | 25,010     |
| <b>P06</b>                   | 25,139     | <b>P16</b> | 25,097     | <b>P34</b> | 25,146     |
| <b>P07</b>                   | 25,021     | <b>P17</b> | 25,400     | <b>P35</b> | 24,858     |
| <b>P08</b>                   | 25,081     | <b>P18</b> | 25,602     | <b>P45</b> | 24,710     |
| <b>P09</b>                   | 24,960     | <b>P19</b> | 25,211     | <b>P46</b> | 24,593     |
| <b>P10</b>                   | 24,848     | <b>P20</b> | 26,385     | <b>P53</b> | 24,650     |
| <b>P11</b>                   | 24,966     | <b>P28</b> | 24,879     | <b>P54</b> | 24,806     |

**Table L.25 – Stochastic Risk Adjusted PVRR by Price Scenario, Initial Cases**

| Name       | PVRR (\$m)                  |                              |                                |                       |
|------------|-----------------------------|------------------------------|--------------------------------|-----------------------|
|            | Low Gas, No CO <sub>2</sub> | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| <b>P16</b> | 20,427                      | 25,097                       | 31,357                         | 41,717                |
| <b>P17</b> | 22,071                      | 25,400                       | 30,312                         | 38,247                |
| <b>P18</b> | 23,587                      | 25,602                       | 29,187                         | 37,051                |
| <b>P19</b> | 21,209                      | 25,211                       | 30,701                         | 40,334                |
| <b>P20</b> | 21,881                      | 26,385                       | 29,832                         | 39,421                |

**Table L.26 – Stochastic Risk Adjusted PVRR, C Cases**

| Name    | Med Gas, Med CO <sub>2</sub><br>PVRR (\$m) |
|---------|--|
| P31C    | 24,551                                     |
| P36C    | 24,614                                     |
| P45C    | 24,456                                     |
| P46C    | 24,451                                     |
| P46J23C | 24,488                                     |
| P47C    | 24,367                                     |
| P48C    | 24,391                                     |
| P53C    | 24,516                                     |
| P53J23C | 24,570                                     |
| P54C    | 24,558                                     |

**Table L.27 – Stochastic Risk Adjusted PVRR by Price Scenario, CP Cases**

| Name     | PVRR (\$m)                  |                              |                                |                       |
|----------|-----------------------------|------------------------------|--------------------------------|-----------------------|
|          | Low Gas, No CO <sub>2</sub> | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| P36CP    | 21,403                      | 24,595                       | 29,290                         | 38,405                |
| P45CP    | 21,105                      | 24,360                       | 29,188                         | 38,791                |
| P46CP    | 21,305                      | 24,465                       | 29,217                         | 38,550                |
| P46J23CP | 21,327                      | 24,478                       | 29,215                         | 38,394                |
| P47CP    | 21,143                      | 24,388                       | 29,208                         | 38,794                |
| P48CP    | 21,187                      | 24,374                       | 29,135                         | 38,649                |
| P53CP    | 21,349                      | 24,524                       | 29,296                         | 38,681                |
| P45CNW   | 20,969                      | 24,376                       | 29,355                         | 38,960                |

**Table L.28 – Stochastic Risk Adjusted PVRR, FOT Risk Assessment Cases**

| Name   | Med Gas, Med CO <sub>2</sub><br>PVRR (\$m) |
|--------|--|
| P45CNW | 25,288                                     |
| P45CP  | 25,233                                     |
| P46CP  | 25,314                                     |
| P47CP  | 25,209                                     |
| P48CP  | 25,312                                     |
| P53CP  | 25,382                                     |

**Table L.29 – Stochastic Risk Adjusted PVRR, Gateway and No Gas Cases**

| <b>Name</b>    | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|----------------|---|
| <b>P-22CNW</b> | 24,792  |
| <b>P-23CNW</b> | 25,402  |
| <b>P-25CNW</b> | 25,460  |
| <b>P-26CNW</b> | 24,481  |
| <b>P29</b>     | 24,503  |
| <b>P29PS</b>   | 24,806  |

**Table L.30 – Stochastic Risk Adjusted PVRR, Sensitivity Cases**

| <b>Name</b> | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|-------------|---|
| <b>S01</b>  | 23,193  |
| <b>S02</b>  | 25,572  |
| <b>S03</b>  | 24,565  |
| <b>S04</b>  | 24,482  |
| <b>S05</b>  | 24,126  |
| <b>S06</b>  | 25,248  |
| <b>S07</b>  | 24,291  |
| <b>S08</b>  | 24,353  |

**Table L.31 – Stochastic Risk Adjusted PVRR, DSM Rebundled Cases**

| <b>Name</b>  | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|--------------|---|
| <b>P45DP</b> | 24,453  |
| <b>P46DP</b> | 24,526  |
| <b>P53DP</b> | 24,587  |

**Table L.32 – Stochastic Risk Adjusted PVRR, P70 Cases**

| <b>Name</b> | <b>Med Gas, Med CO<sub>2</sub><br/>PVRR (\$m)</b> |
|-------------|---|
| <b>P70</b>  | 25,251  |
| <b>P71</b>  | 25,218  |
| <b>P72</b>  | 25,334  |
| <b>P73</b>  | 25,482  |
| <b>P74</b>  | 25,449  |

**Table L.33 – Carbon Dioxide Emissions, Initial Cases**

| Med Gas, Med CO <sub>2</sub> |                                 |            |                                 |            |                                 |
|------------------------------|---------------------------------|------------|---------------------------------|------------|---------------------------------|
| Name                         | CO <sub>2</sub> (thousand tons) | Name       | CO <sub>2</sub> (thousand tons) | Name       | CO <sub>2</sub> (thousand tons) |
| <b>P01</b>                   | 616,896                         | <b>P12</b> | 579,167                         | <b>P30</b> | 587,905                         |
| <b>P02</b>                   | 605,872                         | <b>P13</b> | 604,396                         | <b>P31</b> | 588,421                         |
| <b>P03</b>                   | 595,728                         | <b>P14</b> | 535,774                         | <b>P32</b> | 583,565                         |
| <b>P04</b>                   | 567,901                         | <b>P15</b> | 472,569                         | <b>P33</b> | 569,586                         |
| <b>P06</b>                   | 585,907                         | <b>P16</b> | 669,944                         | <b>P34</b> | 568,422                         |
| <b>P07</b>                   | 581,583                         | <b>P17</b> | 475,390                         | <b>P35</b> | 557,489                         |
| <b>P08</b>                   | 595,956                         | <b>P18</b> | 427,110                         | <b>P45</b> | 583,981                         |
| <b>P09</b>                   | 597,855                         | <b>P19</b> | 607,157                         | <b>P46</b> | 560,199                         |
| <b>P10</b>                   | 571,707                         | <b>P20</b> | 607,157                         | <b>P53</b> | 562,025                         |
| <b>P11</b>                   | 596,911                         | <b>P28</b> | 594,322                         | <b>P54</b> | 584,377                         |

**Table L.34 – Carbon Dioxide Emissions by Price Scenario, Initial Cases**

| Name       | CO <sub>2</sub> (thousand tons) |                              |                                |                       |
|------------|---------------------------------|------------------------------|--------------------------------|-----------------------|
|            | Low Gas, No CO <sub>2</sub>     | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| <b>P16</b> | 674,184                         | 669,944                      | 653,963                        | 496,702               |
| <b>P17</b> | 465,998                         | 475,390                      | 478,795                        | 366,220               |
| <b>P18</b> | 418,674                         | 427,110                      | 431,628                        | 321,000               |
| <b>P19</b> | 607,941                         | 607,157                      | 598,587                        | 459,469               |
| <b>P20</b> | 579,150                         | 607,157                      | 572,793                        | 437,132               |

**Table L.35 – Carbon Dioxide Emissions, C Cases**

| Name    | Med Gas, Med CO <sub>2</sub><br>(thousand tons) |
|---------|---|
| P31C    | 588,334   |
| P36C    | 550,233   |
| P45C    | 578,607   |
| P46C    | 560,210   |
| P46J23C | 553,673   |
| P47C    | 573,088   |
| P48C    | 567,025   |
| P53C    | 562,972   |
| P53J23C | 556,990   |
| P54C    | 581,465   |

**Table L.36 – Carbon Dioxide Emissions by Price Scenario, CP Cases**

| Name     | CO <sub>2</sub> (thousand tons) |                              |                                |                       |
|----------|---------------------------------|------------------------------|--------------------------------|-----------------------|
|          | Low Gas, No CO <sub>2</sub>     | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| P36CP    | 549,329                         | 549,427                      | 544,092                        | 405,969               |
| P45CP    | 577,806                         | 577,439                      | 571,643                        | 432,168               |
| P46CP    | 555,322                         | 557,824                      | 553,331                        | 414,320               |
| P46J23CP | 549,304                         | 552,065                      | 549,152                        | 411,129               |
| P47CP    | 572,966                         | 573,649                      | 568,183                        | 429,251               |
| P48CP    | 567,163                         | 567,889                      | 562,313                        | 424,073               |
| P53CP    | 558,186                         | 560,553                      | 556,201                        | 418,116               |
| P45CNW   | 586,648                         | 585,641                      | 579,073                        | 437,599               |

**Table L.37 – Carbon Dioxide Emissions, FOT Risk Assessment Cases**

| Name       | Med Gas, Med CO <sub>2</sub><br>(thousand tons) |
|------------|---|
| P45CNW-FOT | 542,046   |
| P45CP-FOT  | 540,134   |
| P46CP-FOT  | 522,510   |
| P47CP-FOT  | 535,827   |
| P48CP-FOT  | 533,930   |
| P53CP-FOT  | 525,364   |

**Table L.38 – Carbon Dioxide Emissions, Gateway and No Gas Cases**

| Name    | Med Gas, Med CO2<br>(thousand tons) |
|---------|-------------------------------------|
| P-22CNW | 581,028                             |
| P-23CNW | 544,811                             |
| P-25CNW | 580,014                             |
| P-26CNW | 579,969                             |
| P29     | 580,126                             |
| P29PS   | 576,806                             |

**Table L.39 – Carbon Dioxide Emissions, Sensitivity Cases**

| Name | Med Gas, Med CO2<br>(thousand tons) |
|------|-------------------------------------|
| S01  | 569,357                             |
| S02  | 607,239                             |
| S03  | 590,315                             |
| S04  | 590,401                             |
| S05  | 580,957                             |
| S06  | 586,136                             |
| S07  | 583,986                             |
| S08  | 581,368                             |

**Table L.40 – Carbon Dioxide Emissions, DSM Rebundled Cases**

| Name  | Med Gas, Med CO2<br>(thousand tons) |
|-------|-------------------------------------|
| P45DP | 578,417                             |
| P46DP | 556,742                             |
| P53DP | 559,529                             |

**Table L.41 – Carbon Dioxide Emissions, P70 Cases**

| Name | Med Gas, Med CO2<br>(thousand tons) |
|------|-------------------------------------|
| P70  | 25,251                              |
| P71  | 25,218                              |
| P72  | 25,334                              |
| P73  | 25,482                              |
| P74  | 25,449                              |

**Table L.42 – Average Annual Energy Not Served, Initial Development Cases**

| Med Gas, Med CO <sub>2</sub> |     |      |      |      |     |
|------------------------------|-----|------|------|------|-----|
| Name                         | GWh | Name | GWh  | Name | GWh |
| P01                          | 4.3 | P12  | 5.3  | P30  | 6.4 |
| P02                          | 5.6 | P13  | 5.3  | P31  | 5.8 |
| P03                          | 5.3 | P14  | 10.2 | P32  | 5.5 |
| P04                          | 7.2 | P15  | 7.9  | P33  | 4.7 |
| P06                          | 4.6 | P16  | 4.4  | P34  | 5.0 |
| P07                          | 4.6 | P17  | 37.9 | P35  | 6.7 |
| P08                          | 5.8 | P18  | 73.3 | P45  | 5.2 |
| P09                          | 5.9 | P19  | 4.5  | P46  | 8.1 |
| P10                          | 6.0 | P20  | 4.5  | P53  | 8.3 |
| P11                          | 5.1 | P28  | 5.5  | P54  | 5.8 |

**Table L.43 – Average Annual ENS by Price Scenario, Initial Development Cases**

| Name | GWh                         |                              |                                |                       |
|------|-----------------------------|------------------------------|--------------------------------|-----------------------|
|      | Low Gas, No CO <sub>2</sub> | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| P16  | 4.4                         | 4.4                          | 4.4                            | 4.5                   |
| P17  | 37.9                        | 37.9                         | 38.0                           | 37.9                  |
| P18  | 73.8                        | 73.3                         | 73.9                           | 73.9                  |
| P19  | 4.5                         | 4.5                          | 4.5                            | 4.5                   |
| P20  | 4.6                         | 4.5                          | 4.6                            | 4.6                   |

**Table L.44 – Average Annual Energy Not Served, C Cases**

| Name    | Med Gas, Med CO <sub>2</sub><br>GWh |
|---------|-------------------------------------|
| P31C    | 6.8                                 |
| P36C    | 8.9                                 |
| P45C    | 6.7                                 |
| P46C    | 7.2                                 |
| P46J23C | 8.3                                 |
| P47C    | 8.1                                 |
| P48C    | 7.5                                 |
| P53C    | 7.4                                 |
| P53J23C | 8.3                                 |
| P54C    | 7.7                                 |

**Table L.45 – Average Annual Energy Not Served by Price Scenario, CP Cases**

| Name     | GWh                         |                              |                                |                       |
|----------|-----------------------------|------------------------------|--------------------------------|-----------------------|
|          | Low Gas, No CO <sub>2</sub> | Med Gas, Med CO <sub>2</sub> | High Gas, High CO <sub>2</sub> | Social Cost of Carbon |
| P36CP    | 7.5                         | 7.5                          | 7.5                            | 7.5                   |
| P45CP    | 6.3                         | 6.3                          | 6.4                            | 6.3                   |
| P46CP    | 8.4                         | 8.4                          | 8.4                            | 8.4                   |
| P46J23CP | 9.1                         | 9.1                          | 9.1                            | 9.1                   |
| P47CP    | 8.9                         | 8.9                          | 8.9                            | 8.9                   |
| P48CP    | 8.3                         | 8.3                          | 8.3                            | 8.3                   |
| P53CP    | 8.4                         | 8.4                          | 8.4                            | 8.4                   |
| P45CNW   | 5.4                         | 5.4                          | 5.4                            | 5.4                   |

**Table L.46 – Average Annual Energy Not Served, FOT Risk Assessment Cases**

| Name       | Med Gas, Med CO <sub>2</sub><br>GWh |
|------------|-------------------------------------|
| P45CNW-FOT | 5.2                                 |
| P45CP-FOT  | 6.2                                 |
| P46CP-FOT  | 8.6                                 |
| P47CP-FOT  | 6.5                                 |
| P48CP-FOT  | 7.6                                 |
| P53CP-FOT  | 8.5                                 |

**Table L.47 – Average Annual Energy Not Served, Gateway and No Gas Cases**

| Name    | Med Gas, Med CO <sub>2</sub><br>GWh |
|---------|-------------------------------------|
| P-22CNW | 4.9                                 |
| P-23CNW | 4.8                                 |
| P-25CNW | 4.0                                 |
| P-26CNW | 4.0                                 |
| P29     | 4.2                                 |
| P29PS   | 30.8                                |



**Table L.48 – Average Annual Energy Not Served, Sensitivity Cases**

| <b>Name</b> | <b>Med Gas, Med CO<sub>2</sub><br/>GWh</b> |
|-------------|--|
| <b>S01</b>  | 3.5  |
| <b>S02</b>  | 8.4  |
| <b>S03</b>  | 7.3  |
| <b>S04</b>  | 5.1  |
| <b>S05</b>  | 5.4  |
| <b>S06</b>  | 6.5  |
| <b>S07</b>  | 5.6  |
| <b>S08</b>  | 5.5  |

**Table L.49 – Average Annual Energy Not Served, DSM Rebundled Cases**

| <b>Name</b>  | <b>Med Gas, Med CO<sub>2</sub><br/>GWh</b> |
|--------------|--|
| <b>P45DP</b> | 6.7  |
| <b>P46DP</b> | 8.6  |
| <b>P53DP</b> | 8.6  |

**Table L.50 – Average Annual Energy Not Served, P70 Cases**

| <b>Name</b> | <b>Med Gas, Med CO<sub>2</sub><br/>GWh</b> |
|-------------|--|
| <b>P70</b>  | 25250.8                                    |
| <b>P71</b>  | 25218.3                                    |
| <b>P72</b>  | 25334.3                                    |
| <b>P73</b>  | 25481.9                                    |
| <b>P74</b>  | 25449.2                                    |

**Table L.51 – PVRR Cost Components by Price Scenario, Initial Cases, Medium Gas, Medium CO<sub>2</sub>**

| Name       | Stochastic PVRR (\$ millions) |                        |                     |           |           |       |                        |                            |                            |            |
|------------|-------------------------------|------------------------|---------------------|-----------|-----------|-------|------------------------|----------------------------|----------------------------|------------|
|            | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM   | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P01</b> | 10,526                        | 245                    | 463                 | 3,179     | (760)     | 939   | (5,190)                | 886                        | 13,818                     | 24,106     |
| <b>P02</b> | 10,520                        | 318                    | 461                 | 3,078     | (756)     | 926   | (5,024)                | 957                        | 14,440                     | 24,919     |
| <b>P03</b> | 10,459                        | 260                    | 462                 | 2,971     | (764)     | 911   | (5,076)                | 919                        | 13,680                     | 23,822     |
| <b>P04</b> | 9,815                         | 236                    | 527                 | 2,846     | (772)     | 987   | (5,181)                | 890                        | 14,426                     | 23,775     |
| <b>P06</b> | 10,258                        | 262                    | 491                 | 2,923     | (765)     | 972   | (4,986)                | 902                        | 13,874                     | 23,932     |
| <b>P07</b> | 10,196                        | 265                    | 496                 | 2,886     | (769)     | 972   | (4,956)                | 931                        | 13,799                     | 23,819     |
| <b>P08</b> | 10,465                        | 259                    | 460                 | 2,968     | (767)     | 926   | (5,025)                | 918                        | 13,672                     | 23,875     |
| <b>P09</b> | 10,498                        | 261                    | 459                 | 2,990     | (769)     | 897   | (5,107)                | 908                        | 13,622                     | 23,760     |
| <b>P10</b> | 10,017                        | 237                    | 512                 | 2,866     | (765)     | 982   | (5,246)                | 898                        | 14,154                     | 23,655     |
| <b>P11</b> | 10,496                        | 261                    | 464                 | 2,987     | (766)     | 926   | (5,095)                | 900                        | 13,595                     | 23,768     |
| <b>P12</b> | 10,130                        | 255                    | 475                 | 2,863     | (760)     | 979   | (5,022)                | 928                        | 13,828                     | 23,678     |
| <b>P13</b> | 10,470                        | 260                    | 460                 | 3,065     | (760)     | 903   | (5,028)                | 921                        | 13,726                     | 24,016     |
| <b>P14</b> | 9,855                         | 289                    | 518                 | 2,594     | (763)     | 989   | (4,870)                | 1,081                      | 14,093                     | 23,786     |
| <b>P15</b> | 10,246                        | 380                    | 580                 | 1,898     | (750)     | 1,105 | (4,721)                | 1,171                      | 14,376                     | 24,285     |
| <b>P16</b> | 11,737                        | 350                    | 453                 | 3,659     | (315)     | 875   | (4,936)                | 1,234                      | 10,833                     | 23,889     |
| <b>P17</b> | 10,322                        | 421                    | 556                 | 1,914     | (773)     | 1,020 | (4,439)                | 1,684                      | 13,476                     | 24,182     |
| <b>P18</b> | 8,799                         | 271                    | 632                 | 1,512     | (684)     | 1,258 | (4,894)                | 1,613                      | 15,869                     | 24,376     |
| <b>P19</b> | 10,811                        | 320                    | 483                 | 3,180     | (792)     | 715   | (4,844)                | 1,089                      | 13,039                     | 24,000     |
| <b>P20</b> | 10,811                        | 320                    | 483                 | 3,180     | (792)     | 715   | (4,844)                | 1,089                      | 14,157                     | 25,118     |
| <b>P28</b> | 10,444                        | 258                    | 464                 | 2,968     | (766)     | 923   | (5,022)                | 922                        | 13,495                     | 23,686     |
| <b>P30</b> | 10,411                        | 258                    | 470                 | 2,928     | (767)     | 974   | (5,066)                | 899                        | 13,625                     | 23,733     |
| <b>P31</b> | 10,341                        | 256                    | 463                 | 2,925     | (757)     | 906   | (5,037)                | 912                        | 13,477                     | 23,484     |
| <b>P32</b> | 10,337                        | 269                    | 484                 | 2,898     | (769)     | 977   | (4,981)                | 930                        | 13,605                     | 23,750     |
| <b>P33</b> | 10,088                        | 248                    | 505                 | 2,810     | (762)     | 995   | (5,015)                | 917                        | 14,023                     | 23,809     |

**Table L.52 Continued– PVRR Cost Components by Price Scenario, Initial Cases, Medium Gas, Medium CO<sub>2</sub>**

|            |        |     |     |       |       |     |         |     |        |        |
|------------|--------|-----|-----|-------|-------|-----|---------|-----|--------|--------|
| <b>P34</b> | 10,023 | 257 | 511 | 2,806 | (760) | 950 | (4,973) | 929 | 14,194 | 23,938 |
| <b>P35</b> | 10,103 | 280 | 502 | 2,700 | (760) | 973 | (5,187) | 963 | 14,092 | 23,666 |
| <b>P45</b> | 10,343 | 268 | 471 | 2,892 | (766) | 915 | (5,021) | 923 | 13,500 | 23,524 |
| <b>P46</b> | 10,137 | 281 | 478 | 2,669 | (759) | 905 | (4,976) | 967 | 13,712 | 23,413 |
| <b>P53</b> | 10,158 | 281 | 478 | 2,688 | (760) | 905 | (4,977) | 966 | 13,730 | 23,468 |
| <b>P54</b> | 10,321 | 262 | 468 | 2,865 | (702) | 910 | (5,014) | 935 | 13,573 | 23,616 |

**Table L.53 – PVRR Cost Components by Price Scenario, Initial Cases, Low Gas, No CO<sub>2</sub>**

| <b>Name</b> | <b>Stochastic PVRR (\$ millions)</b> |                                   |                            |                  |                  |            |                               |                                   |                                       |                   |
|-------------|--------------------------------------|-----------------------------------|----------------------------|------------------|------------------|------------|-------------------------------|-----------------------------------|---------------------------------------|-------------------|
|             | <b>Thermal Fuel</b>                  | <b>Variable O&amp;M incl. FOT</b> | <b>Long Term Contracts</b> | <b>Emissions</b> | <b>Renewable</b> | <b>DSM</b> | <b>System Balancing Sales</b> | <b>System Balancing Purchases</b> | <b>Capital and Fixed O&amp;M Cost</b> | <b>Total PVRR</b> |
| <b>P16</b>  | 9,901                                | 351                               | 442                        | 0                | (311)            | 875        | (3,412)                       | 768                               | 10,833                                | 19,448            |
| <b>P17</b>  | 8,213                                | 430                               | 546                        | 0                | (766)            | 1,020      | (3,073)                       | 1,168                             | 13,476                                | 21,013            |
| <b>P18</b>  | 7,228                                | 282                               | 621                        | 0                | (684)            | 1,258      | (3,338)                       | 1,218                             | 15,871                                | 22,456            |
| <b>P19</b>  | 9,058                                | 323                               | 473                        | 0                | (787)            | 715        | (3,342)                       | 714                               | 13,039                                | 20,194            |
| <b>P20</b>  | 8,585                                | 261                               | 489                        | 0                | (743)            | 1,026      | (3,557)                       | 614                               | 14,158                                | 20,833            |

**Table L.54 – PVRR Cost Components by Price Scenario, Initial Cases, High Gas, High CO<sub>2</sub>**

| <b>Name</b> | <b>Stochastic PVRR (\$ millions)</b> |                                   |                            |                  |                  |            |                               |                                   |                                       |                   |
|-------------|--------------------------------------|-----------------------------------|----------------------------|------------------|------------------|------------|-------------------------------|-----------------------------------|---------------------------------------|-------------------|
|             | <b>Thermal Fuel</b>                  | <b>Variable O&amp;M incl. FOT</b> | <b>Long Term Contracts</b> | <b>Emissions</b> | <b>Renewable</b> | <b>DSM</b> | <b>System Balancing Sales</b> | <b>System Balancing Purchases</b> | <b>Capital and Fixed O&amp;M Cost</b> | <b>Total PVRR</b> |
| <b>P16</b>  | 13,968                               | 307                               | 465                        | 6,855            | (317)            | 875        | (5,285)                       | 2,145                             | 10,833                                | 29,847            |
| <b>P17</b>  | 12,935                               | 372                               | 568                        | 3,720            | (780)            | 1,020      | (4,868)                       | 2,416                             | 13,476                                | 28,858            |
| <b>P18</b>  | 10,760                               | 224                               | 644                        | 2,925            | (688)            | 1,258      | (5,417)                       | 2,211                             | 15,868                                | 27,785            |
| <b>P19</b>  | 13,000                               | 281                               | 495                        | 6,015            | (801)            | 715        | (5,342)                       | 1,821                             | 13,039                                | 29,224            |
| <b>P20</b>  | 12,097                               | 217                               | 511                        | 5,437            | (753)            | 1,026      | (5,793)                       | 1,499                             | 14,156                                | 28,397            |

**Table L.55 – PVRR Cost Components by Price Scenario, Initial Cases, Social Cost of Carbon**

| Name         | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|--------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|              | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P45CP</b> | 9,129                         | 289                    | 532                 | 15,098    | (813)     | 906 | (4,844)                | 3,263                      | 13,375                     | 36,934     |
| <b>P46CP</b> | 9,074                         | 323                    | 539                 | 14,571    | (897)     | 908 | (4,795)                | 3,287                      | 13,694                     | 36,703     |
| <b>P47CP</b> | 9,117                         | 291                    | 538                 | 15,028    | (831)     | 862 | (4,818)                | 3,315                      | 13,434                     | 36,936     |
| <b>P48CP</b> | 9,094                         | 298                    | 538                 | 14,875    | (830)     | 904 | (4,853)                | 3,275                      | 13,496                     | 36,798     |
| <b>P53CP</b> | 9,113                         | 322                    | 539                 | 14,696    | (897)     | 908 | (4,818)                | 3,254                      | 13,712                     | 36,829     |

**Table L.56 – PVRR Cost Components, C Cases, Medium Gas, Medium CO<sub>2</sub>**

| Name           | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|----------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|                | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P31C</b>    | 10,266                        | 252                    | 473                 | 2,929     | (763)     | 934 | (4,948)                | 965                        | 13,265                     | 23,374     |
| <b>P36C</b>    | 9,998                         | 282                    | 521                 | 2,603     | (740)     | 935 | (4,860)                | 1,110                      | 13,581                     | 23,430     |
| <b>P45C</b>    | 10,139                        | 248                    | 479                 | 2,865     | (764)     | 893 | (5,006)                | 972                        | 13,458                     | 23,283     |
| <b>P46C</b>    | 10,109                        | 282                    | 485                 | 2,676     | (847)     | 901 | (4,970)                | 981                        | 13,659                     | 23,278     |
| <b>P46J23C</b> | 10,058                        | 282                    | 499                 | 2,641     | (845)     | 941 | (4,966)                | 993                        | 13,709                     | 23,312     |
| <b>P47C</b>    | 10,104                        | 253                    | 501                 | 2,800     | (782)     | 893 | (4,994)                | 998                        | 13,426                     | 23,198     |
| <b>P48C</b>    | 10,057                        | 256                    | 506                 | 2,741     | (780)     | 910 | (5,000)                | 992                        | 13,539                     | 23,221     |
| <b>P53C</b>    | 10,142                        | 282                    | 485                 | 2,699     | (847)     | 901 | (4,974)                | 976                        | 13,677                     | 23,340     |
| <b>P53J23C</b> | 10,104                        | 282                    | 499                 | 2,665     | (845)     | 941 | (4,973)                | 983                        | 13,735                     | 23,391     |
| <b>P54C</b>    | 10,189                        | 252                    | 468                 | 2,882     | (759)     | 915 | (4,970)                | 982                        | 13,422                     | 23,381     |

**Table L.57 – PVRR Cost Components, CP Cases, Medium Gas Medium CO<sub>2</sub>**

| Name            | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|-----------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|                 | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P36CP</b>    | 9,982                         | 282                    | 520                 | 2,599     | (742)     | 975 | (4,877)                | 1,090                      | 13,582                     | 23,413     |
| <b>P45CP</b>    | 10,116                        | 249                    | 497                 | 2,852     | (764)     | 906 | (5,008)                | 970                        | 13,375                     | 23,192     |
| <b>P46CP</b>    | 10,024                        | 271                    | 504                 | 2,652     | (846)     | 908 | (4,941)                | 1,025                      | 13,694                     | 23,292     |
| <b>P46J23CP</b> | 10,000                        | 275                    | 504                 | 2,626     | (845)     | 955 | (4,950)                | 1,014                      | 13,723                     | 23,303     |
| <b>P47CP</b>    | 10,109                        | 252                    | 503                 | 2,804     | (782)     | 862 | (4,980)                | 1,017                      | 13,434                     | 23,219     |
| <b>P48CP</b>    | 10,076                        | 257                    | 503                 | 2,749     | (780)     | 904 | (4,999)                | 998                        | 13,496                     | 23,205     |
| <b>P53CP</b>    | 10,055                        | 271                    | 504                 | 2,674     | (846)     | 908 | (4,946)                | 1,017                      | 13,712                     | 23,348     |
| <b>P45CNW</b>   | 10,280                        | 258                    | 494                 | 2,933     | (792)     | 932 | (4,997)                | 988                        | 13,111                     | 23,207     |

**Table L.58 – PVRR Cost Components, CP Cases, Low Gas No CO<sub>2</sub>**

| Name            | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|-----------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|                 | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P36CP</b>    | 8,383                         | 287                    | 510                 | 0         | (734)     | 975 | (3,350)                | 724                        | 13,583                     | 20,377     |
| <b>P45CP</b>    | 8,603                         | 254                    | 487                 | 0         | (758)     | 906 | (3,426)                | 653                        | 13,375                     | 20,094     |
| <b>P46CP</b>    | 8,437                         | 275                    | 493                 | 0         | (840)     | 908 | (3,380)                | 696                        | 13,694                     | 20,285     |
| <b>P46J23CP</b> | 8,379                         | 278                    | 494                 | 0         | (838)     | 955 | (3,382)                | 696                        | 13,724                     | 20,306     |
| <b>P47CP</b>    | 8,576                         | 257                    | 492                 | 0         | (776)     | 862 | (3,406)                | 690                        | 13,434                     | 20,130     |
| <b>P48CP</b>    | 8,529                         | 263                    | 492                 | 0         | (774)     | 904 | (3,418)                | 679                        | 13,497                     | 20,173     |
| <b>P53CP</b>    | 8,470                         | 275                    | 493                 | 0         | (840)     | 908 | (3,383)                | 691                        | 13,712                     | 20,327     |
| <b>P45CPNW</b>  | 8,731                         | 262                    | 483                 | 0         | (786)     | 932 | (3,424)                | 654                        | 13,112                     | 19,965     |

**Table L.59 – PVRR Cost Components, CP Cases, High Gas High CO<sub>2</sub>**

| Name            | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|-----------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|                 | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P36CP</b>    | 11,983                        | 239                    | 532                 | 4,888     | (750)     | 975 | (5,357)                | 1,789                      | 13,582                     | 27,881     |
| <b>P45CP</b>    | 12,054                        | 208                    | 509                 | 5,389     | (768)     | 906 | (5,516)                | 1,631                      | 13,374                     | 27,786     |
| <b>P46CP</b>    | 12,065                        | 230                    | 516                 | 5,025     | (851)     | 908 | (5,452)                | 1,681                      | 13,693                     | 27,814     |
| <b>P46J23CP</b> | 12,084                        | 234                    | 516                 | 4,982     | (850)     | 955 | (5,479)                | 1,647                      | 13,723                     | 27,812     |
| <b>P47CP</b>    | 12,066                        | 211                    | 515                 | 5,309     | (786)     | 862 | (5,487)                | 1,683                      | 13,433                     | 27,805     |
| <b>P48CP</b>    | 12,039                        | 216                    | 515                 | 5,200     | (784)     | 904 | (5,508)                | 1,659                      | 13,495                     | 27,736     |
| <b>P53CP</b>    | 12,101                        | 230                    | 516                 | 5,073     | (851)     | 908 | (5,463)                | 1,664                      | 13,711                     | 27,889     |
| <b>P45CPNW</b>  | 12,315                        | 217                    | 506                 | 5,534     | (796)     | 932 | (5,488)                | 1,679                      | 13,110                     | 28,009     |

**Table L.60 – PVRR Cost Components, CP Cases, Social Cost of Carbon**

| Name            | Stochastic PVRR (\$ millions) |                        |                     |           |           |       |                        |                            |                            |            |
|-----------------|-------------------------------|------------------------|---------------------|-----------|-----------|-------|------------------------|----------------------------|----------------------------|------------|
|                 | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM   | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P36CP</b>    | 9,031                         | 324                    | 540                 | 14,444    | (897)     | 955   | (4,820)                | 3,254                      | 13,723                     | 36,555     |
| <b>P45CP</b>    | 9,117                         | 291                    | 538                 | 15,028    | (831)     | 862   | (4,818)                | 3,315                      | 13,434                     | 36,936     |
| <b>P46CP</b>    | 9,094                         | 298                    | 538                 | 14,875    | (830)     | 904   | (4,853)                | 3,275                      | 13,496                     | 36,798     |
| <b>P46J23CP</b> | 9,094                         | 298                    | 538                 | 14,875    | (830)     | 904   | (4,853)                | 3,275                      | 13,496                     | 36,798     |
| <b>P47CP</b>    | 9,113                         | 322                    | 539                 | 14,696    | (897)     | 908   | (4,818)                | 3,254                      | 13,712                     | 36,829     |
| <b>P48CP</b>    | 10,489                        | 437                    | 488                 | 17,102    | (353)     | 875   | (4,274)                | 4,113                      | 10,833                     | 39,712     |
| <b>P53CP</b>    | 9,328                         | 441                    | 592                 | 13,132    | (831)     | 1,020 | (4,531)                | 3,788                      | 13,476                     | 36,415     |
| <b>P45CPNW</b>  | 7,867                         | 281                    | 667                 | 11,726    | (729)     | 1,258 | (5,207)                | 3,544                      | 15,869                     | 35,276     |

**Table L.61 – PVRR Cost Components, FOT Cases, Medium Gas Medium CO<sub>2</sub>**

| Name              | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|-------------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|                   | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P45CNW-FOT</b> | 9,588                         | 245                    | 499                 | 2,680     | (815)     | 945 | (3,093)                | 723                        | 13,304                     | 24,075     |
| <b>P45CP-FOT</b>  | 9,507                         | 238                    | 498                 | 2,671     | (806)     | 903 | (3,090)                | 724                        | 13,379                     | 24,024     |
| <b>P46CP-FOT</b>  | 9,414                         | 259                    | 508                 | 2,492     | (809)     | 944 | (3,073)                | 773                        | 13,591                     | 24,099     |
| <b>P47CP-FOT</b>  | 9,515                         | 249                    | 495                 | 2,620     | (785)     | 862 | (3,103)                | 703                        | 13,445                     | 24,001     |
| <b>P48CP-FOT</b>  | 9,602                         | 264                    | 489                 | 2,596     | (844)     | 890 | (3,095)                | 728                        | 13,468                     | 24,098     |
| <b>P53CP-FOT</b>  | 9,447                         | 258                    | 508                 | 2,515     | (809)     | 944 | (3,074)                | 766                        | 13,609                     | 24,164     |

**Table L.62 – PVRR Cost Components, Gateway and No Gas Cases, Medium Gas Medium CO<sub>2</sub>**

| Name           | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|----------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|                | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P-22CNW</b> | 10,181                        | 246                    | 491                 | 2,883     | (772)     | 888 | (5,012)                | 910                        | 13,788                     | 23,603     |
| <b>P-23CNW</b> | 9,869                         | 277                    | 495                 | 2,562     | (776)     | 957 | (4,965)                | 961                        | 14,804                     | 24,184     |
| <b>P-25CNW</b> | 10,145                        | 249                    | 463                 | 2,872     | (738)     | 903 | (5,024)                | 843                        | 14,527                     | 24,239     |
| <b>P-26CNW</b> | 10,183                        | 257                    | 472                 | 2,888     | (800)     | 934 | (4,916)                | 988                        | 13,301                     | 23,307     |
| <b>P29</b>     | 10,184                        | 257                    | 467                 | 2,890     | (800)     | 934 | (4,916)                | 993                        | 13,319                     | 23,328     |
| <b>P29PS</b>   | 9,921                         | 205                    | 568                 | 2,836     | (771)     | 940 | (4,778)                | 1,292                      | 13,402                     | 23,616     |

**Table L.63 – PVRR Cost Components, Sensitivity Cases, Medium Gas Medium CO<sub>2</sub>**

| Name       | Stochastic PVRR (\$ millions) |                        |                     |           |           |       |                        |                            |                            |            |
|------------|-------------------------------|------------------------|---------------------|-----------|-----------|-------|------------------------|----------------------------|----------------------------|------------|
|            | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM   | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>S01</b> | 9,946                         | 240                    | 466                 | 2,836     | (790)     | 843   | (4,997)                | 872                        | 12,665                     | 22,080     |
| <b>S02</b> | 10,724                        | 291                    | 486                 | 3,068     | (794)     | 896   | (4,855)                | 1,144                      | 13,386                     | 24,346     |
| <b>S03</b> | 10,430                        | 277                    | 485                 | 2,975     | (774)     | 942   | (5,007)                | 989                        | 13,071                     | 23,388     |
| <b>S04</b> | 10,413                        | 270                    | 481                 | 2,973     | (777)     | 923   | (4,995)                | 988                        | 13,032                     | 23,308     |
| <b>S05</b> | 10,177                        | 246                    | 493                 | 2,883     | (775)     | 920   | (4,929)                | 969                        | 12,985                     | 22,970     |
| <b>S06</b> | 10,755                        | 422                    | 498                 | 2,956     | (769)     | 1,067 | (5,059)                | 1,005                      | 13,163                     | 24,038     |
| <b>S07</b> | 10,233                        | 246                    | 498                 | 2,904     | (760)     | 922   | (4,952)                | 1,007                      | 13,028                     | 23,126     |
| <b>S08</b> | 10,184                        | 248                    | 503                 | 2,900     | (770)     | 895   | (4,998)                | 986                        | 13,238                     | 23,186     |

**Table L.64 – PVRR Cost Components, DSM Rebundled Cases, Medium Gas Medium CO<sub>2</sub>**

| Name         | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|--------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|              | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P45DP</b> | 10,148                        | 250                    | 497                 | 2,858     | (780)     | 889 | (4,899)                | 993                        | 13,325                     | 23,281     |
| <b>P46DP</b> | 10,013                        | 272                    | 505                 | 2,648     | (845)     | 887 | (4,925)                | 1,018                      | 13,778                     | 23,350     |
| <b>P53DP</b> | 10,046                        | 271                    | 505                 | 2,671     | (846)     | 887 | (4,930)                | 1,010                      | 13,795                     | 23,409     |



**Table L.65 – PVRR Cost Components, P70 Cases, Medium Gas Medium CO<sub>2</sub>**

| Name       | Stochastic PVRR (\$ millions) |                        |                     |           |           |     |                        |                            |                            |            |
|------------|-------------------------------|------------------------|---------------------|-----------|-----------|-----|------------------------|----------------------------|----------------------------|------------|
|            | Thermal Fuel                  | Variable O&M incl. FOT | Long Term Contracts | Emissions | Renewable | DSM | System Balancing Sales | System Balancing Purchases | Capital and Fixed O&M Cost | Total PVRR |
| <b>P70</b> | 10,454                        | 249                    | 487                 | 3,111     | (761)     | 992 | (5,239)                | 920                        | 14,221                     | 24,433     |
| <b>P71</b> | 10,380                        | 232                    | 476                 | 3,116     | (761)     | 999 | (5,182)                | 891                        | 14,269                     | 24,419     |
| <b>P72</b> | 10,479                        | 244                    | 470                 | 3,161     | (759)     | 959 | (5,159)                | 887                        | 14,225                     | 24,508     |
| <b>P73</b> | 10,455                        | 258                    | 501                 | 3,034     | (758)     | 950 | (5,135)                | 954                        | 14,397                     | 24,656     |
| <b>P74</b> | 10,523                        | 248                    | 467                 | 3,178     | (761)     | 984 | (5,138)                | 873                        | 14,244                     | 24,617     |

**Table L.66 – 10-year Average Incremental Customer Rate Impact\***

| \$ Millions     | 10-year Average Incremental Customer Rate Impact (2019 - 2028) |      |                                     |      |                                     |      |                                     |      |                                     |      |
|-----------------|--|------|-------------------------------------|------|-------------------------------------|------|-------------------------------------|------|-------------------------------------|------|
|                 | Low Gas, No CO <sub>2</sub>                                    |      | Medium Gas, Medium CO <sub>2</sub>  |      | High Gas, High CO <sub>2</sub>      |      | Social Cost of Carbon               |      | Average                             |      |
|                 | Difference from Preferred Portfolio                            | Rank | Difference from Preferred Portfolio | Rank | Difference from Preferred Portfolio | Rank | Difference from Preferred Portfolio | Rank | Difference from Preferred Portfolio | Rank |
| <b>P45CNW</b>   | 0  | 4    | 0                                   | 5    | 0                                   | 5    | 0                                   | 6    | 0                                   | 5    |
| <b>P36CP</b>    | 114  | 8    | 102                                 | 8    | 81                                  | 8    | 9                                   | 8    | 77                                  | 8    |
| <b>P45CP</b>    | (1)  | 3    | (1)                                 | 3    | (1)                                 | 3    | 0                                   | 7    | (0)                                 | 4    |
| <b>P46CP</b>    | 4  | 5    | (0)                                 | 4    | (1)                                 | 4    | (30)                                | 1    | (7)                                 | 1    |
| <b>P46J23CP</b> | 50   | 7    | 34                                  | 7    | 19                                  | 7    | (28)                                | 2    | 19                                  | 7    |
| <b>P47CP</b>    | (7)  | 1    | (5)                                 | 1    | (2)                                 | 2    | (1)                                 | 5    | (3)                                 | 2    |
| <b>P48CP</b>    | (5)  | 2    | (4)                                 | 2    | (2)                                 | 1    | (2)                                 | 4    | (3)                                 | 3    |
| <b>P53CP</b>    | 18   | 6    | 15                                  | 6    | 16                                  | 6    | (7)                                 | 3    | 11                                  | 6    |

\*The relative difference in customer rate impacts is negligible and no adjustment to the selection of P-45CNW as the preferred portfolio.

**Table L.67 – 20-year Average Incremental Customer Rate Impact \***

| \$ Millions     | 20-year Average Incremental Customer Rate Impact (2019 - 2038) |      |                                     |      |                                     |      |                                     |      |                                     |      |
|-----------------|--|------|-------------------------------------|------|-------------------------------------|------|-------------------------------------|------|-------------------------------------|------|
|                 | Low Gas, No CO <sub>2</sub>                                    |      | Medium Gas, Medium CO <sub>2</sub>  |      | High Gas, High CO <sub>2</sub>      |      | Social Cost of Carbon               |      | Average                             |      |
|                 | Difference from Preferred Portfolio                            | Rank | Difference from Preferred Portfolio | Rank | Difference from Preferred Portfolio | Rank | Difference from Preferred Portfolio | Rank | Difference from Preferred Portfolio | Rank |
| <b>P45CNW</b>   | 0  | 1    | 0                                   | 6    | 0                                   | 8    | 0                                   | 8    | 0                                   | 7    |
| <b>P36CP</b>    | 50   | 8    | 21                                  | 8    | (20)                                | 7    | (45)                                | 5    | 2                                   | 8    |
| <b>P45CP</b>    | 35   | 7    | 5                                   | 7    | (30)                                | 6    | (20)                                | 7    | (3)                                 | 6    |
| <b>P46CP</b>    | 25   | 5    | (12)                                | 3    | (51)                                | 3    | (56)                                | 2    | (24)                                | 2    |
| <b>P46J23CP</b> | 4  | 2    | (33)                                | 1    | (75)                                | 1    | (90)                                | 1    | (48)                                | 1    |
| <b>P47CP</b>    | 23   | 4    | (5)                                 | 5    | (37)                                | 5    | (27)                                | 6    | (11)                                | 5    |
| <b>P48CP</b>    | 22   | 3    | (13)                                | 2    | (51)                                | 2    | (46)                                | 4    | (22)                                | 3    |
| <b>P53CP</b>    | 29   | 6    | (7)                                 | 4    | (45)                                | 4    | (47)                                | 3    | (17)                                | 4    |

\*The relative difference in customer rate impacts is negligible and no adjustment to the selection of P-45CNW as the preferred portfolio.

**Table L.68 – Loss of Load Probability, Major (> 25,000 MWh) July Event, Medium Gas Medium CO<sub>2</sub>**

| Year | P45CNW - Preferred Portfolio | P36CP | P45CP | P46CP | P46J23CP | P47CP | P48CP | P53CP |
|------|------------------------------|-------|-------|-------|----------|-------|-------|-------|
| 2019 | 2%                           | 0%    | 2%    | 2%    | 2%       | 2%    | 2%    | 2%    |
| 2020 | 0%                           | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2021 | 0%                           | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2022 | 2%                           | 2%    | 2%    | 2%    | 2%       | 2%    | 2%    | 2%    |
| 2023 | 0%                           | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2024 | 0%                           | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2025 | 0%                           | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2026 | 0%                           | 2%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2027 | 0%                           | 2%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2028 | 0%                           | 4%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2029 | 4%                           | 2%    | 4%    | 2%    | 4%       | 4%    | 4%    | 2%    |
| 2030 | 0%                           | 0%    | 0%    | 2%    | 2%       | 0%    | 0%    | 0%    |
| 2031 | 0%                           | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2032 | 0%                           | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| 2033 | 2%                           | 0%    | 6%    | 6%    | 12%      | 2%    | 0%    | 6%    |
| 2034 | 0%                           | 2%    | 0%    | 0%    | 2%       | 0%    | 2%    | 0%    |
| 2035 | 12%                          | 0%    | 6%    | 12%   | 14%      | 12%   | 14%   | 12%   |
| 2036 | 6%                           | 2%    | 0%    | 8%    | 10%      | 14%   | 8%    | 8%    |
| 2037 | 2%                           | 18%   | 2%    | 24%   | 20%      | 24%   | 22%   | 24%   |
| 2038 | 14%                          | 24%   | 8%    | 28%   | 22%      | 26%   | 26%   | 28%   |

**Table L.69 – Summer Peak, Average Loss of Load Probability, Medium Gas Medium CO<sub>2</sub>**

| Event Size<br>(MWh) | Average for operating years 2019 through 2028 |       |       |       |          |       |       |       |
|---------------------|---|-------|-------|-------|----------|-------|-------|-------|
|                     | P45CNW - Preferred<br>Portfolio               | P36CP | P45CP | P46CP | P46J23CP | P47CP | P48CP | P53CP |
| > 0                 | 12%   | 11%   | 12%   | 11%   | 12%      | 12%   | 12%   | 11%   |
| > 1,000             | 5%  | 8%    | 5%    | 6%    | 6%       | 6%    | 5%    | 6%    |
| > 10,000            | 1%  | 3%    | 1%    | 1%    | 1%       | 1%    | 1%    | 1%    |
| > 25,000            | 0%  | 1%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| > 50,000            | 0%  | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| > 100,000           | 0%  | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| > 500,000           | 0%  | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |

| Event Size<br>(MWh) | Average for operating years 2019 through 2038 |       |       |       |          |       |       |       |
|---------------------|---|-------|-------|-------|----------|-------|-------|-------|
|                     | P45CNW - Preferred<br>Portfolio               | P36CP | P45CP | P46CP | P46J23CP | P47CP | P48CP | P53CP |
| > 0                 | 21%   | 15%   | 16%   | 22%   | 24%      | 24%   | 22%   | 22%   |
| > 1,000             | 15%   | 12%   | 12%   | 17%   | 19%      | 18%   | 18%   | 17%   |
| > 10,000            | 6%  | 6%    | 4%    | 9%    | 10%      | 9%    | 9%    | 9%    |
| > 25,000            | 2%  | 0%    | 2%    | 4%    | 5%       | 4%    | 4%    | 4%    |
| > 50,000            | 1%  | 1%    | 0%    | 2%    | 2%       | 2%    | 1%    | 2%    |
| > 100,000           | 0%  | 1%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| > 500,000           | 0%  | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |
| > 1,000,000         | 0%  | 0%    | 0%    | 0%    | 0%       | 0%    | 0%    | 0%    |