HEBER LIGHT & POWER
INTEGRATED RESOURCE PLAN

2021-2025 with long-term projections

JANUARY 20, 2020

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ENERGY RESOURCE DEPARTMENT
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Contents

Introduction

Heber Light & Power conducts an extensive planning process for integrating resources that includes working with our Board of Directors, stake holders, and consultants to define our energy future. Together we have developed a plan that addresses our current portfolio strengths and weaknesses and identifies the need to rebalance and diversify our energy resource mix. This document defines our objectives, characterizes our planning environment along with external factors that could impact our decision making, and provides a plan that will help us transition into an emissions-conscious future while meeting our cost, risk, and reliability objectives.

Plan Objective

THE COMPANY'S MISSION IS TO PROVIDE ITS CUSTOMERS WITH SAFE, RELIABLE ENERGY, IN AN OPEN, RESPONSIBLE AND ENVIRONMENTALLY SOUND MANNER WHILE UNDERTAKING A COMMITMENT TO THE VALUES OF INTEGRITY, INNOVATION, ACCOUNTABILITY AND COMMUNITY SERVICE, AND TO PROMOTE AN INTERNAL CULTURE THAT FOSTERS SAFETY, LOYALTY AND CREATIVITY AS WELL AS MAINTAINING A HIGHLY SKILLED, MOTIVATED WORKFORCE.

HL&P Mission Statement

The objectives of this plan are designed to support our company mission.

- Providing reliable service is the foundation of what we do. A diverse portfolio with redundancy in resources and transmission is the key to reliability.
- Managing costs ensures that we provide affordable service and stable rates to our customers.
- Providing energy in an environmentally responsible manner is important to our community. Developing a sustainable portfolio requires us to seek innovative means of reducing load requirements and incorporating emissions free resources.
- We work to mitigate risk by maintaining a diverse portfolio and a flexible plan that can be adapted to fit a changing environment.

To meet these objectives, we will seek innovative solutions, maintain flexibility as new technologies and opportunities emerge in the energy sector, and build a diverse energy resource portfolio in order to provide reliable cost-conscious service to the community we serve.

Planning Approach

Load studies, engineering studies, customer surveys, and discussions with our BOD helped us create a snapshot of the planning environment and identify how external and internal influences may impact the plan going forward.

Load Studies

Understanding our system load profile and our forecast provides the basis of our planning environment. In 2018, Utility Financial Solutions(UFS) completed the Heber Light & Power(HL&P) Electric Load and Energy Forecast (Heberpower.com, 2020). UFS developed an econometric model to fit historical usage patterns with consideration to future population growth projections and additional independent variables that impact energy loads and demand. To facilitate the study, HL&P provided ten years of historical hourly kilowatt-hour usage and kilowatt demand data broken out by city and circuit, ten years of historical hourly weather data, a ten-year forecast of energy efficiency kilowatt-hour savings, and a distributed generation energy forecast. UFS used demographic data from Woods and Pool and the University of Utah for predicted population growth and changes over the next twenty plus years.

In addition to studying energy and demand requirements, Intermountain Consumer Professional Engineers, Inc. (ICPE) completed a 46 kV Load Flow Study in June 2018 and a 12.47 kV Load Flow Study in March 2019 (Heberpower.com, 2020). These load flow studies help us understand how energy flows through our system and what needs to be done to ensure reliable and redundant transmission and distribution of energy to our customers. For these studies, we provided ICPE with ten years of 15-minute interval load data by circuit, and fifteen-minute interval data for on-system generation including the Jordanelle Hydro-electric generation, the three run-of-the-river hydro-electric generators, and the natural gas power plant generation data. These studies also considered load data by city and the 12.47 kV Load Flow Study utilized the growth by city projections provided in the UFS Electric Load and Energy Forecast.

Stakeholder Input

Gathering stakeholder input included planning discussions with our BOD where topics related to energy resource planning were covered. In 2019, workshops with UFS and the BOD were held to discuss rate design and its impact on customer energy usage and distributed generation. Energy resource presentations and discussions are a regular part of board meetings and provide opportunity for the BOD to learn about resource options and provide related feedback to staff. Our customers were also given the opportunity to participate in the planning process through an energy resource survey and an Open House held during the October 2019 Public Power Week. The following table provides the dates of important discussions and events related to resource planning and the IRP process, occurring during 2018 and 2019.

Table 1 IRP Planning Activities

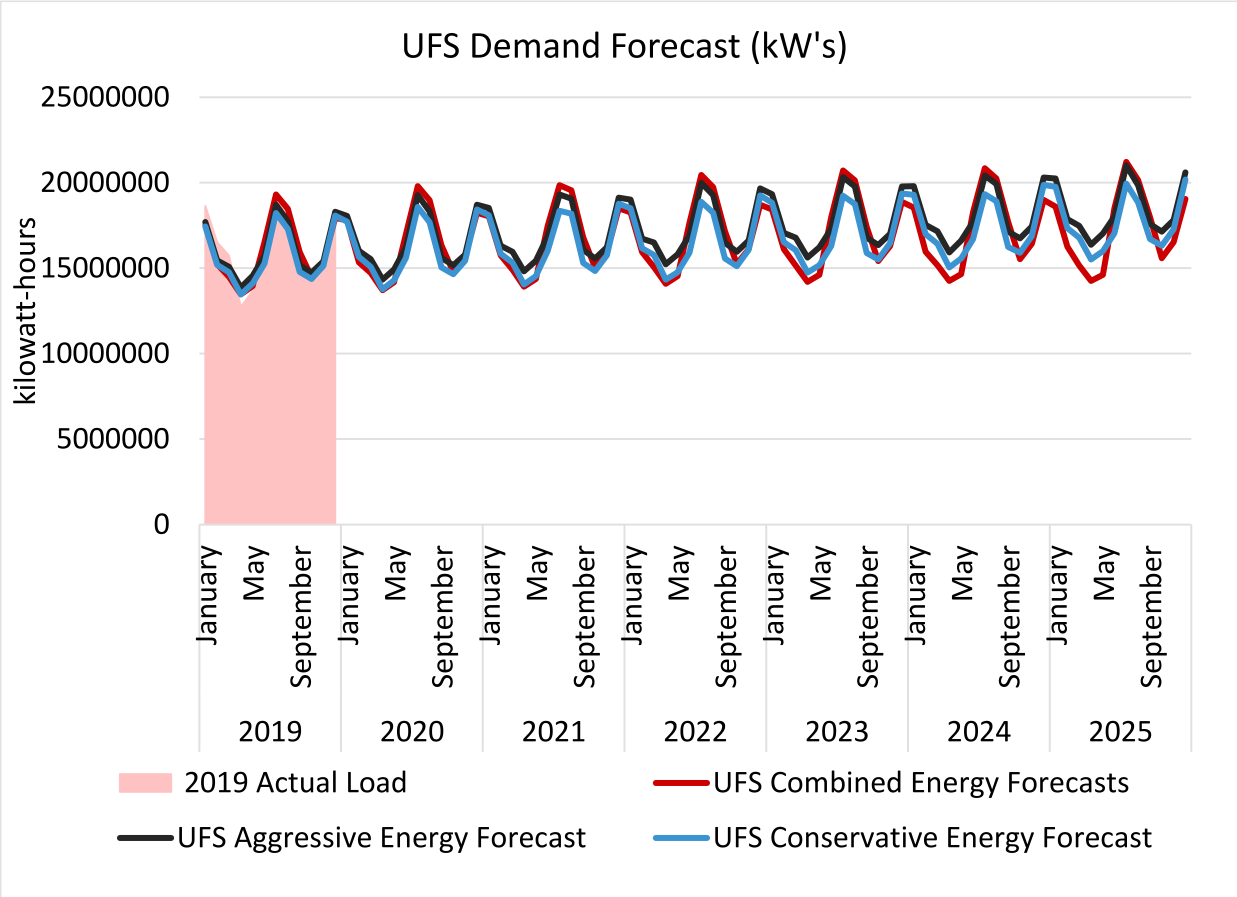
Integrated Resource Plan BOD Workshops & Discussions	
April 18, 2018	Review of Econometric Modeling and Load Forecast Study with BOD
May 31, 2018	Review of Overhead/Underground Engineering Study with BOD
July 18, 2018	Wholesale Energy Portfolio and Risk Management Review with BOD
August 6, 2018	Carbon Free Power Project Work Session/ Public Hearing
August 22, 2019	Review of Patua Power Purchase Agreement
February 27, 2019	Introduction to Integrated Resource Planning
April 2019	Company Newsletter IRP News
March 27, 2019	IRP Goals
April 1, 2019	UFS Rate Design Option Discussion / Workshop
May 29, 2019	Review of rate action
June 26, 2019	Review of energy resource evaluation criteria
July 31, 2019	Discussion of resources & rates: Carbon Free Power Project, rate design, Red Mesa Solar Project
August 28, 2019	Discussion of IRP Customer Survey
August 29, 2019	IRP Survey Opens
October 10, 2019	Resource Open House & Power Plant Tour

Planning Environment Defined

Load & Resource

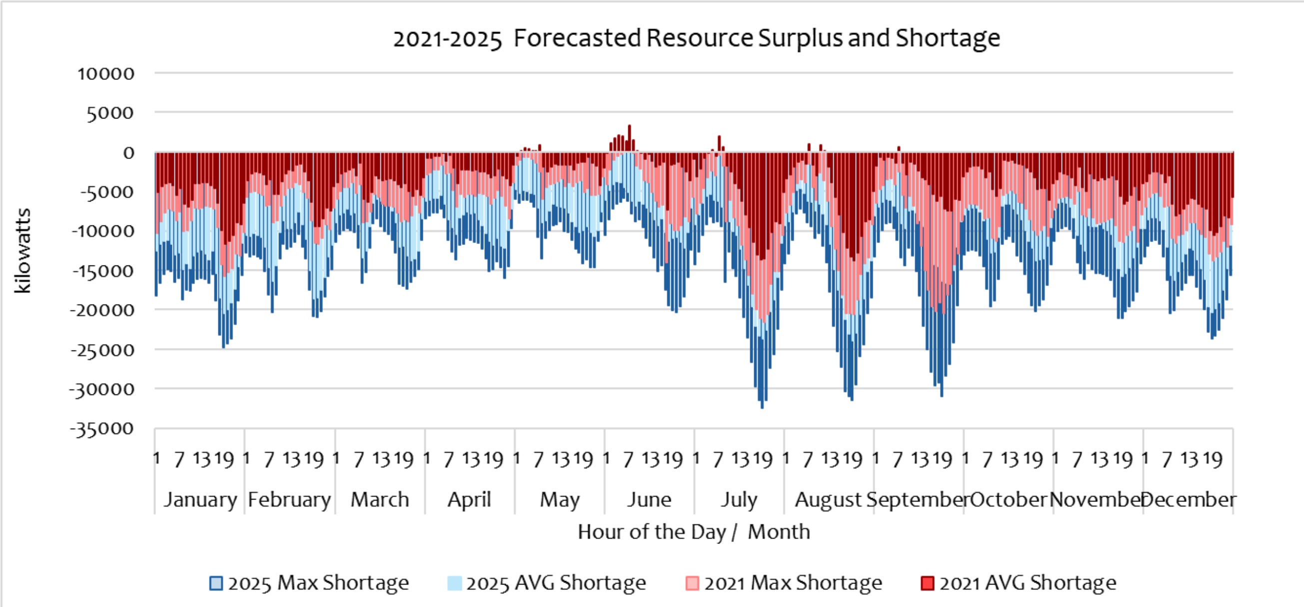
The UFS load study forecasted demand growing at an average rate of 2.1 percent each year over the next five years and energy sales growing 1.9 percent each year over the next twenty years. Since the completion of the study, we have seen load growth vary due to the seasonality of building and weather patterns. We expect to continue to see growth spurts and above and below average weather patterns which will cause actual growth to deviate from the UFS forecast to some extent. To plan for these deviations from the forecast, we track housing and commercial developments to project when they will connect to the system, unusual events such as annexations and large developments are also considered in near-term forecasting, along with weather forecasts.

Figure 1 UFS Demand Forecast



The goal of energy resource procurement is to meet the hourly energy and peak demand requirements of our system while controlling cost. To do this effectively, resource forecasts and load patterns are modeled using the current energy resource portfolio and load forecast as a starting point. First, we identify expected hourly shortages so we can determine how to fill them. Below is a chart with the hourly shortages for the next five years.

Figure 2 2021-2025 Resource Surplus and Shortage



The future planning environment will dictate which resources will retire, be subject to carbon tax, or be in high demand, but today there are contracts and generation facilities in place that make up our current power supply. Small run-of-the-river hydropower was the first resource available to HL&P customers in 1909. Small hydro continues to be one of the company's most reliable and affordable resources, but much has changed since Heber City, and the cities of Midway and Charleston founded HL&P. Today, geothermal, solar, natural gas, coal, and large hydro are also part of the portfolio. The Heber Light & Power Energy Resources table below summarizes the energy resources that are now in the portfolio, as well as what is planned.

Table 2 HL&P Energy Resource Portfolio

Heber Light and Power Energy Resources						
Project	Location	Total Project Capacity	Capacity Available to Heber	Fuel	Heber Percent Ownership	History
Federal Hydro Power	Colorado River/Upper Basin States	10395 MW	Seasonal Contract Rate of Delivery (9.45 MW Winter/ 7 MW Summer)	Federal Hydro and Other	None	Agreement as of March 27, 2007. Renews in 2025.
Hunter	Hunter, UT	1320 MW	PPA 6.0334% of UAMPS	Coal	None	Agreement as of June 1, 1981. Ends

			share (3.783 MW)			upon plant retirement.
IPP	Delta, UT	1800 MW	0.627% (1 MW)	Coal	None	Agreement as of December 1, 1980. Retrofit to Nat Gas in 2025.
Pleasant Valley Wind	Uinta County Wyoming	144 MW	0.02% (.726MW)	Wind	None	Agreement active 2004 - 2029
Horse Butte Wind	Bonneville County Idaho	57.6 MW	1.76% of total plant capacity	Wind	None	Plant operation commenced August 15, 2012.
Heber Owned Nat Gas Gen	Wasatch County	13 MW	100%	Natural Gas	100%	Plant in service since 1986
Jordanelle	Wasatch County	13 MW	1/3 plant generation (0-4.3MW)	Run of River Hydro	None	Plant in service since 2008
Heber Light & Power Hydros	Wasatch County	4.1 MW	100% (0-4MW)	Run of Stream Hydro	100%	Plants in service since 1982 L.C. 1942 S.C. Est.
Patua Geothermal/Solar	Nevada	25 MW Geothermal 10 MW Solar	0-12 MW	Binary Geothermal Solar PV	None	Geothermal Plant Commissioned in 2013 Solar commissioned in 2017 Heber PPA active Nov 2018 - November 2033
Market Power Purchases	Market Contract	Varies	3 MW HLH/ 3 MW Flat/ Seasonal Shaped Varies	Misc.	None	April 2017- March 2022/ Seasonal Shaped as Needed
CFPP	Idaho	720 MW	10 MW	Small Modular Nuclear Reactor	None	Currently in planning stage
Red Mesa Tapaha Solar Project	Navajo Nation	66 MW	7.5758% entitlement share (5 MW)	Solar	None	Scheduled Commercial Operation ~June 1, 2022 - 25-year delivery term

The peak demand forecast below shows historical and projected system coincident peaks. We project exceeding the UFS peak and energy forecast over the next seven years then coming back in line with the UFS forecast in 2028. Our forecast deviates from the UFS forecast because our growth projections for our service territory are higher than the area population forecasts used by UFS.

Table 3 UFS and HL&P Coincident Peak Projections

UFS and HL&P Coincident Peak Projections							
Year	Historical Peak	Year	Historical Peak	UFS Peak Projection	HL&P Projection	Year	UFS/HL&P Peak Projection
2007	29,558	2018	42,503	40,244		2029	49,737
2008	29,102	2019	43,207	41,188		2030	51,511
2009	29,111	2020		42,169	44,071	2031	52,634
2010	30,909	2021		42,642	44,864	2032	53,141
2011	29,693	2022		43,864	45,446	2033	54,369
2012	31,725	2023		45,132	46,264	2034	55,944
2013	35,205	2024		45,565	46,708	2035	57,354
2014	35,863	2025		45,420	47,175	2036	58,437
2015	36,713	2026		46,191	47,647	2037	60,646
2016	38,781	2027		47,208	48,124	2038	61,074
2017	39,776	2028		48,829	48,845	2039	62,609
						2040	63,198

External Influences on the Planning Environment

Many factors external to our planning environment could impact our system demand, energy requirements, and system configuration. New homes and business continue to be built at a rapid rate in our service territory, increasing our customer base and changing our load profile . Legislation on the federal and local level also impact our resource portfolio. Increasing renewables could change how we operate and how much generation we keep in reserves. Electrification trends could substantially change our load profile and energy requirements. Electric vehicle car charging could increase our evening and off-peak loads. As we add customer-owned distributed generation on the system we will see a significant decrease in day-time loads and an increase in peak loads. Pilot rates and time of use rates could also change our load profile and the types of resources that we need. All these factors trigger a change in planning.

Wholesale Power Markets, Transmission, and Risk

The most concerning of all external factors are those that affect the cost of power and reliable transmission. To understand the need for flexibility, we need to understand our wholesale power markets, transmission rights, load balancing requirements, and the environmental regulations that we face.

As a member of Utah Associated Municipal Power Systems (UAMPS), we participate in the Pool Project which is an hourly resource clearinghouse for member energy surplus, reserves, and transmission rights. As a Joint Action Agency, UAMPS provides wholesale electric-energy services to its members. Through this UAMPS service, we have access to the regional wholesale power market and the UAMPS member power pool.

We operate in the Western Interconnection's Bulk Electric System which is regulated by the Western Electricity Coordinating Council (WECC). WECC operates under a Federal Regulatory Commission (FERC) agreement with the North American Electric Reliability Corporation (NERC). WECC exists to mitigate risks to the reliability and security of the Western Interconnection's Bulk Power System (Wecc.org, 2020). We receive transmission from PacifiCorp/Rocky Mountain Power, as does UAMPS. PacifiCorp's 2019 IRP includes an analysis of regional power reliability as it applies to our region(71). As a PacifiCorp customer, our transmission needs are included in their regional planning efforts and we work with them to ensure that our interconnect(s) are adequate for our needs going forward.

FERC requires that Investor Owned Utilities (IOUs) participate in local and sub-regional transmission planning to identify transmission project needs and the associated costs, benefits, and risks. To utilize regional transmission systems the Energy Imbalance Market (EIM) was established by the California Independent System Operator and PacifiCorp for real-time balancing of supply and demand. Currently, HL&P is subject to the EIM as it applies to the total UAMPS member's real-time energy balancing and because PacifiCorp is HL&P's transmission provider, HL&P may be subject to the EIM as it applies to only HL&P's node, in the future. As a participant in the EIM, we are required to balance our utility load in real-time with the help of the UAMPS member power pool. We are subject to pay our share of the UAMPS energy imbalance charges. To mitigate EIM risk, we operate a real-time power trading desk and our natural gas power plants.

We have additional access to the wholesale power market through the Western Replacement Power (WRP) piece of the Federal Hydro-Power Salt Lake Area Integrated Projects contracts administered by the Western Area Power Administration (WAPA). The contract allows for a small amount of market power to be purchased each month to replace federal hydro power generation that is less than the total Contracted Rate of Delivery (CROD) available to HL&P. In October 2019, WAPA announced that it intends to join the Southwest Power Pool (SPP) Western Energy Imbalance Service (WEIS). Currently, the consequences of being subject to multiple EIM is unknown. We will continue to monitor the changes and subsequent effects on power availability, scheduling constraints, and cost.

If an EIM operates as designed, there will be some benefits to participation as we gain access to resources dispersed throughout the grid. Economic efficiencies become available which in turn reduce pressure on the company to maintain its own costly generation reserves and renewable resources.

In addition to the EIM charges, we face the risk of increases to transmission charges. We pay transmission and scheduling charges to UAMPS for delivered energy. UAMPS has a Transmission Service and Operating Agreement (TSOA) with PacifiCorp that provides a form of network transmission service to UAMPS that is regulated by FERC. As with all rates and fees, there is always the risk that they will go up. Furthermore, any energy that is wheeled to HL&P outside of the UAMPS/PacifiCorp TSOA is subject to a much higher transmission rate.

Aside from transmission and scheduling rates, fluctuations in future wholesale market power prices can significantly impact rate stability and power costs for our customers. Market power prices can and will fluctuate from hour to hour with the influx of intermittent renewable resources, Renewable Portfolio Standards (RPS) putting pressure on utilities to further increase renewables, and the retirement of coal plants

Portfolio Cost Modeling

The PacifiCorp IRP uses econometric modeling techniques for forecasting which include variables such as natural gas pricing, electricity market prices for Mid-C, COB, Four Corners, and Palo Verde, the Official Forward Price Curve (OFPC), loads for regions including Utah, hydro generation, and short-term volatility. It is not the intent of the HL&P IRP to delve into econometric modeling for price forecasting, instead we rely on the work of large utilities that participate in the same EIM, specifically the price models from PacifiCorp's most recent IRP. Chapter Seven of the PacifiCorp 2019 IRP includes a detailed explanation of their modeling and statistical analysis of pricing and resource mix (Pacificorp.com, 2020, pp. 171). In the PacifiCorp IRP, electricity price forecasts range from $21.64/MWh to $99.34/MWh during the 20-year study period (Pacificorp.com, 2020, pp. 186).

In addition to considering the PacifiCorp electricity price forecast for this IRP, the Simulated Annual Western Natural Gas Market Prices are also considered useful. In this forecast natural gas prices range from $1.85/MMBtu to $7.65/MMBtu over the long-term 20-year period (Pacificorp.com, 2020, pp. 187). Our cost models utilize the pricing reflected in the PacifiCorp IRP, as well as UAMPS budgetary numbers for the short-term cost.

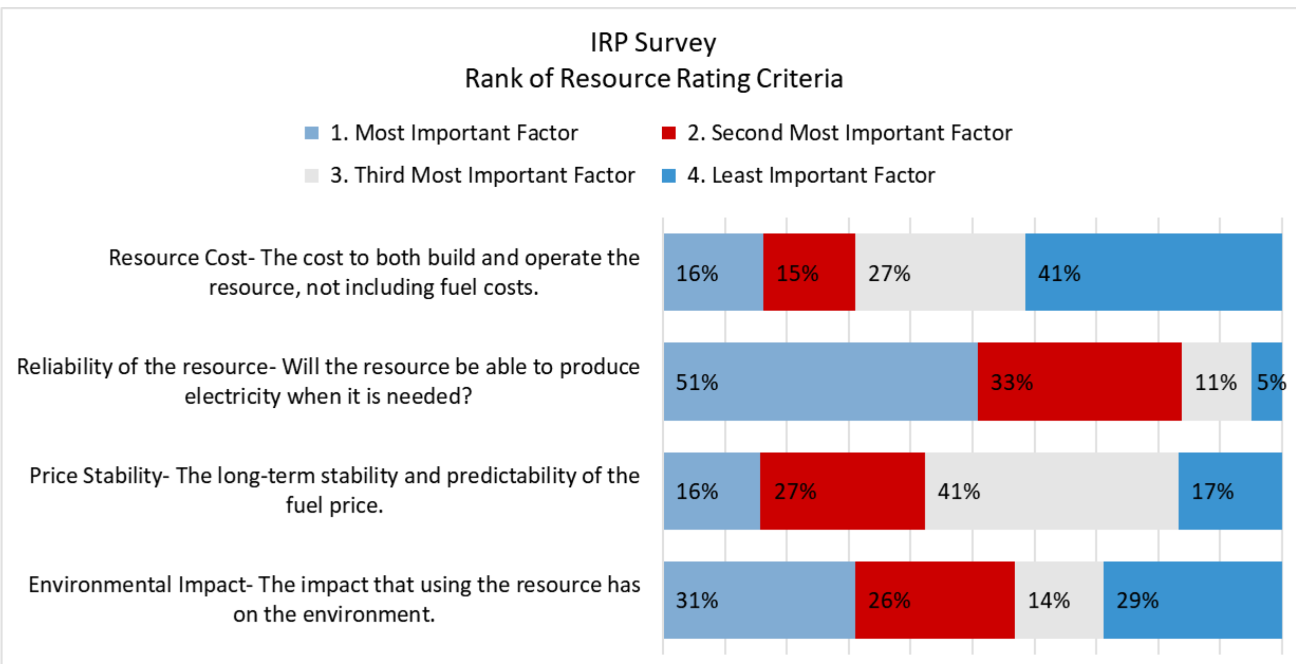
While market electric prices and natural gas prices are constantly fluctuating, the possibility of a carbon tax could further raise power prices. Keeping CO_2 emissions to a minimum in the HL&P portfolio will help to mitigate this risk. Other mitigation measures cannot be weighed until the timing of CO_2 reduction rules and regulations are known. Avoiding ownership in new carbon-based projects that are not eligible for carbon capture technologies should be avoided to reduce risk.

Preferred Plan Evaluation Criteria

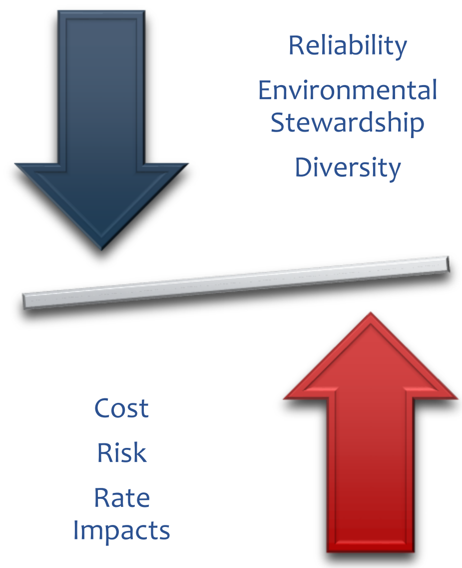
Throughout the planning process, we have explored how we can supply energy requirements in accordance with the priorities and goals of our customers and owner cities, and with our goal to strive to always provide transmission reliability, affordable energy, and best-fit resource options in an environmentally friendly manner.

Our HL&P IRP Customer Survey was completed by two percent of our customer base. The survey results show that customers are interested in integrated resource planning. They want to see coal phased out of the portfolio, and our residential customers consider reliability to be the first most important factor to consider when evaluating a resource while our commercial customers consider cost to be the first most important factor. Overall, our customers are interested in emissions-free resources, and incorporating demand-side management tools and emerging technologies into the portfolio.

Figure 3 HL&P IRP Survey Results on Resource Evaluation for All Customers



It can be difficult to strike a balance between our cost, risk, environmental and operational objectives as we see that meeting one objective can mean sacrificing our desire to meet another. For example, choosing only emissions free resources could meet our environmental objectives if we are willing to sacrifice our desire to provide rate stability and reliability. In determining how to strike a balance without sacrificing our ideals, we have developed a scorecard that can be used to evaluate resources as we need to add to our portfolio in the future. Adding a new resource typically involves years of study and analysis. The scorecard is just one tool that can be used to ensure that all objectives for our portfolio are given consideration as we analyze resource options.



The scorecard criteria help us evaluate the negative impact a resource could have on meeting portfolio objectives. Cost and risk, environmental stewardship, fit to load, and transmission reliability are scored based on having zero impact to a high impact on each of the criteria. Additional considerations will be made for individual resources based on unique circumstances like contract terms, ownership, and life cycle. Resource with a higher impact score will either be slated for retirement from the portfolio or be considered as "place-holders" to fill shortages over the near-term until better fit lower impact resources can be secured.

Table 4 Energy Resource Evaluation Scorecard

Resource Impact on Portfolio Objectives

Impact	Transmission Reliability	Environmental Stewardship	Best fit & Diversity	Cost	Score- Negative impact on meeting portfolio objectives
High Impact (3)	Is there loss of load risk? Does this resource account for a large percentage of demand?	This resource is not eligible for carbon capture and is a carbon-based resource.	This resource has an assigned retirement / expiration date? Is the project life less than ten years?	Will this likely cause rates to increase? Is there a risk of unknown costs being added to the cost of energy?	

Medium Impact (2)	Is loss of load risk minimal?	Is this resource carbon free and if not is it eligible for carbon capture technology?	Is it intermittent or scheduled for the benefit of outside entities?	Are transmission losses/costs higher than other portfolio resources? Does this resource cost more than other portfolio resources?	
Low Impact (1)	Does this resource have a transmission path that is within the UAMPS network?	This resource is carbon free.	Does unit availability typically match load requirements?	Is it in line with other portfolio costs? Can risk be managed through futures hedging/ planning?	
No Impact (0)	Is this resource on system and/or dispatchable?	This resource is adding additional carbon free kWhs to the portfolio (i.e. not replacing another carbon-free resource)	Is it dispatchable to some extent or provide a needed load profile?	Does it minimize portfolio cost and/ or risk?	
Resource					
Horse butte Wind	1	0	2	2	5
Jordanelle	0	0	0	1	1
Hunter	1	3	3	0	7
Patua- Geothermal/Solar	1	0	1	0	2
Red Mesa Solar	1	0	1	0	2
Nat Gas Gen	0	2	0	1	3

Planning Horizon

Planning horizon for this IRP follows the Western Area Power Administration (WAPA) IRP requirement for our Federal hydropower contracts. WAPA requires that we submit yearly IRP reports and five-year IRP updates. The State of Utah does not currently require public power utilities to submit IRPs to the state. This IRP covers the required five-year plan horizon as well as a 10- and 20-year planning horizon, although in less detail. This plan shall be updated every five years according to the WAPA update requirements.

Our Energy Future

Carbon Conscious

The five-year planning horizon for this IRP begins a transition to a portfolio that is substantially carbon-free. Emissions reduction requirements and carbon taxes are very likely to be part of our future and keeping a carbon-based portfolio increases the company's risk of paying high energy prices. It is imperative that we transition away from carbon-based resources to prepare for inevitable changes to our planning environment. The transition away from carbon may take ten to twenty years, but by paving the way with prudent decision making we help to smooth the transition. Maintaining diversity in the portfolio and adding carbon-free resources when, and only when, it makes sense will help us do that.

Energy Efficient

Our Energy Efficiency Program is an important part of our portfolio, as well. Energy that we can avoid using is always our lowest cost option. When our customers invest in energy efficient appliances, load controls, and efficient cooling systems it helps reduce the company's load and demand. In 2019, we updated our energy efficiency program to be more flexible to incent options with the highest return on investment. As different areas in energy efficiency meet saturation levels, we will continue to update our program to ensure that we are incenting options with the highest return for all our customers.

As administrators of our own energy efficiency program, we have staff dedicated to helping our customers reduce their energy consumption levels. This includes new customers that are building homes and businesses in our service territory. Many cities are starting to adopt green building codes and as part of our efforts we would like to be a resource for our owner cities and to Wasatch County when they choose to explore green building codes. It is our hope that our community will look to us for assistance and expertise in helping them reduce their carbon footprints and manage their energy usage.

Customer Owned Generation

Our customer survey showed our community wants renewable resources and our customers continue to make substantial investments in generating their own renewable energy. We offer a Net Metering Program and Policy that supports our customers by providing a one for one kilowatt credit for their generation. This policy is currently subsidized by all our customers and will slowly be corrected with rate design changes over time. Currently, we have close to 1.5 megawatts of installed roof-top solar capacity on our system. Based on our last engineering study looking at distributed generation, we could allow almost 5.5 megawatts of distributed generation in total on our system, with different circuits having different limits. Thirty percent of that is installed, and if installations continue at the same rate as we have seen over the last six years we will be saturated before 2035. As we add solar installations, our load profile shows reduced day-time loads and increased ramp rates on peak.

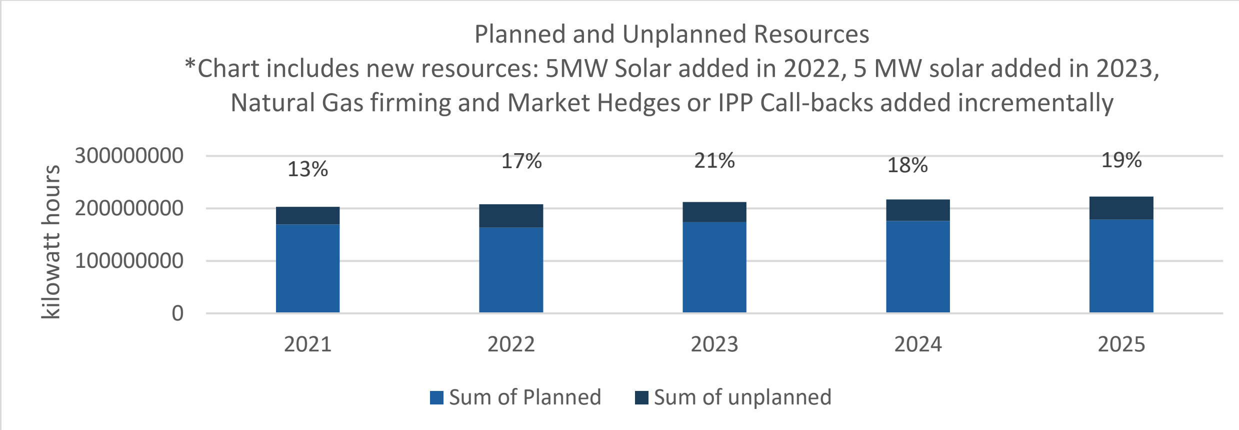
Five Year Plan

In the five-year planning horizon, a significant market power hedge expires in 2022. To replace part of this hedge, we have signed a power purchase agreement to add five megawatts from the Red Mesa Solar Project coming online in 2022. In addition to the Red Mesa Solar Power Purchase Agreement, this plan calls for the addition of five more megawatts of solar to be added in 2023. The solar energy will be firmed with our natural gas power plants. Natural gas will also be used to bridge the gap that will remain between load and resources.

Our natural gas power plants operate under a minor source emissions Approval Order from the Department of Environmental Quality Division of Air Quality. We are not a major source of pollutants and operate well under our limits for CO and NOx, making our plants a carbon-conscious option for firming renewables. During the five-year planning period, we may have the option of adding additional natural gas capacity to our natural gas fleet to allow for more renewable firming capacity and peak shaving.

Additionally, we may need to include a resource that can serve as a placeholder so that carbon-free resources can be added down the road. This will likely be a short-term market power hedge or a seasonal call-back of Intermountain Power Plant capacity. This additional power will likely be needed to comply with the company's risk management policy to stay planned within 20% of expected load. The recommended additions to the portfolio reduce hourly shortages to manageable levels and allow shortages to be managed with hourly market and natural gas. The gap between what is planned and what is needed will grow as load grows, but with the plan in place we keep risk at a manageable level.

Figure 4 2021-2025 Preferred Portfolio

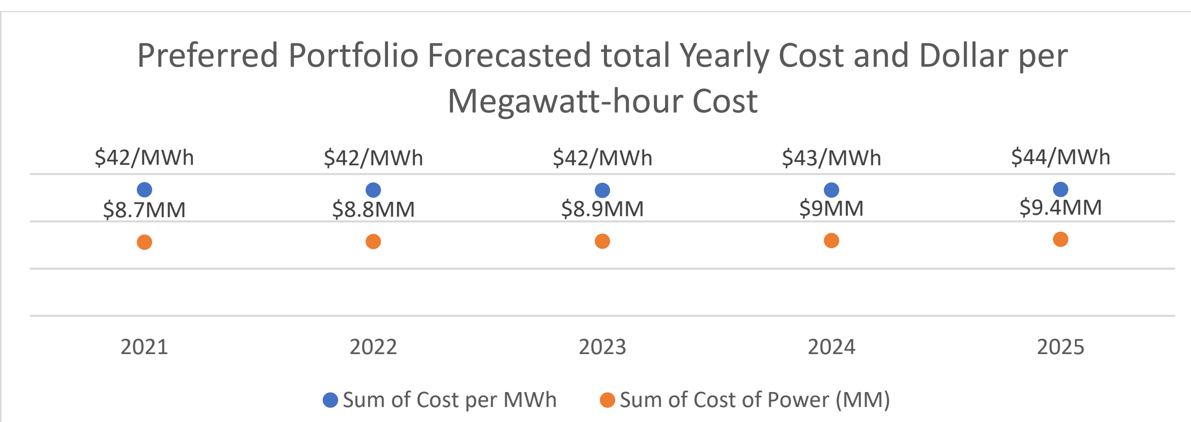


Cost of Wholesale Power

This preferred portfolio results in an average cost per megawatt hour that remains in line with historical pricing at $42/MWh, in the projected scenario. The total cost of wholesale power rises each year due to our expected load growth which increases the amount of higher cost resources that we need in the portfolio. By blending solar in with the higher cost resources, we maintain our overall low cost per megawatt hour. Our preferred portfolio model factors in unexpected weather events, price swings, and other normal market conditions.

To understand the worst-case scenario, we also modeled using unexpected aggressive market pricing scenarios combined with larger than expected load growth. This could bring the overall dollar per megawatt-hour cost up to $49/MWh. The preferred portfolio includes locking in resources with fixed pricing to lower the risk of market exposure. We add solar which is intermittent, but not to the extent that we cannot back it up with natural gas generation. This also helps us avoid the negative impact of renewable generation intermittency.

Figure 5 2021-2025 Projected Wholesale Power Cost



Circumstances that could have the greatest impact on cost would be any combination of the following: losing a significant amount of our local run-of-the-river and stream hydro generation, higher than expected load growth, a low water year, poor solar generation year, loss of multiple natural gas units and/or an extreme weather pattern. Each of these events alone would not significantly impact our portfolio cost, but several of these events occurring at the same time could cause an increase in the cost per megawatt hour. This type of scenario is unlikely and would trigger a temporary power cost adjustment. Keeping a diverse portfolio and spreading risk across many different generating units makes this kind of worst-case scenario highly unlikely.

Long-term Planning

Considering the long-term, we understand that portfolio additions and placeholders made in the near-term will impact our ability to significantly reduce carbon down the road. It is important that we avoid locking in carbon-based projects and power purchase agreements so that in the 2026 to 2030 time-frame we will be in a position to add more carbon-free resources to the portfolio.

We are working with UAMPS to develop a baseload option known as the Carbon Free Power Project(CFPP). It is in the planning stages, and involves building a small modular nuclear reactor facility that would add ten megawatts of carbon-free power to HL&P's portfolio, when and if it is developed. While our long-term plan includes the CFPP, we understand that there is risk and we continue to persue other alternatives. The energy sector is working diligently develop new technology that will allow the industry to move towards a carbon-free future and we remain open to the possibilites. Battery storage, solar, wind, geothermal, hydrogen, and carbon-capture will be improved and emerging technologies will continue to be vetted as we continue into this decade.

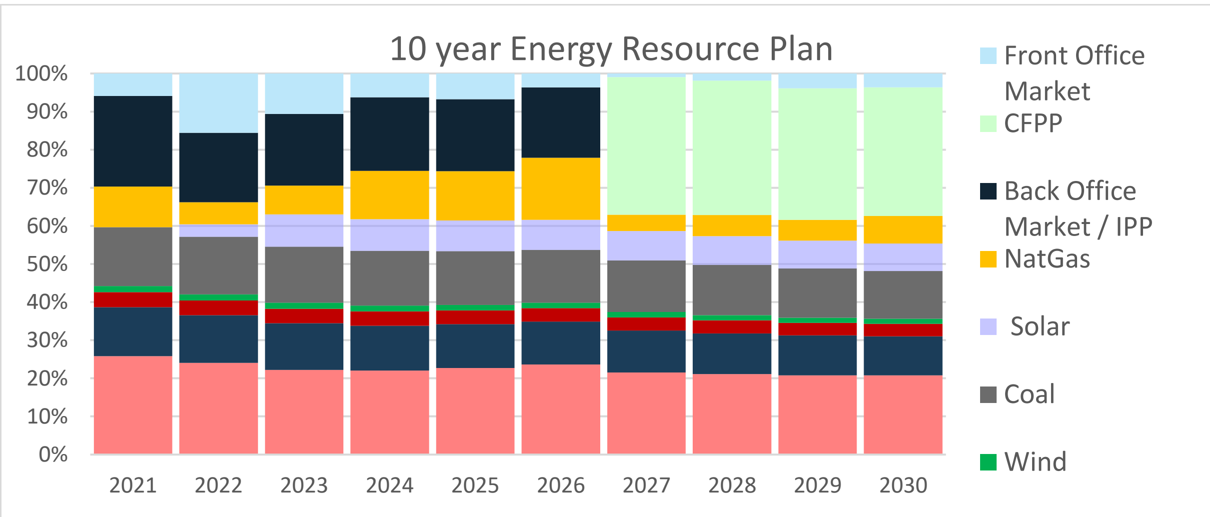
In addition to new technology, rate design can be used as a demand side mangement tool. Time of use rates can provide an incentive for customers to curb energy usage at peak times and demand charges used to pass on actual capacity costs to customers that help create the demand on our system. There are a number of ways to use rates as a demand-side management tool, and through pilot rates and periodic rate studies we will explore the best way to use this tool to manage demand and energy consumption.

In the charts below, we can see how carbon-free resources can replace place-holder resources in our porfolio in the long-term. If the CFPP is built, it will fill the shortage that we have filled with place-holder type resources. Adding this resource will increase the renewables in our portfolio above 70 percent by 2030 and it is not projected to have a significant impact on our dollar per megawatt-hour cost. According to the U.S. Energy Information Agency (EIA) 2019 Energy Outlook, higher natural gas prices in a Low Oil and

Gas Resource and Technology scenario could result in an aditional gigawatt of unplanned nuclear power plant capacity being built over then next thirty years (Eia.gov, 2020, pp. 106).

By 2030, our preferred portfolio includes next generation nuclear combined with solar, geothermal, hydro, wind, natural gas, existing coal resource, with hourly market power purchases included for load balancing. We also expect that by 2030, our portfolio will include battery storage for firming renewables and providing voltage support to our system as we see distributed generation maximized on all circuits.

Figure 6 2021-2030 Preferred Energy Resource Mix



Conclusion

Our energy plan prepares the path to the future. Through the IRP planning process, we have learned the importance of flexibility as we plan for the near-term and the long-term. Maintaining a diverse portfolio allows us to be flexible as the planning environment evolves. Spreading our portfolio across multiple generating shafts reduces our overall risk by ensuring that our portfolio isn’t too dependent on any one resource. Remaining open to new technology allows us to incorporate the best fit resources that help us meet the goals of our community. Most importantly, this plan ensures that we can continue to provide the reliable electric service that has powered our strong community since 1909.

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