Selendy & Gay PLLC
Jennifer M. Selendy
Philippe Z. Selendy
Joshua S. Margolin
Lauren J. Zimmerman
1290 Avenue of the Americas
New York, NY 10104
212-390-9000
jselendy@selendygay.com
pselendy@selendygay.com
jmargolin@selendygay.com
lzimmerman@selendygay.com

Attorneys for Vote Solar

BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Rocky Mountain Power to Establish Export Credits for Customer Generated Electricity	**Docket No. 17-035-61 Phase 2**

SURREBUTTAL TESTIMONY OF CAROLYN A. BERRY, PH.D.

ON BEHALF OF

VOTE SOLAR

September 15, 2020

Table of Contents

I. Introduction

Q. Please state your name, title, and business address.

A. My name is Carolyn A. Berry. I am a Principal with Bates White, LLC. My business address is 2001 K Street NW, North Building, Suite 500, Washington, DC 20006.

Q. Have you submitted testimony previously in this docket?

A. Yes. I filed Affirmative and Rebuttal Testimonies in Phase 2 of this docket on behalf of Vote Solar.[1]

Q. Please summarize your professional background.

A. I am a Principal with the economic consulting firm of Bates White, LLC. I have worked for over 25 years on a wide range of issues concerning competition and regulation in the electricity industry, including transmission access, market power, market manipulation, cost recovery, market restructuring and design, distributed generation, and rates. I have prepared economic analyses and filed testimony in various state and federal jurisdictions analyzing the effects of energy policy on incentives and market outcomes. I have testified before the Federal Energy Regulatory Commission, the California Public Services Commission, and the U.S. District Court for the District of South Carolina. I have an appreciation of a variety of industry perspectives, as I have worked inside a regulatory agency (Federal Energy Regulatory Commission), at an investor-owned utility (Pacific Gas & Electric Company),

[1] Vote Solar, *Revised Affirmative Testimony of Carolyn A. Berry*, May 8, 2020 ("*Berry Revised Affirmative*"); Vote Solar, *Rebuttal Testimony of Dr. Carolyn A. Berry*, July 15, 2020 ("*Berry Rebuttal*").

and as an economic consultant for regulatory commissions, state governments, regulated entities, and independent power producers. A copy of my curriculum vitae that includes a complete list of my testimony was attached to my Revised Affirmative Testimony filed on May 8, 2020.[2]

II. Assignment

Q. On whose behalf are you submitting this surrebuttal testimony?

A. I am submitting this surrebuttal testimony on behalf of Vote Solar.

Q. What is the purpose of your surrebuttal testimony?

A. I have been asked to review and respond to the July 15, 2020 Rebuttal Testimony filed on behalf of Rocky Mountain Power/PacifiCorp ("RMP"),[3] the July 15, 2020 Rebuttal Testimony filed on behalf of the Utah Division of Public Utilities ("DPU"),[4] and the July 15, 2020 Rebuttal Testimony filed on behalf of the Office of Customer Services ("OCS").[5]

My lack of comments on any components of other parties' affirmative, direct, or rebuttal testimony should not be interpreted as acquiescence or agreement. I reserve the right to express additional opinions, to amend or supplement the opinions in this testimony, or to provide additional rationale for these opinions as additional documents are produced and

[2] *Berry Revised Affirmative*, Ex. 1-CAB.

[3] Rocky Mountain Power, *Rebuttal Testimony of Joelle R. Steward*, July 15, 2020 ("*Steward Rebuttal*"); Rocky Mountain Power, *Rebuttal Testimony of Daniel J. MacNeil*, July 15, 2020 ("*MacNeil Rebuttal*"); Rocky Mountain Power, *Rebuttal Testimony of Jacob S. Barker*, July 15, 2020 ("*Barker Rebuttal*"); Rocky Mountain Power, *Rebuttal Testimony of Robert M. Meredith*, July 15, 2020 ("*Meredith Rebuttal*").

[4] Utah Division of Public Utilities, *Rebuttal Testimony of Robert A. Davis*, July 15, 2020 ("*Davis Rebuttal*").

[5] Office of Customer Services, *Rebuttal Testimony of Michele Beck*, July 15, 2020 ("*Beck Rebuttal*"); Office of Customer Services, *Rebuttal Testimony of Philip Hayet*, July 15, 2020 ("*Hayet Rebuttal*").

new facts are introduced during discovery and trial. I also reserve the right to express additional opinions in response to any opinions or testimony offered by other parties in this proceeding.

III. Summary of Recommendations

Q. After reviewing the Rebuttal Testimonies of RMP, DPU, and OCS what do you conclude?

1. The Transition Program, temporary by design, has created regulatory uncertainty that has adversely impacted installations of Customer Generation ("CG").
2. Under Vote Solar's proposal to reinstate net energy metering ("NEM"), the value of CG exports exceeds the retail rate resulting in a net benefit to non-CG customers.
3. The penetration level of CG in Utah is still very low, thus any cost shifts to non-CG customers as a result of the reduction in CG customer demand from RMP, which there is no evidence of in this proceeding, are negligible. Even at much higher levels of CG penetration, any cost-shifting due to relative changes in CG and non-CG customer demand will be offset by the rate-reducing benefits CG provides.
4. The reduction in demand by CG customers is similar to the reduction in demand by customers who adopt load management and energy efficiency measures. The system benefits that RMP measures and forecasts for in load management and energy efficiency are similar to the benefits provided by CG. These benefits flow to all of RMP's customers. Any consideration of cost shifts to non-CG customers attributable to a reduction in CG demand must include the consideration of benefits shifted to non-CG customers from CG

demand reductions, similar to the benefits provided by the reduction in load through load management and energy efficiency measures.

5. CG is one of the few sources of competition to RMP's monopoly over power generation and supply. Competition provides benefits to all customers by spurring innovation and creating efficiencies.

6. RMP's rate design reduces the incentive to install and export CG by making new installations uneconomic and by incentivizing customers to increase consumption during periods of peak system load, respectively.

7. Battery storage can substantially increase the value of CG exports above Vote Solar's proposal by increasing the ability of CG customers to export energy during on-peak hours, reducing RMP's energy and infrastructure costs.

8. PacifiCorp's recognition and inclusion of the benefits of CG solar and battery storage in its 2021 Integrated Resource Plan ("IRP") belie RMP's arguments in this proceeding that CG solar has little value.

9. CG solar is a system resource that fits into RMP's integrated resource planning like other RMP resources. A properly designed ECR will incentivize the provision of CG exports to the system when most valuable, enhancing transmission and distribution avoided cost benefits.

10. CG exports provide a fuel hedging benefit similar to that calculated by RMP for energy efficiency.

11. PacifiCorp includes a carbon price in the optimization of its resources to select the preferred portfolio in its IRP. Customers ultimately pay this price when these resources are built. Therefore, including an avoided carbon cost in the ECR is appropriate.

12. RMP has been imposing carbon and health costs on all persons within the emissions regions of its fossil generating plants for many years. Including a carbon and health benefit in the ECR appropriately recognizes the reduction in harm provided by CG exports.

13. RMP supports real-time netting on the basis that is sends efficient price signals to match load and solar production on a real-time basis. However, RMP's real-time netting proposal to measure quantities on a second-by-second basis uses an hourly price, thus there is no intra-hour price signal to which to respond. RMP's real time netting proposal that uses hourly prices for real time quantities cannot produce RMP's claimed efficiencies.

14. The growth of distributed energy resources, including CG, will require RMP to adapt its business model to take on new roles of orchestrating transactions on the distribution system, getting actively involved in the electric vehicle market, and investing in grid modernization such as new communications networks, new sensors, and smart meters that will maximize customer value and generate revenue for the utility.

Q. Have there been any changes to the value of solar presented in your Revised Affirmative Testimony filed on May 8, 2020?

A. Yes. There has been one change. Dr. Milligan has corrected the value of avoided generation capacity from 1.48 ¢/kWh to 3.43 ¢/kWh to reflect the cost of a combustion turbine (as he intended) rather than the cost of a duct-firing resource.[6] Table 1A shows Vote Solar's revised value of CG exports. The value has increased from 22.22 ¢/kWh to 24.17 ¢/kWh.

[6] Vote Solar, *Surrebuttal Testimony of Michael Milligan, Ph.D.*, September 15, 2020 ("*Milligan Surrebuttal*"), lines 634-36.

Table 1A: Value of CG Exports in Utah

Category	**Value** ¢/kWh 2021USD (levelized)
<u>**Utility-Based Benefits**</u>	
Energy	
Avoided Energy	3.55
Avoided line losses	0.31
Capacity	
Avoided generation capacity	3.43
Avoided transmission capacity	1.34
Avoided distribution capacity	0.52
Grid Support Services	
Ancillary services	*nq**
Financial Risk	
Fuel price hedge	0.19
Market price effect	*nq*
Security Risk	
Reliability and resilience	*nq*
Environmental	
Carbon (CO_2) compliance costs	2.80
Utility Costs	
Integration costs	0.00
Subtotal	**12.14**
<u>**Community Benefits**</u>	
Environmental	
Health benefits from reduced air pollution	2.09
Benefits of reduced carbon emissions (CO_2)	6.57
Avoided fossil fuel lifecycle costs	*nq*
Societal	
Local economic benefits	3.37
Subtotal	**12.03**
Total Value of CG Exports	**24.17**

**not quantified*

IV. Growth in Customer Generation under the Transition Program

Q. What do RMP witness Ms. Joelle Steward and the DPU witness Mr. Davis argue with respect to growth in CG under the Transition Program?

A. Ms. Steward argues that the increase in CG applications in 2016 and 2017 was abnormally high, likely due to the anticipated termination of Schedule 135, and that the number of CG applications in 2018 and 2019, although lower than 2016/2017, was higher than applications in 2015 and thus "the transition program did not adversely curtail the growth of customer generation."[7] Mr. Davis states that he is not convinced that "the solar market is ebbing due to this proceeding or a rate structure as proposed by RMP"[8] based on some annual growth statistics that he says illustrate "a robust increase in solar facilities."[9]

Q. Do you agree that growth in CG solar was not adversely affected by the Transition Program?

No. Ms. Steward uses 2015 as a base year for comparison; however, this proceeding dates back to 2014 when RMP initially proposed a change to the NEM program under Schedule 135. As a result of RMP's proposed changes, the Commission established a framework to quantify the costs and benefits of NEM in November 2015, ordering RMP to conduct two cost of service studies, one using actual costs and the other using hypothetical costs. A year later, in November 2016, RMP filed these cost of service studies with the Commission and advocated for the end of NEM and a new structure to compensate CG at substantially lower

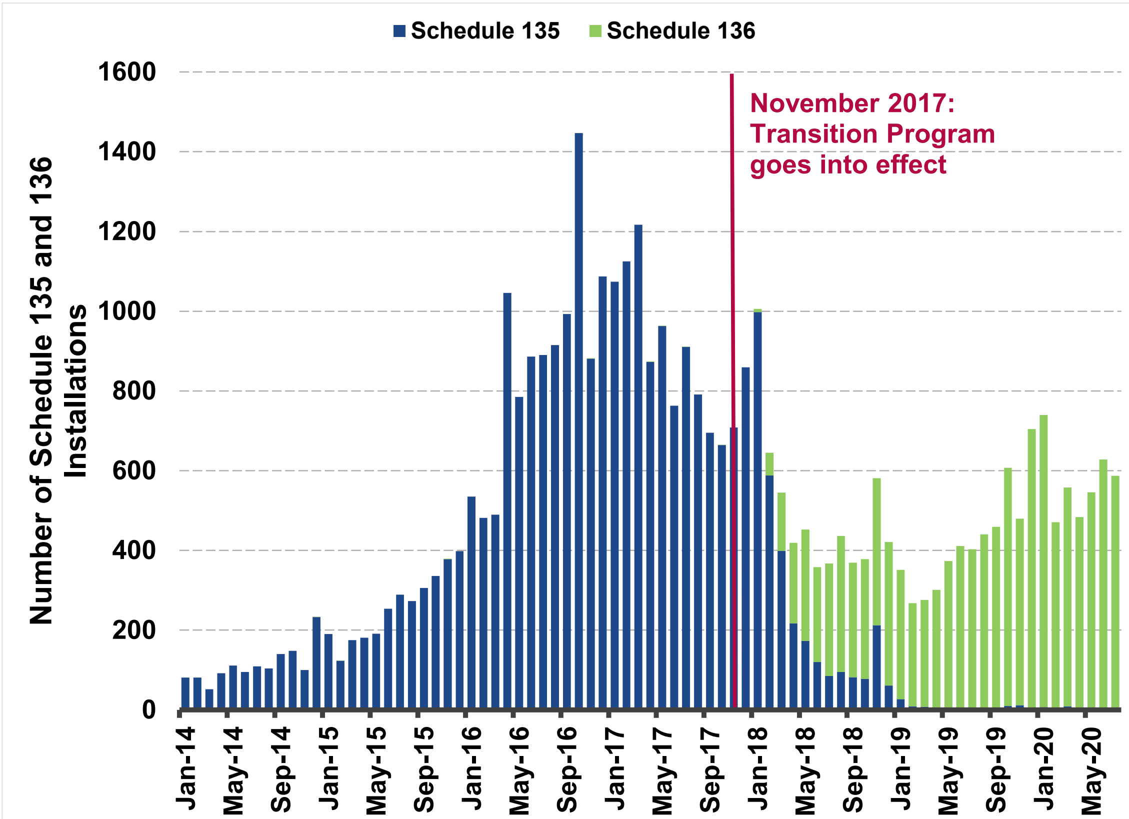
[7] *Steward Rebuttal*, lines 105-07.
[8] *Davis Rebuttal*, lines 425-27.
[9] *Id.* at lines 428-29.

rates. Although testimony was filed, a hearing on the merits was never conducted because RMP reached a settlement stipulation ("Stipulation") with various parties that it filed with the Commission on August 28, 2017. The Stipulation set November 15, 2017 as the last date for submission of applications under the NEM program. The Commission approved the Stipulation on September 29, 2017. Given this history, customers might have anticipated that NEM could change as early as 2014, but most likely could not anticipate *how* it would change until November 2016 when RMP filed its studies, and did not know with certainty what changes would be made until the Commission approved the Stipulation in September 2017.

Figure 2 shows monthly installations of customer generation from 2014 to present. As can be seen, the number of monthly installations in 2016 (before RMP filed its cost of service studies) are greater than in 2015 and growing, but monthly installations start to fall at the end of the first quarter of 2017. If CG customers were anticipating the end of NEM and a decrease in CG compensation, then installations should have continued to rise through the end of 2017, but instead they fell.

We can observe in the data the anticipated termination of Schedule 135 described by Ms. Steward. Around the time the Stipulation was approved, prior to the November 15, 2017 application deadline, there was a surge in applications as evidenced by increased installations in December 2017 and January 2018. Contrary to Ms. Steward's assertion, the data does not suggest that CG applications in 2016 and 2017 were abnormally high due to the anticipated termination of Schedule 135. The data clearly shows a drop-off of installations during the Transition Period.

Figure 1: CG Monthly Installations[10]



Q. Why have CG installations fallen under the Transition Program?

A. As I explained in my Revised Affirmative Testimony, the Transition Program has caused a reduction in CG installations because the compensation for CG exports has fallen and because the Transition Program, as a temporary measure, has introduced uncertainty into the market.[11] Uncertainty dampens economic activity, causing CG customers to hold back on purchases and CG solar companies to delay or suspend investments. In order to restore

[10] Exhibit 1-CAB, *Response to Vote Solar Data Request 15.1*, RMP's Responses to Vote Solar 15th Set of Data Requests (Aug. 14, 2020).

[11] *Berry Revised Affirmative*, lines 141-149.

growth in CG investments, the Commission needs to compensate CG at a fair value and provide regulatory certainty that CG solar will be part of the electric future in Utah.

Q. What does DPU witness Mr. Davis assert about the growth in CG solar facilities and how do you respond?

A. Mr. Davis asserts that there has been a robust increase in solar facilities.[12] The statistics that Mr. Davis presents are misleading. He reports percentage growth in the period between March 2019 and March 2020. But, as Figure 1 shows, the total amount of Schedule 136 installations from the beginning of the Transition Program until March 2019 was small as the Transition Program was just beginning. Therefore, to use installation up to March 2019 as a baseline to show percentage growth is misleading and inaccurately portrays the state of CG installations. Monthly installations under Schedule 136 are far below monthly installations prior to the Transition Program. From January 2015 through December 2017, newly-installed capacity averaged 5,225 kW per month. Since January 2018 through July 2020, new installations averaged only 3,009 kW per month—a decrease of nearly 42%.[13]

[12] *Davis Rebuttal,* lines 428-29.

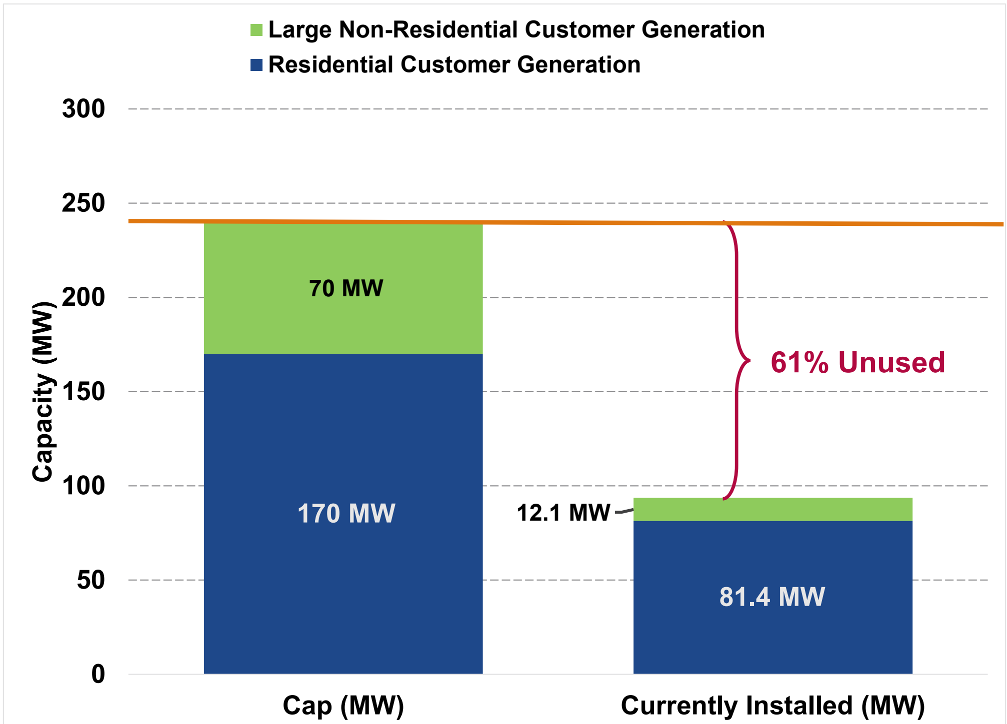
[13] Exhibit 1-CAB, *Response to Vote Solar Data Request 15.1*, RMP's Responses to Vote Solar 15th Set of Data Requests (Aug. 14, 2020).

Q. What percentage of capacity allowed under the Transition Program has been installed?

A. As of July 29, 2020, less than 39% of the allowed capacity has been installed.[14] Investments in CG under the Transition Program remain far below expectation as evidenced by the difference between investments and the cap as shown in Figure 2.

[14] *Id*.

Figure 2: CG (Schedule 136) Installed Capacity to Cap[15]



Q. Were installations expected to reach the cap by the end of the Transition Period?

A. Yes. Ms. Steward in testimony before the Commission supported the cap as part of the Stipulation because in her view it put a "cap on runaway net metering"[16] and opposed opening up a new docket or proceeding when 75 percent of the transition program cap was reached because the Stipulation "reflects a reasonable balance to allow for growth and customer generation and the timing thought necessary to conduct the export proceeding."[17]

---

[15] Figure 2 reflects installations through July 29, 2020. *See* Exhibit 1-CAB, *Response to Vote Solar Data Request 15.1*, RMP's Responses to Vote Solar 15th Set of Data Requests (Aug. 14, 2020)..

[16] *In Re: RMP – Net Metering Program, Public Utility Commission of Utah*, Hearing Transcript at 26:2-3, Sept. 18, 2017, Docket No. 14-035-114, https://pscdocs.utah.gov/electric/14docs/14035114/296956RepTrans9-18-2017,9-26-2017.pdf.

[17] *Id.* at 29:20-30:2.

Q. Given 2020 monthly installations, how long would it take for the full amount of capacity allowed under the Transition Program to be installed?

A. At an installation rate of 5,000 kW per month it would take until December 2022 to install all the amounts allowed under the program.[18]

Q. Is the total amount of CG production, from all pre-Transition and Transition installed amounts, still very small?

A. Yes. Utah's small-scale PV generation (MWh) [19] as a percentage of total generation (MWh) is just above 1% as shown in Figure 3. The penetration rate in Hawaii is almost nine times that of Utah.

Q. What is the significance of a low penetration level?

A. RMP has raised numerous concerns about CG resulting in a shift of costs from CG customers to non-CG customers due to the reduction in CG demand from RMP. Although RMP's arguments are incomplete and unsubstantiated because they fail to acknowledge the rate-reducing benefits that CG provides to non-CG customers, at the current low penetration level, any demand-related cost shifting is negligible. Moreover, there is no evidence in this proceeding of any demand-related cost shifting. Even at much higher levels of CG penetration, any cost-shifting due to relative changes in CG and non-CG customer demand must be balanced against the substantial system benefits that CG demand reductions will

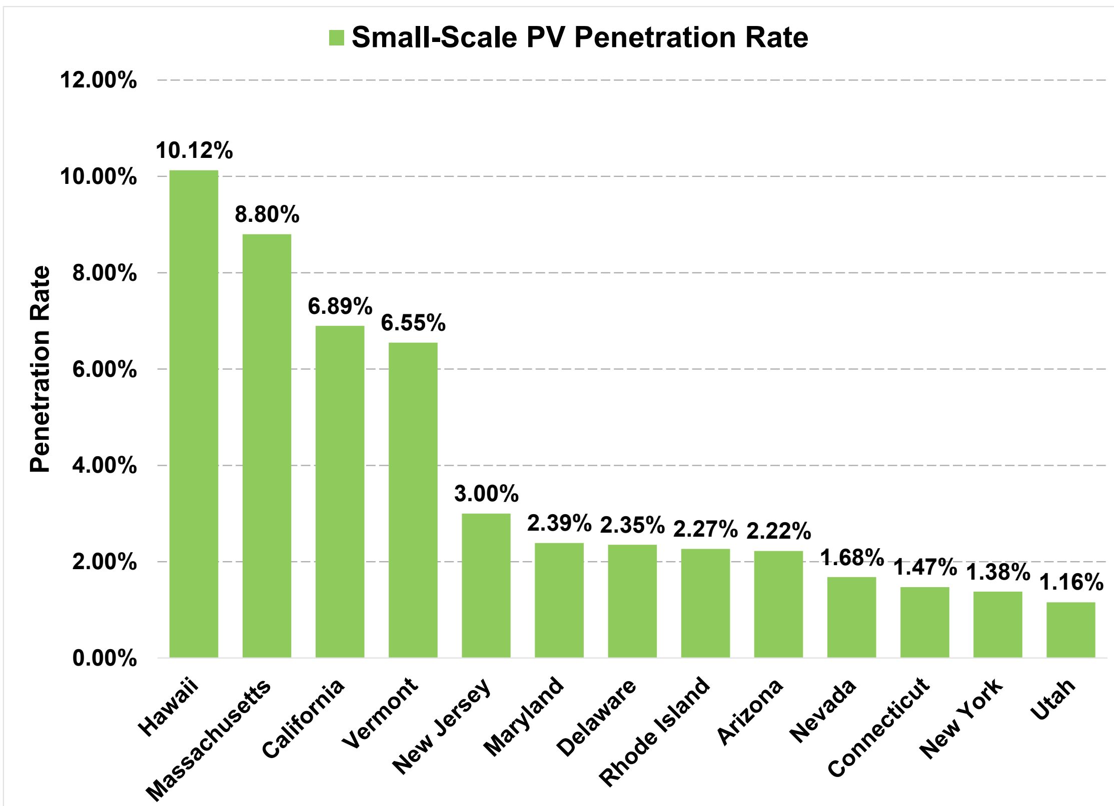
---

[18] From January 2020 through July 2020, monthly installations of Schedule 136 capacity averaged 4,534 kW. *See* Exhibit 1-CAB, *Response to Vote Solar Data Request 15.1*, RMP's Responses to Vote Solar 15th Set of Data Requests (Aug. 14, 2020)..

[19] The U.S. Energy Information Administration ("EIA") defines "small-scale" PV as the following: "Small-scale photovoltaic systems are electricity generators with less than one megawatt of electricity generating capacity that are usually at or near the location where the electricity is consumed. Most small-scale solar photovoltaic systems are installed on building rooftops." EIA, *What is U.S. electricity generation by energy source?*, Feb. 27, 2020, https://www.eia.gov/tools/faqs/faq.php?id=427&t=8.

provide and that will flow to all customers.[20] Due consideration of both cost and benefit shifting to non-CG customers makes the potential for adverse cost-shifting unlikely even at much higher levels of penetration.

Figure 3: Penetration Rates of Small Scale/CG PV, 2019
(MWh Small Scale PV / Total MWh) [21]



[20] In 2019, RMP reported net benefits from its DSM programs of up to $139 million. *See* Rocky Mountain Power, *Utah Energy Efficiency and Peak Reduction Annual Report, January 1, 2019 – December 31, 2019*, June 1, 2020, p.6, https://pscdocs.utah.gov/electric/20docs/2003527/314083RdctdDSM2019AnlEnerEffPeakLoadRedRprt6-1-2020.pdf.

[21] Data sourced from the EIA Electricity Data Browser. Dataset available at: https://www.eia.gov/electricity/data/browser/#/topic/0?agg=2,0,1&fuel=g002&geo=g0fvvvvvvvvvo&sec=g&freq=A&start=2018&end=2019&ctype=linechart&ltype=pin&rtype=s&maptype=0&rse=0&pin=.

V. CG Introduces Competition into RMP's Monopoly Service Territory

Q. What points did you make in your Revised Affirmative Testimony regarding the impacts of CG on competition?

A. I stated that customer choice and CG "threaten the profits of a regulated monopoly franchise by reducing retail sales revenue between rate cases and reducing the need for infrastructure investments on which a regulated utility earns a rate of return."[22]

Q. How did Ms. Steward respond to these points?

A. Regarding sales revenue between rate cases, Ms. Steward agrees that RMP "may have to absorb a loss of revenue and fixed cost recovery in between rate setting."[23] She goes on to explain that the revenues would be recoverable in the next general rate case. She then concludes that "[i]f a customer class does not pay the full costs that the Company incurs to serve them, those costs are then ostensibly shifted to other customers" thus, "this is not primarily an issue of the Company's bottom line; this is an issue of fairness among our customers."[24]

Q. Does Ms. Steward agree with your point that CG threatens RMP's sales revenues between rate cases?

A. Yes. She further explains that those revenues would be recoverable in the next rate case thus the revenue shortfall would be temporary.[25]

---

[22] *Berry Revised Affirmative*, lines 239-42.

[23] *Steward Rebuttal*, lines 134-35.

[24] *Id*. at lines 136-39.

[25] *Id*. at lines 135-36.

Q. Do you agree with Ms. Steward's conclusion that the revenue shortfall between rate cases results in a shift in costs from CG customers to non-CG customers?

No. Ms. Steward's premise, "if a customer class does not pay the full costs that the Company incurs to serve them," is false. CG customers do pay the full costs RMP incurs to serve them. RMP serves CG customers by (a) serving their electric needs similar to all RMP customers, and by (b) purchasing CG exports. Regarding CG customer purchases from RMP, Ms. Steward's premise is flatly false since CG customers pay the full retail rate for their purchases.

CG customers do purchase less electricity from RMP, reducing RMP revenues between rate cases, but a reduction in power consumption is not the same as not covering costs. A CG customer's reduction in demand, including on-peak demand, is no different from the reduction in demand that RMP achieves through its extensive and costly[26] demand-side management ("DSM") programs. CG demand reductions bring the same host of system benefits as energy efficiency *but at no cost to RMP's customers*. In this way, CG is in fact subsidizing non-CG customers by providing uncompensated system benefits.

There are no losses in RMP revenues between rate cases associated with CG exports. Currently, under the Transition Program and under RMP's ECR proposal, RMP collects more revenues from the sale, at the retail rate, of CG exports than it pays CG customers for the exports provided to RMP. Under Vote Solar's ECR proposal to return to NEM, CG

[26] For example, in 2019, RMP incurred costs of over $50 million for its DSM programs. *See* Rocky Mountain Power, *Utah Energy Efficiency and Peak Reduction Annual Report, January 1, 2019 – December 31, 2019*, Issued June 1, 2020, p.8, https://pscdocs.utah.gov/electric/20docs/2003527/314083RdctdDSM2019AnlEnerEffPeakLoadRedRprt6-1-2020.pdf.

exports would be compensated at the retail rate so there is no impact on revenue. Vote Solar's alternative ECR proposal is based on the value CG exports provide to customers, a value that is greater than the retail rate. All retail customers, including CG customers, rightly share in those costs. If Ms. Steward's concern has anything to do with the issue of fairness then it concerns the fairness of CG customers subsidizing non-CG customers.

Q. What is Ms. Steward's response to your point that CG reduces the need for infrastructure investments on which a regulated utility earns a rate of return?

A. Ms. Steward doesn't address the reduction in need for infrastructure investments, but instead falsely asserts that I claim that RMP "does not have to plan for and build resources to serve customers with onsite generation."[27] Then she explains that RMP has an integrated resource planning process and concludes that CG "undermines lower-cost generation alternatives for customers generally unless the rates for customer generation better reflect those alternatives."[28]

Q. Does CG undermine lower-cost generation alternatives?

A. No. CG is a distributed resource with many unique attributes that other sources of generation cannot provide. This proceeding has been opened to evaluate these unique attributes and to determine their value. RMP consistently evaluates CG exports in the narrow view of its own avoided costs instead of the more expansive view of customer

[27] *Id*. at lines 143-44.
[28] *Id*. at lines 151-52.

benefits. RMP's real concern is the reduction in its asset base upon which it earns a rate of return.

Q. How does infrastructure investment and rate of return affect RMP's profits?

A. RMP is a vertically integrated monopoly. RMP does not earn profits by competing in the marketplace; rather, RMP is allowed a regulated rate of return on the Company's investment in capital items such as generation and transmission facilities. The more investments, the more return. The determination of the rate of return is based on RMP's cost of debt and a Commission-determined return on equity. It is the return on shareholder equity that RMP keeps as profits. CG reduces RMP's energy requirements, reducing or deferring the need for expensive new investments in generation and transmission, and thus reduces the base upon which the Company can earn a profit at the expense of RMP's customers.[29,30]

Q. Is there an industry consensus that distributed energy resources ("DERs") such as rooftop solar will be a challenge to utility profits?

A. Yes. Survey results, published in June of this year, summarizing the opinions of nearly 400 energy industry executives found that "62% feel rapidly increasing renewables and DER are the most disruptive force to the utility business model."[31]

---

[29] *See* Coley Girouard, *How Do Electric Utilities Make Money?*, Advanced Energy Perspectives, April 23, 2015, https://blog.aee.net/how-do-electric-utilities-make-money.

[30] RMP's parent company Berkshire Hathaway also owns upstream pipeline and coal assets that would also be negatively affected by a reduction in RMP's customer base. *See*, *e.g.,* Berkshire Hathaway Energy, *Kern River Gas Transmission Company*, https://www.brkenergy.com/our-businesses/kern-river-gas-transmission-company; s*ee also* Hampstead, John Paul, *BNSF and the future of coal*, Freight Waves, Apr. 2, 2018, https://www.freightwaves.com/news/economics/bnsf-future-of-coal.

[31] Guidehouse, *Utilities Must Further Adapt, Diversify Investments to Edge out Competition and Meet Changing Energy Needs*, June 16, 2020, https://guidehouse.com/news/energy/2020/state-and-future-2020-press-release; *see also* Mackinnon Lawrence and Jessie Mehrhoff, *PUF Annual Pulse of Power Survey: How You Answered Eight Questions*, Public Utilities Fortnightly, June 15, 2020, p.36, https://guidehouse.com/-/media/www/site/insights/energy/2020/gh_state-and-future-of-the-power-industry-2020.pdf.

Q. How will utilities be affected?

A. Utilities will need to adapt to the growth in distributed solar, battery storage, electric vehicles, and other new resources and technology that will be connected at the distribution level and secure new revenue sources by providing new energy management products and services to integrate this growing segment into the overall energy system. All customers stand to benefit from these new opportunities and technology advances through enhanced reliability and resilience of the electric grid, cleaner energy, optimized system loads, enhanced cost efficiency, and enhanced customer choice and value.[32] Utilities that fail to adapt will see an erosion in their profitability.

Q. What is Ms. Steward's position regarding competition in the energy market?

A. Ms. Steward poses the question, "Do you agree that subsidizing customer generation introduces competitive forces into the market that open a pathway to benefits?"[33] Then Ms. Steward states that subsidizing CG reduces competitive forces because "[i]f export credit rates are set at a level that is above their actual value, costs are shifted to other customers and the electric rates for other customers increase."[34] Ms. Steward points out that the solar industry has benefitted from subsidies, enabling cost reductions and increased competition, but that these benefits are not true competitive benefits.[35]

---

[32] *See* Peter H. Kind, Ceres, *Pathway to a 21st Century Electric Utility*, November 2015, p.6, https://www.ceres.org/sites/default/files/reports/2017-03/Ceres_ElecUtilityIndustryModel_110615-rev2-1.pdf

[33] *Steward Rebuttal*, lines 122-23.

[34] *Id.* at lines 125-26.

[35] *Id.* at lines 126-30.

Q. Do you agree?

A. No. Yet again Ms. Steward starts with a false premise, this time that CG is subsidized. There is no evidence to support that premise. This proceeding has been initiated to determine the value of CG exports. As I previously explained, the level of the export credit rate does not shift costs from CG customers to non-CG customers because the value of the CG exports exceeds the cost. All customers, including CG and non-CG customers, will benefit from CG exports, and all will see the positive impact in their retail rates. Regarding the reduction in CG customer demand, the demand reduction is similar to the reduction in demand achieved through energy efficiency. Demand reductions, whether from energy efficiency or CG, provide system benefits to all customers. Customers that lower their bills through energy efficiency provide general system benefits, and for this reason are incentivized by RMP through energy efficiency programs to adopt energy efficiency measures. The same incentives should apply in the context of CG customers. Ms. Steward's concerns about rate impacts are unfounded especially since, at the current level of CG penetration, the impact of investments in energy efficiency is arguably substantially larger than any impact from CG. And again, there is no evidence of any cost shifting here.

I agree with Ms. Steward that the solar industry, like the fossil fuel industry, has benefitted from incentives provided by the federal government, which is not unusual or unfair. In nascent industries, incentives promote growth and development allowing companies to achieve cost reductions through economies of scale and to reach a sustainable level of operation that would otherwise not be possible. I disagree that subsidies do not provide true competitive benefits. Subsidies, by enabling the entrance of new market players, increase competition and provide new innovative products and services that incumbents do not have the incentive or ability to provide. It is important to emphasize that the subsidies that Ms. Steward points to have not come at the expense of other RMP customers since they come from federal and state governments, and are anyway set to expire in 2021 and 2023 for residential PV.[36] By dis-incentivizing solar adoption in Utah, RMP would discourage Utah from taking advantage of government incentives for solar adoption. Moreover, the competition that is created does benefit all of RMP's customers by expanding energy options, reducing costs, and improving system resilience and efficiency.

VI. The ECR should be designed to integrate CG into the grid, not to push CG off the grid

Q. Does Mr. MacNeil argue that RMP's proposed rate design for the export credit incentivizes CG customers to reduce exports to the grid and self-supply?

A. Yes. Mr. MacNeil explains that RMP's proposed rate structure for CG is designed to give customers "a strong incentive to use as much of their own generation as possible, as the avoided retail rate is significantly higher than the Company's proposed export credit."[37] He opines that "exports would likely drop the most during the hottest conditions, further diminishing the value of what is exported to meet peak requirements."[38] Mr. MacNeil argues further that "the timing of CG exports does not align well with periods in which there

[36] See Navigant, *PacifiCorp: Private Generation Resource Assessment for Long Term Planning*, July 30, 2021, pp. 25-26, https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/07-30-2020_Navigant_Private_Resource_Assessment.pdf. Federal tax credits expire in 2021 and state tax credits expire in 2023.

[37] *MacNeil Rebuttal*, lines 402-03.

[38] *Id*. at lines 407-09.

is a significant risk of loss of load events"[39] (that is, peak load hours) and that future CG customers "are likely to have a significant incentive to offset their own retail consumption, rather than export to the Company."[40]

Q. What does Mr. MacNeil conclude?

A. Mr. MacNeil concludes that because CG customers have an incentive to reduce exports during peak hours "it is not appropriate to compensate [CG customers] for avoided capacity costs."[41]

Q. Do you agree with Mr. MacNeil's argument?

A. No: it is of course appropriate to compensate CG customers for the value of their investments that avoid capacity costs for RMP (and non-CG customers). However, I do agree that RMP's proposed rate design creates the incentive for CG customers to shift consumption to on-peak hours to avoid paying the retail rate for purchases. Creating an incentive to shift consumption to on-peak hours is a serious flaw in RMP's proposed rate design as I explained in my Rebuttal Testimony.[42] RMP's conclusion relies on reduced CG exports during peak hours that in turn result from RMP's proposed rate design. In other words, *RMP has proposed an export credit rate design that creates incentives for CG customers to reduce exports during peak load hours reducing the capacity value of CG solar, and then argues that no capacity value be included in the export rate.* This is flawed

[39] *Id*. at lines 736-37.
[40] *Id*. at lines 743-45.
[41] *Id*. at lines 867-68.
[42] *Berry Rebuttal,* lines 306-16.

circular reasoning. On its face, RMP's proposal creates incentives that, by discouraging CG customers from exporting during peak hours, drive up costs for *non-CG* customers.

Q. Is a rate design that provides CG customers "a significant incentive to offset their own retail consumption, rather than export to the Company,"[43] as explained by Mr. MacNeil, efficient?

A. No. As I explained in my Rebuttal Testimony, an efficient rate design should incentivize customers to avoid purchases/usage *during on-peak hours*, and to increase exports during those hours. Increasing exports during on-peak hours would reduce costs for all of RMP's customers by reducing or delaying the need to build additional generation, transmission, and distribution assets.[44]

Q. Mr. Meredith has proposed the addition of battery storage as a resource that would make a customer eligible to take service under the CG export rate tariff.[45] How will battery storage affect the value of solar?

A. Battery storage has the potential to significantly expand the capacity value of CG solar if the ECR is designed to encourage CG customers to charge their batteries with their solar production during off-peak mid-day hours and export stored energy to the system during peak load hours.

---

[43] *MacNeil Rebuttal*, lines 743-45.
[44] *See Berry Rebuttal*, lines 265-70.
[45] *See Meredith Rebuttal*, lines 201-04.

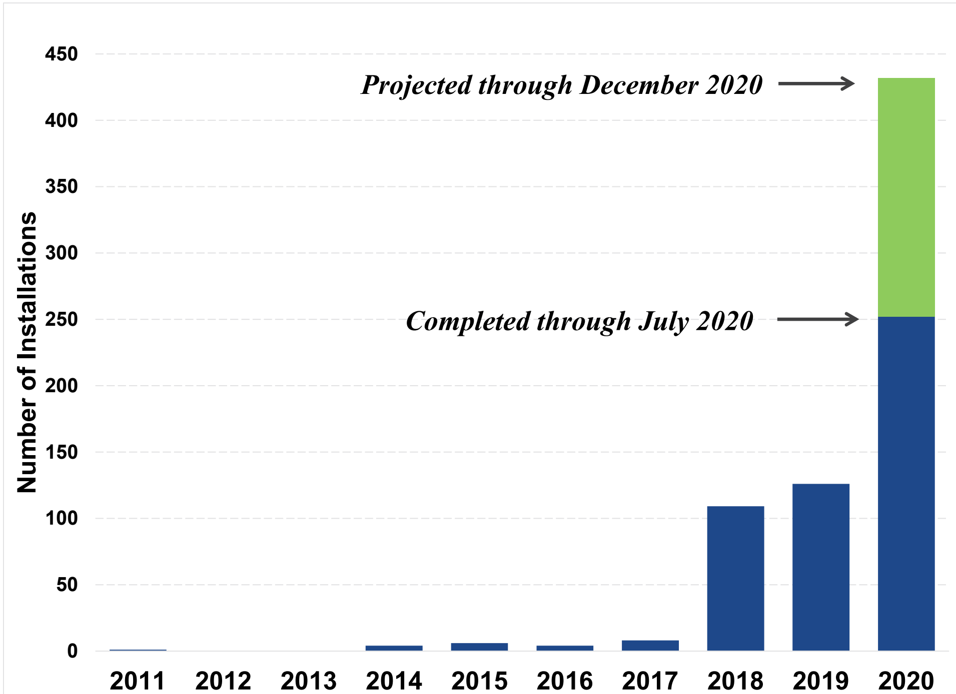
Q. Has there been an increase in the installation of CG solar with battery storage in RMP's service territory?

A. Yes. Figure 4 shows the annual installations of CG solar with battery storage in RMP's service territory. The number of installations in the first seven months of 2020 is more than double the number of installations in 2019.[46] The number of installations in 2020 will be more than triple the number in 2019 if installations continue at the same pace for the remainder of the year. What is happening in Utah is happening elsewhere. Behind-the-meter storage is expected to grow at a rapid pace over the next five years in the U.S. and worldwide.[47]

[46] Exhibit 1-CAB, *Response to Vote Solar Data Request 15.1*, RMP's Responses to Vote Solar 15th Set of Data Requests (Aug. 14, 2020).

[47] Owen Zinaman, Thomas Bowen, Alexandra Aznar, USAID, NREL, *An Overview of Behind-The-Meter Solar-Plus-Storage Regulatory Design*, Mar. 2020, pp.9-11, https://www.nrel.gov/docs/fy20osti/75283.pdf.

Figure 4: CG Solar Plus Battery Storage Installations on RMP's System[48]



Q. Does Mr. Meredith recognize the significant increase in the value of CG solar made possible when CG solar is coupled with battery storage?

A. No. Under RMP's ECR design, battery storage would be used by the CG customer for self-supply. As Mr. Meredith explains, "if a customer installs a battery, it would be programmed to reduce exports and serve the customer's load with stored solar energy. There is therefore little reason why the goal of adopting such technology shouldn't be to match load with renewable output as accurately as possible."[49] Because of RMP's flawed proposal for the ECR design that incentivizes CG customers to self-supply rather than to increase exports during peak hours, Mr. Meredith fails to recognize the significant increase in capacity

---

[48] Exhibit 1-CAB, *Response to Vote Solar Data Request 15.1*, RMP's Responses to Vote Solar 15th Set of Data Requests (Aug. 14, 2020).

[49] *Meredith Rebuttal*, lines 139-143.

benefits that the combination of solar plus battery exports can provide under a properly designed ECR tariff.

Q. Does RMP generally recognize the increase in the capacity value of solar when coupled with battery storage?

A. Yes. In reference to the capacity contribution of solar resources in PacifiCorp's 2019 IRP, Mr. MacNeil explains that "energy storage . . . can complement solar, for example by providing energy later in the evening when solar does not generate. Complementary interactions result in a greater effective contribution than individual resources would have on their own." [50] Also, customer-sited battery storage is prominently featured in PacifiCorp's 2021 IRP process. It is classified for the first time as a demand response resource option that works by "shifting of load away from peak hours using stored electrochemical energy."[51] The IRP modeling will assume that 50% of CG solar customers with time of export net billing will install battery storage. The modeling will assess the potential for PacifiCorp to discharge customer-sited batteries. Customer storage benefits identified include maximization of energy value, resiliency, and demand reduction.[52]

[50] *MacNeil Rebuttal*, lines 502-05.

[51] PacifiCorp, *2021 IRP DSM Technical Workshop*, Feb. 18, 2020, p.26, https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/PacifiCorp_2021_IRP_February_18_2020_CPA_Workshop_Meeting.pdf.

[52] PacifiCorp, *Conservation Potential Update, 2021 IRP Public Input Meeting – Technical Workshop*, Aug. 28, 2020, p.45, https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/08-28-2020_PacifiCorp_2021_IRP_PIM.pdf.

Q. Is there a disconnect between RMP's position in this ECR proceeding and in PacifiCorp's position in its 2021 IRP, with regards to the value of CG solar?

A. Yes. RMP's position in this ECR proceeding which discounts, disregards, and undermines the value of CG solar is in direct conflict with PacifiCorp's recognition and incorporation of the value of CG solar in its 2021 IRP. PacifiCorp's statements and treatment of CG solar in the IRP process belie RMP's arguments here, that CG solar has little value.

Q. What other inefficiencies can arise from RMP's ECR proposal that pushes CG solar off the grid?

A. As I explained in my Rebuttal Testimony, a rate design such as RMP's that incentivizes CG customers to isolate from the grid to avoid paying a retail rate that is substantially higher than the cost of self-supplied energy is suboptimal from an efficiency perspective. It disincentivizes exports of energy when system demand is high or when there is heavy loading on transmission or distribution facilities, precisely at times when those exports could provide substantial benefits to the grid. RMP's ECR design can also result in inefficient undersizing of solar and battery storage assets because the ECR is designed to discourage exports.[53]

[53] *See Berry Rebuttal*, lines 335-363.

VII. RMP's Proposal Violates the Principle of Gradualism

Q. What argument does Ms. Steward make about gradualism?

A. Ms. Steward states that since "issues surrounding customer generation rates have been active in Utah since 2014 . . . the solar industry will have had almost seven years to adapt to the changes," and therefore "gradualism has already been employed."[54]

Q. Do you agree?

A. No. As Ms. Steward points out, there is still "ongoing uncertainty"[55] regarding the ECR. The solar industry has not "had almost seven years to adapt to the changes" because the changes are not yet known. Certainty for the solar industry and for solar customers will not come until the Commission sets the ECR in this proceeding. If the Commission were to adopt RMP's proposal to reduce the ECR by 83%, and that decision was made in November or December of 2020, then solar customers and the solar industry would have only weeks to adapt to the dramatic rate reduction before a 2021 ECR implementation date. Therefore, contrary to Ms. Steward's assertion, a reduction of 83% in the ECR would give the solar industry and prospective solar customers almost no time to adapt and would therefore violate the principle of gradualism. Moreover, that sharp a reduction in the ECR would discourage and largely eliminate solar adoption by customers regardless of whether the reductions were gradually introduced.

---

[54] *Steward Rebuttal*, lines 79–90.

[55] *Id.* at line 77.

VIII. Value of Solar Components

A. CG Exports Avoid Transmission and Distribution Costs

Q. What does RMP witness, Mr. Jacob S. Barker, assert about avoided transmission and distribution costs?

A. RMP witness Mr. Barker states that, "[CG exports]. . . .could never eliminate necessary investments to maintain a safe and reliable distribution system."[56]

Q. How do you respond?

A. Mr. Barker's testimony wrongly characterizes unnecessary investments as "necessary." CG exports reduce or defer distribution investment while maintaining the same level of reliability. To 'keep the lights on' every time customers flip a light switch or turn on the air conditioner, utilities plan their power systems (i.e., generation, transmission and distribution systems) to meet their peak demand cost effectively and reliably.[57] The North American Electric Reliability Corporation (NERC) calls these aspects of electricity essential reliability services.[58] CG reduces utility peak demand, by satisfying demand of CG customers and other customers locally, hence avoiding the need for peak load-related transmission and distribution capacity investments.[59] Reliable operation of power systems does not mean that the power can never go out. To ensure 100% reliability, if even possible, would be

---

[56] *Barker Rebuttal*, lines 31-34.

[57] *See, e.g.*, PacifiCorp, *2019 Integrated Resources Plan*, Vol. I, p. 71, Oct. 18, 2019. https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2019_IRP_Volume_I.pdf.

[58] *See* NERC, *Essential Reliability Services: Whitepaper on Sufficiency Guidelines*, Dec. 2016. https://www.nerc.com/comm/Other/essntlrlbltysrvcstskfrcDL/ERSWG_Sufficiency_Guideline_Report.pdf

[59] Vote Solar, *Revised Affirmative Testimony of Spencer Yang* ("*Yang Revised Affirmative*"), lines 90-94.

exorbitantly expensive. The system is planned with a high degree of reliability reflective of the tradeoff between reliability and costs.

Q. In what other way does CG exports allow RMP to avoid transmission and distribution costs?

A. CG exports reduce the loading on upstream portions of the distribution system and the higher voltage transmission system. This reduces transmission and distribution system losses, again avoiding the need for transmission and distribution capacity investments.

Q. Is there evidence that CG exports reduce peak demand on PacifiCorp's system?

A. Yes. Evidence has been provided by Vote Solar witnesses Dr. Michael Milligan and Dr. Spencer Yang. First, Dr. Milligan estimated the amount of CG exports that can be reliably delivered to the system at system peak load—*i.e.*, the annual effective capacity associated with CG exports.[60] Then, Dr. Yang has shown that system peaks generally coincide with transmission and distribution peaks, and thus CG exports avoid transmission and distribution costs by reducing transmission and distribution peak loads.[61]

Q. Can you provide examples of CG exports deferring significant investments in grid infrastructure?

A. Yes, there are several examples. First, in New York City, rather than investing in transmission facilities, Consolidated Edison has been able to deploy a mix of CG and energy efficiency measures to address a sharp increase in New York City's demand for power. The

[60] Vote Solar, *Revised Affirmative Testimony of Michael Milligan* ("*Milligan Revised Affirmative*"), lines 521-31.

[61] *Yang Revised Affirmative*, lines 117-33.

conventional transmission solution (i.e., adding a substation) would have cost more than $1.2 billion, but the demand-side solution will cost only about $200 million.[62] These savings of $1 billion in reduced transmission investments is a direct financial benefit to all customers in New York. Second, in March 2016, the California Independent System Operator announced it was canceling 13 transmission projects that previously had been planned for the PG&E service territory due to the effect of DSG and energy efficiency programs in reducing load forecasts in that area. The canceled projects include planned line improvements, transformer replacements, and bus upgrades, which resulted in $192 million in transmission cost savings for all customers.[63] Third, in April 2020, the California Public Utilities Commission acknowledged that CG can help avoid certain investments in grid infrastructure and directed its Energy Division (Staff) to further develop and refine the methodology and modeling for "unspecified" transmission and distribution values.[64]

Q. What is Mr. Barker's theory about risks associated with private generation deferring RMP/PacifiCorp's transmission and distribution investment?

A. Mr. Barker is concerned that RMP does not have control over installation timeframes and that RMP doesn't have a "commitment from customer generators to remain in service."[65] He reasoned that because of the long lead time needed to site, permit, and construct new

[62] Utility Dive, *The non-wire alternative: ConEd's Brooklyn-Queens pilot rejects traditional grid upgrades*, Aug. 3, 2016, http://www.utilitydive.com/news/the-non-wire-alternative-coneds-brooklyn-queens-pilot-rejects-traditional/423525/.

[63] Greentech Media, *Californians Just Saved $192 Million Thanks to Efficiency and Rooftop Solar*, May 31, 2016, https://www.greentechmedia.com/articles/read/Californians-Just-Saved-192-Million-Thanks-to-Efficiency-and-Rooftop-Solar.

[64] California Public Utilities Commission, *2020 Policy Updates to the Avoided Cost Calculator*, p. 2-3, Rulemaking 14-10-003, Decision 20-04-010, Apr. 16, 2020, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M334/K734/334734544.PDF. Transmission and distribution cost savings can be either specified or unspecified: the former is a savings tethered to specific projects, whereas the latter is a savings associated with overall reduction in customer load that reduces the need for grid capacity upgrades across the system.

[65] *Barker Rebuttal*, lines 95-97.

projects, these grid expansion projects need to be planned in advance. However, since RMP cannot control CG installation timeframes, nor are there firm commitments from CG to remain in-service,[66] RMP cannot rely on CG resources in planning because if a projected CG capacity were not materialized as planned over a capital investment timeline, "the system issue being deferred would be at risk of occurring."[67]

Q. Are these concerns reasonable?

A. No. RMP does not have control over QF installation timeframes, like CG timeframes, yet the Commission has determined that QFs defer or avoid PacifiCorp's transmission investments. For example, the Commission stated that "we determine PacifiCorp's proposed 2021 Wyoming wind and transmission resources to be deferrable by potential wind QFs for the purposes of determining avoided cost prices."[68] Mr. Barker's second concern, that RMP does not have a commitment that a CG resource will stay in service is unpersuasive. For a CG customer to benefit from her/his CG investment, the CG customer must keep her/his generating asset in service. And, the CG customer has no buyer of exports other than RMP. With a properly designed customer rate, a CG customer will have the incentive to provide those exports to RMP into the future.

---

[66] Mr. MacNeil raises the same "non-firm" concern as Mr. Barker but with regard to the value of avoided generation capacity. He states that "it is inequitable for non-participating customers to pay for [generation] capacity. . . .for which there is no commitment to deliver." *MacNeil Rebuttal*, lines 740-42. Mr. MacNeil's concerns are unpersuasive for the same reasons.

[67] *Id*, at lines 95-99.

[68] Public Service Commission of Utah, *Updates and Revisions to Avoided Cost Pricing Methodologies for QF Resources*, Docket No. 17-035-37, p. 19, Jan. 23, 2018, https://pscdocs.utah.gov/electric/17docs/17035T07/29931117035T07and1703537o1-23-2018.pdf.

Q. OCS witness Mr. Philip Hayet also has concerns about availability of CG exports. What are his concerns?

A. Mr. Hayet states that "since rooftop solar exported energy is not provided by customers pursuant to any long term contractual commitment by the customer, it would not be reasonable for RMP to rely on this exported energy as a source of reliable transmission capacity."[69] He also states that, "it is highly questionable whether there would be any material change in RMP's distribution investment as a result of additional rooftop solar exported energy,"[70] because "if exported energy is not available. . . customer demands. . . will not be met."[71]

Q. What is your response to Mr. Hayet's concerns?

A. First, a QF poses substantially the same availability concerns but RMP has readily entered into power purchase agreements with them and factors those availability issues into its generation dispatch and commitment decisions. Moreover, a contractual obligation is not indicative of whether energy from CG solar will be provided to the grid. Rather, hourly solar production and the export profile (which will depend upon a number of factors including weather conditions and the rate structure approved by the Commission) are more determinative of the provision of energy from CG solar. CG is a long term investment and CG customers can sell their exports to no one else but RMP. As I noted above, Dr. Milligan has estimated the amount of CG exports that can be *reliably* delivered to the system at

[69] *Hayet Rebuttal*, lines 629-633.
[70] *Id*. at lines 708-10.
[71] *Id.* at lines 702-07.

system peak load—the Effective Load Carrying capacity or ELCC. This measure takes into account the fact that CG resources provide a highly reliable service. Moreover, transmission and distribution investments are made based on planning scenarios which estimate load and resources. Planning processes are a balancing of costs and risks. They do not eliminate all risk but do reduce it to acceptable levels. Mr. Hayet's availability concerns have been addressed by in the analyses of Dr. Milligan and Dr. Yang.[72]

Q. Has Mr. Hayet objected to using PacifiCorp's OATT transmission price?

A. Yes. Mr. Hayet states that it is not appropriate to use PacifiCorp's OATT transmission price for the avoided transmission capacity cost associated with CG because PacifiCorp's OATT transmission price includes costs that cannot be avoided by CG exports such as certain general plant and administrative costs and general expenses.[73]

Q. Is it appropriate to use PacifiCorp's OATT transmission price for the avoided transmission capacity cost?

A. Yes. First, Dr. Yang did not assume that all transmission costs included in the PacifiCorp's firm OATT transmission rate are avoidable. Rather, Dr. Yang only allocated a fraction of transmission costs that PacifiCorp would otherwise have to incur but for CG exports. Stated differently, Dr. Yang discounted PacifiCorp's firm OATT transmission rate to the proportion that could be reasonably offset by CG exports using Dr. Milligan's capacity contribution factor – *i.e.*, Dr. Yang's calculation of the avoided transmission costs is the product of Dr.

[72] See footnotes 54 and 55.
[73] *Hayet Rebuttal*, lines 638-45.

Milligan's CG export's capacity contribution factor (about 28%) times PacifiCorp's OATT firm transmission rate.[74] In addition, Dr. Yang notes that "other states like Oregon and Maine used a firm transmission rate as a reasonable proxy in valuing the avoided transmission capacity benefits attributable to DG solar."[75] Dr. Yang's method to compute the avoided transmission capacity cost using PacifiCorp's OATT transmission price correctly reflects avoided cost.

B. CG Provides a Hedging Benefit

Q. What is Mr. MacNeil's position regarding the hedging benefit provided by CG solar?

A. It is Mr. MacNeil's position that RMP's Official Forward Price Curves ("OFPC") for natural gas and electricity "already capture[s] a premium on these commodities relative to spot prices" and since Dr. Milligan uses RMP's OFPC prices for electricity in his avoided energy cost calculation, "no adjustment for avoided fuel hedging and financial risk is appropriate."

Q. Do the OFPCs for natural gas and electricity already capture a premium on these commodities relative to spot prices?

A. They may capture some portion of the premium. Mr. MacNeil explains that "in the first three years, the OFPC reflects current [forward price] offers"[76] and that after a transition period the remaining years the OFPC are based on production cost modeling that "retains a

[74] *Yang Revised Affirmative*, lines 245-252; *see also* Vote Solar, *Surrebuttal Testimony of Spencer S. Yang, Ph.D.*, September 15, 2020 (*Yang Surrebuttal*), lines 104-05.

[75] *Yang Revised Affirmative*, lines 243-245; *see also Yang Surrebuttal*, lines 107-113.

[76] *MacNeil Rebuttal*, lines 207-208.

forward premium consistent with current market offers."[77] In discovery, RMP explained that "PacifiCorp's OFPC is composed of 37 months of market forwards followed by 12 months of forwards blended with fundamental forecast prices that transition to a *pure fundamentals forecast* starting in month 50."[78] Long-term forward prices are not incorporated into the OFPC because long-term forward contracts are largely unavailable.[79] A fundamentals forecast is very different from actual forward commitments. Certainly for years 4-20, there is no evidence that a risk premium is reflected in OFPC prices.

Q. Does Dr. Milligan use PacifiCorp's OFPC for natural gas?

A. No. Thus, the natural gas hedging benefit is not reflected in Dr. Milligan's calculations.

Q. Does PacifiCorp compute a hedging benefit for avoided energy costs in other contexts?

A. Yes. In measuring energy efficiency costs, PacifiCorp's IRP "incorporates three credits that reduce the modelled cost of energy efficiency bundles."[80] One of those is the stochastic risk reduction credit. "The stochastic risk reduction credit is intended to reflect the value energy efficiency provides in terms of reducing portfolio risk."[81] "[T]he stochastic risk reduction

---

[77] *Id*. at lines 211-212.

[78] *Milligan Rebuttal*, Vote Solar Exhibit 1-MM, filed July 15, 2020.

[79] *See*, *e.g.*,, Mark Bolinger, Ryan Wiser, and William Golove, *Accounting for Fuel Price Risk When Comparing Renewable to Gas-Fired Generation: The Role of Forward Natural Gas Prices,* Energy Policy, July 17, 2004, p. 16, https://www.osti.gov/servlets/purl/886817; *see also* Idaho Public Utilities Commission, *Rebuttal Testimony of Rick T. Link,* Case No. PAC-E-17-07, 22:9-13, https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/rates-regulation/idaho/filings/case_no_pac_e_17_07/12-18-17_rebuttal_testimony/06_Rebuttal_Testimony_Rick_Link.pdf.

[80] PacifiCorp, *2021 IRP DSM Technical Workshop*, Feb. 18, 2020, p.16, https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/PacifiCorp_2021_IRP_February_18_2020_CPA_Workshop_Meeting.pdf.

[81] *Id*. at p.17.

benefit [is] associated with resources that do not incur variable fuel costs that are subject to market volatility."[82] The credit value in the 2019 IRP was $4.74/MWh or .474 ¢/kWh.

Q. Do CG exports reduce stochastic risk, i.e., provide a hedging benefit, like energy efficiency?

Yes. CG exports, just like energy efficiency, is a resource that does not incur variable fuel costs that are subject to market volatility. I have proposed a fuel price hedge benefit of 0.19 ¢/kWh, which is less than half of the hedge value calculated by RMP for energy efficiency. The value I propose likely understates the hedge value provided by CG exports.

Q. Does Mr. MacNeil raise other concerns about your proposed fuel price hedge value?

A. Yes. Mr. MacNeil claims that "no fuel savings should be assumed, since Dr. Milligan is assuming that CG exports impact electricity market volumes."[83]

Q. How do you respond?

A. Dr. Milligan does not assume that CG exports impact electric market volumes. In any event, CG exports change RMP's fuel mix, reducing fuel price volatility and thus hedging costs.

Q. What concern does Mr. MacNeil express about the term of the hedge?

A. Mr. MacNeil poses the question, "Are there significant downsides to a hedge for an extended term, such as the 25 years proposed by Vote Solar?"[84] He then responds, "Yes." He explains

[82] PacifiCorp, *PacifiCorp's 2017 Class 2 Demand-Side Management Decrement Study*, p.1, https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/2019-draft-study-docs/PacifiCorp_Class2_DSM_Decrement_Study.pdf.

[83] *MacNeil Rebuttal*, lines 948-49.

[84] *MacNeil Rebuttal*, lines 980-981.

that over the long run, RMP can cost-effectively use renewable resource procurement, fuel-switching, and energy efficiency programs to reduce electricity and natural gas demand.[85] Thus, "[l]ocking in gas costs over a longer period reduces the opportunity for customers to benefit from alternatives that become available at a later time."[86]

Q. Does his concern have merit?

A. No. First, Vote Solar has proposed to fix the ECR rate for 20, not 25 years. Mr. MacNeil appears to argue that in the future, RMP may have ways to reduce hedging costs, thus CG solar should be paid nothing now. But CG solar does provide a hedging benefit now. That hedge value will be paid to CG customers who sign up now under the new ECR. However, when updates are made to the ECR, the hedge value will also be reviewed and updated, and the new value will apply to customers that sign up at that time. Thus, CG hedges will be *averaged-in* over time reflecting changes in RMP's portfolio, similar to RMP's strategy for natural gas and power hedges. Future hedge values will reflect the future opportunities that Mr. MacNeil identifies.

Q. What does Mr. MacNeil state about reciprocal commitment in terms of hedging value?

A. He states that "a long term fixed commitment is inappropriate, especially when customers are not making a reciprocal commitment in return, as in the case of the proposed CG export program."[87]

---

[85] *Id*. at lines 982-88

[86] *Id*. at lines 988-89.

[87] *Id*. at lines 1003-05.

Q. Is CG solar committed for 20 years?

A. Yes. Although CG customers do not enter a contractual arrangement to provide a specific amount of exports to RMP, a CG solar installation is nonetheless committed to operate and produce energy for its operational life. CG exports have no place to go other than to RMP. The commitment to provide exports stems from the tariff design. A well-designed tariff will incentivize CG customers to provide exports when most valuable to RMP. This is equivalent or better than a contractual agreement because providing exports will be in the customer's best interest. Also, if a CG customer chose not to provide exports, but consume all the solar production on site, the customer would receive no hedge value. However, RMP would still reap a hedging benefit, similar to the benefit RMP has calculated for energy efficiency, through the reduction in customer demand.

Q. OCS witness Ms. Beck states that you did not consider differences in state energy policy between Oregon and Utah[88] for your proposed hedge value for CG. How do you respond?

A. RMP's hedging strategy encompasses its net power costs over all its service territories in the east and west sides of its system. It is not state specific. State policies will shape the overall hedging strategy, but would not change the hedging value that I have proposed for CG. I note that the Oregon Public Utility Commission staff has expressed concerns about fuel and generation price stability similar to those of the Commission. "[G]iven tremendous uncertainty regarding the cost of natural gas production, i.e., uncertainty related [to] state

---

[88] *Beck Rebuttal,* lines 113-15.

and federal climate policy, it is plausible that natural gas prices could sharply increase in the next 20 years. In this circumstance, even saturated solar production would be beneficial. Staff does not believe that current market conditions negate the value of stable generation prices."[89]

Q. Ms. Beck also states that you did not consider RMP's hedging guidelines or review actual hedging costs.[90] How do you respond?

A. In 2011, a collaborative process was undertaken to review RMP's hedging strategy. There were concerns about the costs of RMP's hedging program that "was designed for price stability and not for cost minimization."[91] As a result of that process RMP's hedging procedure was modified to consider costs as well as price stability. What is clear is that there are costs associated with hedging. And it is clear that CG exports, by reducing RMP's natural gas fuel costs as a share of total fuel costs, reduces RMP's fuel hedging costs. I proposed a fuel hedging benefit of 5% of energy costs because there is theoretical support for this amount. An in depth analysis of RMP's hedging costs comparing scenarios with and without CG exports could be done and would likely produce results similar to those found for energy efficiency. The value I propose is on the very low side of industry valuations, and less than half the value RMP has calculated for energy efficiency. It is a

[89] Public Utility Commission of Oregon, *Opening Testimony of Brittany Andrus*, *Staff Exhibit 100*, In the Matter of PacifiCorp, dba Pacific Power, Resource Value of Solar, Docket No. UM1910/1911/1912, March 16, 2018, p.46, https://edocs.puc.state.or.us/efdocs/HTB/um1910htb15513.pdf.

[90] *Beck Rebuttal*, lines 115-118.

[91] Utah Division of Public Utilities, *Collaborative Process to Discuss Appropriate Changes to PacifiCorp's Hedging Practices*, Report to the Utah Public Service Commission, March 30,2012, p. 3, https://pscdocs.utah.gov/electric/10docs/10035124/220522RedacRepCollProc3-30-2012.pdf.

reasonable proxy, and it has been accepted by the Oregon Public Service Commission for RMP's hedging portfolio, the same portfolio under consideration here.

C. CG Provides a Carbon Compliance Benefit

Q. What are Mr. MacNeil's and Ms. Beck's positions regarding the inclusion of a carbon compliance benefit in the value of CG solar?

A. Both argue that including a carbon compliance benefit is not appropriate at this time because there is currently no carbon mandate in Utah.[92]

Q. Does PacifiCorp incur any costs associated with reducing carbon emissions?

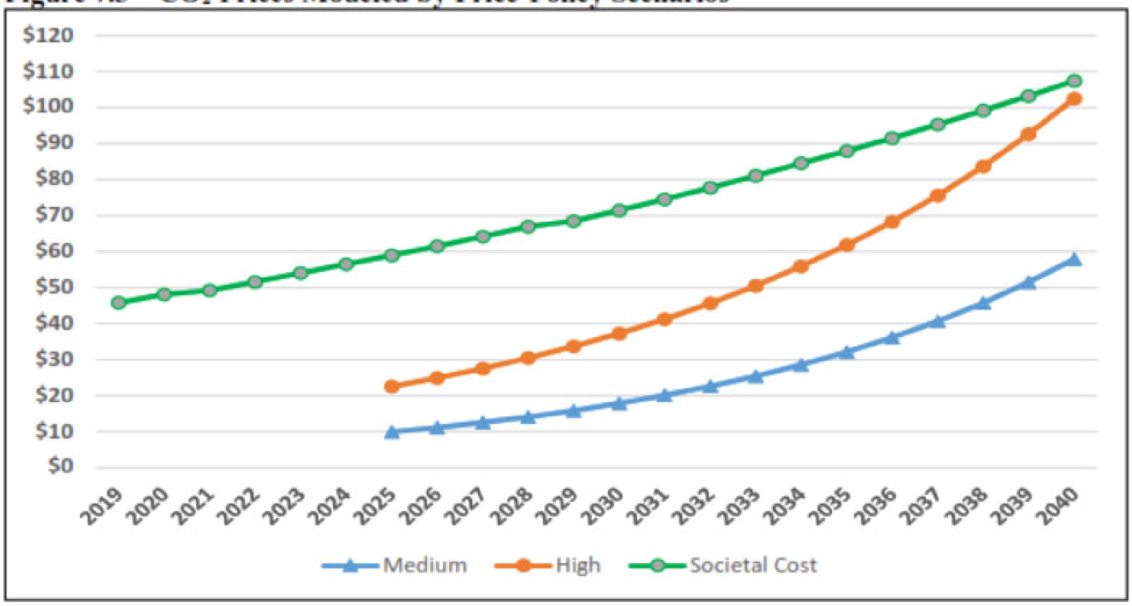
A. Yes. PacifiCorp incorporates a carbon price into its planning process starting in 2025 and continuing through 2040. Figure 5 is taken from PacifiCorp's 2019 IRP. It shows RMP's estimated future CO_2 compliance costs as the two curves labeled medium and high. Mr. MacNeil explains that "the resources selected in the 2019 IRP preferred portfolio were optimized relative to a medium view of future carbon dioxide prices."[93] This means that carbon prices are incorporated into system planning in a way that increases total system costs. In other words, lower cost facilities with higher carbon emissions are replaced with higher cost facilities that have lower carbon emissions. Ultimately, when these resources are built, the costs of these resources will be recovered from customers.

[92] *See MacNeil Rebuttal*, lines 1186-90; *Beck Rebuttal*, lines 123-28.

[93] *MacNeil Rebuttal*, lines 1211-13.

Figure 5: PacifiCorp Estimated Carbon Prices[94]

Figure 7.3 – CO_2 Prices Modeled by Price-Policy Scenarios



Q. Does Utah have a voluntary carbon reduction target?

A. Yes. The Energy Resource and Carbon Emission Reduction Initiative is a law passed in 2008 that requires 20 percent of retail sales of Utah utilities be supplied by renewable energy, if cost effective, by 2025.[95]

Q. Is it possible that RMP incurred costs through resource selection to voluntarily comply with the Carbon Reduction Initiative?

A. Yes. For example, RMP could have chosen to build wind turbines instead of investing in a less costly expansion of coal production in anticipation of future carbon requirements.

[94] PacifiCorp, *2019 Integrated Resources Plan*, Vol. I, p. 180, Fig. 7.2, Oct. 18, 2019. https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2019_IRP_Volume_I.pdf.at p. 180.

[95] Utah State Legislature, S.B. 202 Energy Resource and Carbon Emission Reduction Initiative, effective March 18, 2008, https://le.utah.gov/~2008/bills/static/SB0202.html.

Q. Do you agree that avoided compliance costs should only be considered when a mandate is implemented?

A. No. Investments by customers in CG solar are long-term by nature and will contribute to attaining future goals and will reduce future compliance costs. CG production is a carbon-free source of energy. In its 2019 IRP, PacifiCorp considers carbon risk in its planning process. The Commission, too, must weigh these risks. If the benefits of carbon reduction are not reflected in the value of solar for current CG customers, then they will not be compensated for providing these benefits when they are realized in future years. It is clear that the momentum for carbon reduction is growing and that CG solar is part of the solution.

Q. Are there other active initiatives in Utah to reduce carbon emissions?

A. Yes. As I explained in my Revised Affirmative Testimony, the Kem C. Gardner Policy Institute, in January 2020, released The Utah Roadmap, a guide to reducing carbon emissions and improving air quality.[96] The Roadmap was commissioned by the Utah Legislature and was prepared with the assistance of a 37-person Technical Advisory Committee. The Roadmap recommends the adoption of a goal to reduce CO_2 emissions statewide by 25% below 2005 levels by 2025, 50% by 2030, and 80% by 2050.[97] As part of another strategy in the Roadmap, called mileposts, a recommendation was made to "support national and regional initiatives to put an economy-wide price on greenhouse gas emissions through resolution or legislation."[98]

---

[96] Kem C. Gardner Policy Institute, *The Utah Roadmap: Positive Solutions on Climate and Air Quality,* University of Utah, Jan. 31, 2020, https://gardner.utah.edu/wp-content/uploads/TheUtahRoadmap-Feb2020.pdf.

[97] *Id*. at p. 2.

[98] *Id*. at p. 16.

Q. Are the risks of carbon being recognized generally by businesses and incorporated into their business planning?

A. Yes. According to CDP, an organization that runs a global environmental disclosure system, "more than half the energy companies and two-thirds of the utilities that report their greenhouse gas emissions report that they are, or will soon be, using carbon price assumptions in their strategic planning."[99] For example, BP recently increased the carbon price forecast it uses in its planning from $40 to $100 per ton and wrote down approximately $17.5 billion from its oil and gas portfolio. Analysts say that this is a signal that BP expects European governments to introduce very strong carbon taxes and that the returns from oil investment will fall.[100] Carbon assumptions in resource planning increase projected costs.

Q. What developments in the states of Washington and Oregon are impacting RMP's integrated resource planning and the costs that RMP incurs to reduce carbon emissions?

A. Last year, the state of Washington passed the Clean Energy Transformation Act that requires a full phase-out of coal generation by 2026 and 100 percent carbon-free electricity by 2045. In Oregon, the Clean Energy and Coal Transition Act passed in 2016 requires a phase-out of coal generation by 2030 and 50% clean power by 2040. RMP's 2021 integrated resource plan must reflect these requirements. Specifically, the "new mandates in Washington are driving the utilities to use a common statewide approach that assigns a cost to the damages

---

[99] Ed Crooks, *Surge in corporate planning for cost of carbon*, Financial Times, October 12, 2017, https://www.ft.com/content/33206028-af40-11e7-beba-5521c713abf4.

[100] John Parnell, *BP Adopts $100 Carbon Price Assumption for 2030, With Big Implications for Clean Energy*, Green Tech Media, June 16, 2020, https://www.greentechmedia.com/articles/read/european-oil-majors-ready-to-scale-up-energy-transition-investment.

from greenhouse gas emissions with results provided by the Interagency Working Group on Social Cost of Greenhouse Gases. Going forward, the costs of all power resources will have to reflect their climate impacts. In other words, damages from greenhouse gas emissions—impacts to human health, property value reductions, and declines in agricultural productivity, for example—will be counted as costs, which will make portfolios with high carbon emissions start to look a lot more expensive."[101] Since RMP's IRP covers a multi-state region, planning and investments required to meet Washington and Oregon's carbon requirements will affect RMP's customers in all states, including Utah.

Q. What carbon prices do you use to calculate the avoided cost of carbon benefit for CG exports?

A. I use the prices that correspond to the High case in Figure 5. I adopted this set of prices because of the increased momentum of the carbon initiatives in Utah, Oregon, and Washington, and the trend in carbon allowances prices in the Western Carbon Initiative[102] make it likely that RMP will be faced with an accelerated requirement to reduce carbon emissions.

Q. How would the avoided cost of carbon benefit for CG exports change if you used the Medium case in Figure 5 consistent with the prices used by RMP to optimize the resources in its 2019 IRP preferred portfolio?

A. The benefit would fall from 2.80 ¢/kWh to 1.40 ¢/kWh.

[101] Eric de Place, Laura Feinstein, *How Utility Planning is Building a Clean Energy Future in the Northwest*, Sightline Institute, Feb. 6, 2020, https://www.sightline.org/2020/02/06/how-utility-planning-is-building-a-clean-energy-future-in-the-northwest/.

[102] *See Berry Revised Affirmative*, footnote 89.

D. CG Avoids Emissions and Provides Health Benefits

Q. DPU witness Mr. Davis states that "[t]he Division is not convinced CG provides any significant environmental or societal benefits at the current penetration level."[103] How do you respond?

A. The values that I have proposed for the societal benefits from reduced carbon emissions and the health benefits from reduced pollutants are computed on a kWh basis. The avoided costs and benefits result when a kWh of emissions-free CG solar displaces a kWh of emissions-producing generation. I agree that the current penetration level of CG solar in Utah is very small, and consequently, that the total avoided costs and increased benefits are small, but they are positive and measured correctly for each unit of production.

Q. What other concerns does Mr. Davis have with your proposed environmental and societal values?

A. Mr. Davis has listed a set of concerns that are largely unexplained and unsubstantiated. He has concerns with "dated national averages" he says are used in my assumptions.[104] He questions the ability to isolate the societal or environmental attributes solely attributable to RMP or to exclude double counting of benefits.[105] He concludes that my analysis does not properly consider tax credits or the disposition of retired EV equipment.[106]

[103] *Davis Rebuttal*, lines 37-39.
[104] *Id*. at lines 244-46.
[105] *Id*. at lines 246-48.
[106] *Id*. at lines 253-55.

Q. How do you respond?

A. I do not know what dated national averages Mr. Davis refers to, but regardless, I used the most up-to-date public information available in my estimated values. Regarding attribution of societal or environmental attributes to RMP, again, avoided costs and benefits result when a kWh of emissions-free CG solar displaces a kWh of emissions-producing generation by RMP, thus the avoided costs and benefits are directly tied to RMP. Mr. Davis is concerned about possible double counting of benefits, but health benefits and societal benefits are distinct and can result from the same kWh of displaced emissions-producing generation. Lastly, tax credits do not affect the calculation of the health or societal benefits and if disposal costs were to be considered, they would also need to be analyzed for coal and gas-fired generation and included in the ECR as an avoided cost benefit.

Q. What is OCS witness Ms. Beck's position regarding the benefits of reduced carbon emissions and health benefits associated with reduced pollution?

A. Ms. Beck objects to including the value of these benefits in ECR because, (a) it will result in distortions in price signals and resource selection, (b) it is discriminatory, and (c) the benefits will accrue to individuals that are not RMP ratepayers.[107] In her opinion, valuation of these benefits should be done "in a more global manner to apply consistently to all resources in all proceedings,"[108] and that "these kinds of issues with broader impact should be addressed through state policy, preferably articulated in statute."[109]

[107] *Beck Rebuttal*, lines 133-39.
[108] *Id*. at lines 82-83.
[109] *Id*. at lines 91-93.

Q. How do you respond to Ms. Beck's position that including values for reduced carbon emissions and health benefits will result in distorted price signals, resource selection, and discrimination?

A. One of the roles of a state regulatory commission is to ensure that the operation of regulated monopoly utilities is in line with the public interest. The electric sector is one of the biggest sources of air emissions in the U.S.,[110] and Berkshire Hathaway, RMP's parent company, is one of the top polluters in this sector.[111] RMP has been imposing carbon and health costs on all persons within the emissions regions of its fossil generating plants for many years. The fact that health or carbon benefits might accrue region-wide, mitigating the harm caused by serving RMP customers, is not a justification for excluding environmental or health benefits from the ECR, rather it is a reason to include them. The Commission, as RMP's regulator, has the ability and mandate to rectify this harm.

Ms. Beck does not explain the distortions in price signals and resource selection that she identifies as a problem. She implies that if environmental and health benefits are included in the ECR, that other emissions-free investments would be disadvantaged. This is an open question and a solution, if needed, might involve changes to compensation for other emissions-free investments, not the elimination of the value component in the ECR. The analysis cannot be done, however, because Ms. Beck has not identified what investments would be disadvantaged nor if the impact would be material.

[110] M. J. Bradley & Associates LLC, *Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States*, July 2020, p.7, https://www.nrdc.org/sites/default/files/benchmarking-air-emissions-2020.pdf.

[111] *Id*. at slides 15, 17, 19, and 21.

E. CG Provides Local Economic Benefits

Q. Does Ms. Steward recognize that CG solar provides local economic benefits?

A. Yes, indirectly. Ms. Steward argues that it is not appropriate to subsidize the rooftop solar industry in order to provide economic benefits such as jobs.[112] Although she acknowledges that the rooftop solar industry provides economic benefits, the premise of her argument is false if she is referring to the CG export rate.

What Ms. Steward could be arguing is that it is not appropriate to include local economic benefits in the value of CG solar, because that will indirectly benefit the rooftop solar industry. Since CG solar is a competitor of RMP, it is not surprising that Ms. Steward would be opposed to policies that level the playing field for CG solar. PacifiCorp is building or planning to build large amounts of renewable resources, a large portion of which will be located outside the State of Utah.[113] Investment outside Utah not only exports jobs out-of-state but requires billions of dollars of investment in transmission to bring the energy back to Utah. CG solar creates jobs and economic growth in the State of Utah and does not require investment in a vast transmission infrastructure. Local economic benefits are an undeniable part of the value of CG solar.

---

[112] *Steward Rebuttal,* lines 110-21.

[113] *See, e.g.,* PacifiCorp, *2019 Integrated Resources Plan*, Vol. I, p. 7, Oct. 18, 2019. https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2019_IRP_Volume_I.pdf.

Q. What is Ms. Beck's position on local economic benefits?

A. Ms. Beck states that "although [she] did not review in detail the studies and assumptions Vote Solar relied upon in its estimates of potential local economic benefits, it appears to [her] that embedding their proposed level of benefits into the Export Credit Rate assumes that the same level of rooftop solar will continue into the future"[114] and that since "the pace of future local economic benefits related to the pace of solar construction is at best speculative . . . local economic benefits should not be included in the Export Credit Rate."[115]

Q. Is Ms. Beck's understanding correct?

A. No. The estimate of local economic benefits does not assume that the same level of rooftop solar investment will continue into the future. Economic benefits associated with each kW of rooftop solar investment are spread to the kWh of production over a 20-year period. So each year, a kWh of CG exports will receive just a small fraction of the total benefit (from the installed kW) in the ECR. The total economic benefit from the installed kW of CG capacity will not be recovered until all kWhs over a twenty year period are produced.[116]

[114] *Beck Rebuttal*, lines 150-54.

[115] *Beck Rebuttal*, lines 160-63.

[116] *See Berry Revised Affirmative*, lines 861-62.

F. CG Provides Ancillary Services, Reliability, and Resiliency Benefits

Q. What is Mr. MacNeil's position regarding the ancillary services benefits associated with CG?

A. Mr. MacNeil states that "ancillary services require adjustment in power output"[117] and "absent a storage component, a solar resource that is delivering all of its output to the grid would not have the ability to increase output on demand."[118] Mr. MacNeil also states that "it is unlikely that the communications systems necessary to achieve that capability would be cost-effective given the limited frequency it would be deployed and low margins when it is deployed, relative to other resource options."[119]

Q. Do you agree with Mr. MacNeil?

A. No. CG solar plus storage is growing rapidly, so it is counterproductive to exclude this resource, as done by Mr. MacNeil, from the evaluation of ancillary services benefits. In PacifiCorp's 2021 IRP planning process, grid services such as contingency reserve, regulation reserve, frequency response, and load shift are discussed prominently in conjunction with demand response.[120] The communications systems needed to achieve the integration with demand response are the same systems that would be needed for CG. In fact, distributed solar plus storage already provides ancillary services to RMP's system.[121]

[117] *MacNeil Rebuttal*, line 1027.

[118] *Id.* at lines 1028-30.

[119] *Id.* at lines 1044-47.

[120] PacifiCorp, *2021 Integrated Resource Plan (IRP) Conservation Potential Assessment January 21, 2020 Workshop,* slide 3, Available at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/PacifiCorp_2021_IRP_January_21_2020_CPA_Workshop_Meeting.pdf.

[121], *2019 Integrated Resources Plan*, Vol. II, Appendix Q p. 589, table Q.5, Oct. 18, 2019,

Q. Did you quantify a benefit for ancillary services, reliability, or resiliency from CG solar?

A. No. The values of ancillary services (also referred to as grid support services) are difficult to quantify at the current stage of development and level of penetration in RMP's service territory. Reliability and resiliency benefits are also currently difficult to quantify, particularly resiliency, which is a relatively new concept the understanding of which is still evolving.[122] This does not mean that these benefits do not exist, nor that the Commission should not consider them when determining the ECR. Two very recent examples illustrate the advances taking place in the rooftop solar market, and the ancillary services and resiliency value that is provided. Three California-based community-choice aggregators ("CCAs") have hired Sunrun to install 20 MW of solar-battery systems for about 6,000 homes this year and next to provide vulnerable customers backup if Pacific Gas and Electric shuts off power due to high wildfire risk. The CCAs and Sunrun will then use the batteries to reduce peak load and serve system resource adequacy.[123] Portland General Electric Company ("PGE") is launching a pilot to connect 525 residential storage batteries that PGE will dispatch to add flexibility to the grid. PGE will optimize distribution solar and storage to provide grid services while also increasing resiliency for customers who can rely on their systems as a source of backup power.[124] RMP itself has demonstrated that a mechanism is

---

https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2019_IRP_Volume_II_Appendices_M-R.pdf

[122] NARUC, *The Value of Resilience for Distributed Energy Resources: An Overview of Current Analytical Practices*, Apr. 2019, https://pubs.naruc.org/pub/531AD059-9CC0-BAF6-127B-99BCB5F02198.

[123] Jeff St. John, *Sunrun Lands Contract for 20MW Backup Battery-Solar Project in Blackout-Prone California*, Green Tech Media, July 30, 2020, https://www.greentechmedia.com/articles/read/sunrun-lands-20mw-backup-battery-solar-contract-for-northern-california-communities.

[124] Portland General Company, *Portland General Electric Program Will Transform Hundreds of Homes Into a Virtual Power*

already available that allows RMP to control the output of rooftop solar plus storage projects as it has implemented such a mechanism in Herriman, Utah as part of Soleil Lofts, a new 600-unit all-electric apartment complex.[125]

Q. What is Mr. MacNeil's opinion about system reliability and back-up generation?

A. He states that "the reliability of the electric grid is inherently decided at the system level through regulation and planning"[126] and that "it would be contrary to ratemaking principles for backup equipment serving the needs of an individual customer during outage conditions to be paid for by other customers who don't receive those outage reduction benefits."[127]

Q. Does CG, as a backup to RMP's system, benefit non-CG customers?

A. To be clear, CG equipment is paid for by CG customers, so Mr. MacNeil's point is spurious. As the news reports about the projects in California and Oregon explain, rooftop solar plus storage serves a dual purpose. It provides back-up power to individual customers when the grid goes down and when the grid is up it can provide valuable grid services to other customers. But even back-up power itself has been identified as providing system resiliency benefits. In a recent National Association of Regulatory Utility Commissioners ("NARUC") paper,[128] eight characteristics of resilient distributed energy resources ("DERS") are described, one of which is "Islanding Capability: Resilient DERS have the

---

Plant, PR Newswire, July 1, 2020, https://www.prnewswire.com/news-releases/pge-program-will-transform-hundreds-of-homes-into-a-virtual-power-plant-301086514.html.

[125] *See Berry Revised Affirmative*, lines 503-09.

[126] *MacNeil Rebuttal*, lines 1086-87.

[127] *Id*. at lines 1090-93.

[128] Kiera Zitelman, NARUC, *Advancing Electric System Resilience with Distributed Energy Resources: A Review of State Policies*, April 2020, https://pubs.naruc.org/pub/ECD7FAA5-155D-0A36-3105-5CE60957C305.

ability to island from the distribution grid and serve load during a broader outage."[129] The paper explains further that "DERs capable of islanding—continuing to supply power while electricity from the distribution utility is no longer present—may be able to counter generation issues, including fuel shortages. Some DERs, particularly when aggregated, are also capable of providing similar capacity and ancillary services that traditional, centralized generators do, including demand response, voltage regulation, and other grid services."[130] The resiliency and ancillary services benefits provided by CG benefit all RMP customers and that value should be recognized in the determination of the ECR.

Q. Why are these facts important if you have not computed an ancillary services value or a reliability and resiliency value for CG solar?

A. Ancillary services, reliability, and resiliency benefits are benefits that will accrue to all RMP customers, are attainable, and will be much easier to measure when CG solar penetration reaches threshold levels. Those levels have not yet been reached in RMP's service territory. The determination of the value of solar by the Commission in this proceeding and the timing of ECR implementation should take into account the large system-wide benefits that will be achieved when CG installations reach threshold levels.

---

[129] *Id*. at p.4.

[130] *Id* at p.7.

IX. The ECR Should Be Based on Hourly Netting

Q. What does Mr. Meredith assert about the efficiency of prices under RMP's real-time netting proposal?

A. Mr. Meredith states that RMP's real-time netting proposal "sends efficient price signals that encourage load to be matched with renewable energy output."[131]

Q. Are RMP's proposed price signals efficient?

A. No. RMP's proposed prices are computed on an hourly basis,[132] thus by definition they can only provide an hourly price signal. RMP's proposed quantities are based on real-time netting and will change about every second. Thus, under its netting proposal, RMP proposes to use *hourly* prices for *real-time* export quantities. In order for consumption to respond on a real-time basis, real-time prices are needed; with no price variation within the hour, there is no signal to change consumption. The real-time efficiency that RMP claims is achieved through its real-time netting proposal is not achieved. Hourly prices should apply to hourly net export quantities to incentivize efficient hourly consumption and exports.

Q. What does RMP witness Mr. Meredith assert regarding customers' ability to respond under hourly versus real-time netting?

A. Mr. Meredith asserts that hourly netting is not more actionable than real-time netting.[133]

[131] *Meredith Rebuttal*, lines 223-24.

[132] *See* RMP*, Direct Testimony of Daniel J. MacNeil*, Feb. 3, 2020, lines 85–95.

[133] *Meredith Rebuttal*, lines 164-65.

Q. On what basis does Mr. Meredith support this position that hourly netting is not more actionable than real-time netting?

A. He states that, "solutions that customers can deploy to respond to the price signals from an export credit rate will likely have the capabilities to shift load on a real-time basis with solar output"[134] such as load from "batteries, smart electric vehicle charging, and smart water heaters."[135] He also states that "appropriate price signals will encourage customers to use technology to automate and control their load,"[136] and that "technology will likely enable customers to respond just as well to no netting as they would be able to under hourly netting."[137]

Q. Do you agree?

A. No. I will explain further below.

Q. What does it mean to say that hourly netting is more actionable than 15-minute or real-time netting?

A. Actionable, in this context, means that the CG customer can use the price and quantity information available to make energy consumption decisions. The price and quantity information available to the customer is different under hourly, 15-minute, and real-time netting. Under hourly netting, the customer will be faced with one quantity that is either an export or a delivery, and one price in each hour. Under 15-minute netting the customer will

[134] *Id.* at lines 165-67.
[135] *Id.* at lines 167-68.
[136] *Id.* at lines 179-80.
[137] *Id.* at lines 193-94.

be faced with four quantities that could all be exports, all deliveries, or a combination of both, and 1 or 2 prices (if deliveries and exports are priced differently) in each hour. Under real-time netting, the customer will be faced with 3600 quantities, assuming real-time netting on a one-second basis, consisting of exports and deliveries and their associated prices.

To say that hourly netting is more actionable than 15-minute or real-time netting means that CG customers are both better able to understand and make use of the price and quantity information available when making energy consumption decisions. As I explained in my Rebuttal Testimony, "an hour is about the smallest period of time that energy production/consumption data is useful to customers to put that information into the context of a day,"[138] and customers are best able to respond to one price and one quantity under hourly netting rather than multiple prices and quantities under 15-minute or real-time netting.[139]

Q. What are the shortfalls in Mr. Meredith's reasoning?

A. First, Mr. Meredith assumes that CG customers have access to real-time price and quantity information. They do not. Second, Mr. Meredith's argument rests on the full automation of customer decision-making. This will likely never occur since customers will continue to be involved in the decision-making process, choosing for example, when to operate home appliances, what temperature to set in the home, and when to plug-in an electric vehicle.

[138] *Berry Rebuttal*, lines 505-07.
[139] *Id*. at lines 519-20.

X. Export Credits Should Not Expire Under the ECR

Q. What is RMP witness Ms. Steward's position regarding the expiration of export credits?

A. Ms. Steward states that eliminating RMP's proposed credit expiration provision would "create a perverse incentive for customers to oversize their system."[140] However, she opines that "if the Commission were to end the expiration of export credits, it should take other measures to prevent customers from installing over-sized systems, such as establishing a customer generation facility cap. . . .up to the size of the customer's annual usage."[141]

Q. Has it ever been shown that the credit expiration policy has caused customers to reduce the size of their systems?

A. No. In fact, Mr. Davis's testimony suggests that export credits may arise more from increased energy efficiency or weather related factors, than from the oversizing of systems.[142]

Q. Should the Commission approve RMP's proposal to zero-out export credits each year in order to prevent oversizing of CG installations?

A. No. As I explained in my Rebuttal Testimony, zeroing-out credits creates the incentive to waste energy and flies in the face of RMP's DSM program by *dis-incentivizing* energy

---

[140] *Steward Rebuttal*, lines 159-60.

[141] *Steward Rebuttal*, lines 162-65.

[142] *Davis Rebuttal*, lines 327-329.

conservation and investments in energy efficiency.[143] Moreover, zeroing out customer credits is an unfair taking of value provided by customers' CG investments.

Q. If the Commission adopts Vote Solar's proposal to end the expiration of export credits, should the size of CG installations be limited to the size of customer's annual usage?

A. No. The sizing of CG installations should consider customer usage over a longer time-period since customer usage will vary over the lifetime of the asset. One way to achieve this would be to allow an installation up to 120% or 150% of the most recent annual usage, and to allow expansion of an existing installation if usage is greater than production. Also, sizing should take into account the value that exports can provide to all customers by reducing system peaks, and, when coupled with storage, the range of valuable grid services that can be provided to the system. In Maryland, CG installations are limited to 200% of the customer's baseline annual usage,[144] and the D.C. Public Service Commission just issued a ruling on August 6, 2020 that will increase the size of installations by 20% per year for five years until they reach 200% of the customer's historical usage, with generation in excess of consumption compensated at the wholesale rate.[145] CG is part of the evolving energy solution and should be sized with that in mind.

[143] *Berry Rebuttal*, lines 775-791.

[144] William Driscoll, *DC citizen wins increase in rooftop solar limit to 200% of past usage*, PV Magazine, Aug. 12, 2020, https://pv-magazine-usa.com/2020/08/12/dc-citizen-wins-increase-in-net-metering-limit-to-200-of-past-usage/.

[145] *Id.*; *see also* Public Service Commission of the District of Columbia, RM9-2020-03, Order No. 20387, Aug. 6, 2020, https://edocket.dcpsc.org/apis/api/filing/download?attachId=106196&guidFileName=6fed63d5-e9b1-4d50-8ced-3a52fb9e2ead.pdf.

Q. OCS witness Mr. Davis has also expressed concerns with management and reallocation of expired export credits. What are his concerns?

A. Mr. Davis is concerned about the regulatory burden associated with a projected increase in expiring credits. He states that the increase in expired credits "is the result of customers over-building their systems to meet their own loads, becoming more energy efficient, weather related factors, or a combination of all three."[146] Although Mr. Davis alleges regulatory burden, he has provided no support to substantiate his concern.

Q. How do you respond?

A. Mr. Davis's explanation for the increase in the amount of expired credits, namely that customers are becoming more energy efficient or that the increase is due to weather related factors, supports Vote Solar's position that export credits should not be zeroed out and transferred to other customers or RMP, but rather retained or paid out to their rightful owners. Penalizing customers—by taking away their credits—for becoming more energy efficient or for changing weather patterns over which they have no control is inefficient and unfair.

[146] *Davis Rebuttal*, lines 327-329.

Mr. Davis's concerns about regulatory burden can be resolved by eliminating the practice of zeroing out CG customers' export credits and instead allowing the monetization or roll-over of credits at year-end.

XI. Vote Solar's ECR Proposal Will Benefit Utah's General Economy

Q. What disaster scenario does Mr. Davis believe will result if the Commission adopts Vote Solar's proposed ECR?

A. Mr. Davis describes a disaster scenario[147] which is very similar to the "utility death spiral," an idea that originates in a 2013 paper written by Peter Kind for the Edison Electric Institute in order to provide talking points to discourage competition with utilities.[148] In the utility death spiral, customer adoption of DER such as rooftop solar and energy efficiency reduce utility sales resulting in a loss of revenue. This revenue must be recovered through remaining sales requiring a rate increase. Some customers subject to the rate increase find they are better off installing rooftop solar or reducing consumption causing more lost revenue, further rate increases, and even more installation of rooftop solar and energy efficiency, in a continuing vicious cycle until there are only a few customers left and the utility is in financial peril.

---

[147] *See Davis Rebuttal*, lines 293-303.

[148] Peter Kind, Edison Electric Institute, *Disruptive Challenges: Financial implications and Strategic Responses to a Changing Retail Electric Business*, January 2013, http://roedel.faculty.asu.edu/PVGdocs/EEI-2013-report.pdf.

Q. Have utilities avoided this disruptive cycle?

A. Yes. The utility death spiral commotion was really more an adverse reaction by monopoly utilities to fair competition than a real existential threat. Peter Kind himself has proposed numerous ways that utilities can adjust their business models to adapt to the changes in the industry, and thrive.[149] Utilities are taking on a new role of orchestrating transactions on the distribution system, getting actively involved in the electric vehicle market to increase sales, and investing in grid modernization such as new communications networks, new sensors, and smart meters that maximize customer value and generate revenue for the utility.[150]

Q. Do you agree with Mr. Davis that Vote Solar's proposal would cause an unsustainable frenzy in the solar market[151]?

A. No. The Commission has many tools at its disposal to ensure an orderly transition to a modern, clean, dynamic, and resilient electric system that includes significant amounts of CG resources. CG solar is not a threat, as Mr. Davis describes, but an opportunity for customers, local economies, and RMP. There is no reason to believe that the solar industry will not move through the phases of the industry life cycle: start-up, rapid growth, maturity, and, at some point, ultimate decline, typical of all industries.

[149] Peter Kind, Edison Electric Institute, *Disruptive Challenges: Financial implications and Strategic Responses to a Changing Retail Electric Business*, January 2013, http://roedel.faculty.asu.edu/PVGdocs/EEI-2013-report.pdf.

[150] Mike O'Boyle, *Three Ways Electric Utilities Can Avoid a Death Spiral*, Forbes, Sept. 25, 2017, https://www.forbes.com/sites/energyinnovation/2017/09/25/three-ways-electric-utilities-can-avoid-a-death-spiral/#2f25876758d2.

[151] *Davis Rebuttal*, lines 304-15.

Q. What does Mr. Davis assert about high CG penetration levels?

A. Mr. Davis states that, "it has been demonstrated in Hawaii, California, and other states, when customer generation reaches double-digit penetrations, the long-term effects become detrimental to the grid and utility resources."[152]

Q. Do you agree?

A. No. Both Hawaii and California, states with the highest penetration levels of rooftop solar, have been planning and modernizing their distributions systems to the great benefit of their utilities and customers. In Hawaii, for example, system engineers have learned that distribution circuits are capable of hosting far more distributed photovoltaic (another name for rooftop solar) than the standard rule of thumb (15% of circuit peak load).[153] They initially found that circuits could be loaded from 50% - 100% of daily minimum load without conducting any expensive or lengthy project interconnection requirements studies.[154] Then they found that they could double this hosting limit with an inverter solution, and achieve distributed PV circuit penetration levels several times the served load.[155] Maui Electric, for example, has a detailed mapping of its distribution system that provides customers with available hosting capacity on each circuit. And reverse power

---

[152] *Id*. at lines 318-21.

[153] Leon R. Roose and Marc M. Matsuura, *Session 1: A Window to Your DPV Future (Virtual Training)*, Asia Edge Power Sector Learning Series, A Practitioner's Guide to Implementing Solar Rooftop Programs and Navigating Net-Metering Policies, July 9, 2020, p. 8, http://usaidcleanpowerasia.aseanenergy.org/resource/a-window-to-your-dpv-future-virtual-training/. A recording of the virtual training can be found on the USAID Clean Power Asia website at, https://seasiaedgehubevents.webex.com/recordingservice/sites/seasiaedgehubevents/recording/play/c6251430d6874d388d2f8cdf286f21e2.

[154] *Id*. at p.9.

[155] *Id*. at pp. 10-12.

flows, often cited as creating serious operational concerns, exist on the majority of its distribution circuits today.[156] This is the new established normal.

XII. Vote Solar's Proposed ECR, Based on the Value of Solar, Is Reasonable

Q. What is Mr. Davis's opinion regarding the reasonableness of Vote Solar's value-of-solar-based ECR proposal?

A. Mr. Davis argues that Vote Solar's proposed ECR of 22.22 ¢/kWh (now 24.17 ¢/kWh) is not reasonable as compared to the current average retail rates and wholesale energy prices in California.[157] It is his opinion that "at its face value," Vote Solar's proposal "is not within the realm of reasonableness," and that "there is no scenario where CG solar should meaningfully be valued higher than the cost to acquire new solar resources or purchase power via purchase agreements."[158]

Q. How do you respond?

A. Mr. Davis makes the wrong comparisons and ignores the Commission's mandate in this proceeding. To argue that the value of solar is wrong because it is higher than the retail rate ignores the reduction in the retail rate that is made possible by CG exports, and the benefits that CG exports confer on RMP customers. The retail rate is made up of many disparately priced components that are averaged together. The ECR is one of those components, but unlike other components, it is not strictly additive. CG exports will displace costs in the

[156] *Id*. at p.13.
[157] *Davis Rebuttal*, lines 69-73.
[158] *Id.* at lines 188-190.

retail rate. Thus, it is not accurate to compare the full retail rate to the ECR. Also, CG exports confer benefits to RMP customers that are not currently reflected in the retail rate. These benefits, such as health benefits, should be in the retail rate. A comparison of the retail rate to the ECR is not an apples-to-apples comparison and it is misleading to draw conclusions based on a straight comparison.

Likewise, it is not accurate to compare wholesale energy prices to the proposed ECR. Avoided energy costs are just a component of the value of CG. An apples-to-apples comparison would compare wholesale energy prices to avoided energy costs from CG exports.

It is Mr. Davis's position that the ECR should be based solely on utility avoided costs. The Commission has approved in this proceeding that "parties may present evidence addressing the following costs or benefits: energy value, appropriate measurement intervals, generation capacity, line losses, transmission and distribution capacity and investments, integration and administrative costs, grid and ancillary services, fuel hedging, environmental compliance, and other considerations."[159] Mr. Davis has taken a very narrow view of this direction, searching for reasons to reject some components a priori, rather than considering an appropriate value.

Q. Does this conclude your surrebuttal testimony?

A. Yes.

[159] Rocky Mountain Power, *Settlement Stipulation,* Docket No. 14-035-114*,* ¶ 30, Aug. 28, 2017, https://pscdocs.utah.gov/electric/14docs/14035114/296270RMPSettleStip8-28-2017.pdf.

CERTIFICATE OF SERVICE

I hereby certify that on this 15th day of September, 2020 a true and correct copy of the foregoing was served by email upon the following:

DIVISION OF PUBLIC UTILITIES:	
Chris Parker	chrisparker@utah.gov
William Powell	wpowell@utah.gov
Patricia Schmid	pschmid@agutah.gov
Justin Jetter	jjetter@agutah.gov
Erika Tedder	etedder@utah.gov
	dpudatarequest@utah.gov
OFFICE OF CONSUMER SERVICES:	
Alex Ware	aware@utah.gov
Philip Hayet	phayet@jkenn.com
Samuel Wyrobeck	swyrobeck@jkenn.com
Michele Beck	mbeck@utah.gov
Cheryl Murray	cmurray@utah.gov
Robert Moore	rmoore@agutah.gov
Victor Copeland	vcopeland@agutah.gov
Bela Vastag	bvastag@utah.gov
SALT LAKE CITY CORPORATION:	
Christopher Thomas	christopher.thomas@slcgov.com
Megan DePaulis	megan.depaulis@slcgov.com
UTAH SOLAR ENERGY ASSOCIATION:	
Amanda Smith	asmith@hollandhart.com
Ryan Evans	revans@utsolar.org
Engels J. Tejada	ejtejada@hollandhart.com
Chelsea J. Davis	cjdavis@hollandhart.com
WESTERN RESOURCE ADVOCATES:	
Nancy Kelly	nkelly@westernresources.org
Steven S. Michel	smichel@westernresources.org
Sophie Hayes	sophie.hayes@westernresources.org
UTAH CLEAN ENERGY:	
Sarah Wright	sarah@utahcleanenergy.org
Kate Bowman	kate@utahcleanenergy.org
Hunter Holman	hunter@utahcleanenergy.org
VOTE SOLAR:	
Sachu Constantine	sachu@votesolar.org
Claudine Custodio	claudine@votesolar.org
Jennifer M. Selendy	jselendy@selendygay.com
Philippe Z. Selendy	pselendy@selendygay.com
Joshua Margolin	jmargolin@selendygay.com

AURIC SOLAR:

Elias Bishop	elias.bishop@auricsolar.com

ROCKY MOUNTAIN POWER:

Richard Garlish	Richard.garlish@pacificorp.com
Emily Wegener	Emily.Wegener@pacificorp.com
Jana Saba	jana.saba@pacificorp.com
Joelle Steward	joelle.steward@pacificorp.com
	datarequest@pacificorp.com
	utahdockets@pacificorp.com

VIVINT SOLAR, INC.:

Stephan F. Mecham	sfmecham@gmail.com

/s/ Joshua S. Margolin