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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**

REVISED AFFIRMATIVE TESTIMONY OF ~~BRIANA KOBOR~~SACHU CONSTANTINE

ON BEHALF OF

VOTE SOLAR

~~March 3~~May 8, 2020

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is ~~Briana Kobor~~Sachu Constantine. My business address is ~~358 S 700 E~~360 22nd St., Suite ~~B206, Salt Lake City, Utah 84102.~~730, Oakland, CA 94612.

Q. On whose behalf are you submitting this revised direct testimony?

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

Q. What is Vote Solar?

A. Vote Solar is an independent 501(c)(3) non-profit working to repower the U.S. with clean energy by making solar power more accessible and affordable through effective policy advocacy. Vote Solar seeks to promote the development of solar at every scale, from distributed rooftop solar to large utility-scale plants. Vote Solar has over 100,000 members nationally, including roughly 360 members in Utah. Vote Solar is not a trade group, nor does it have corporate members.

Q. By whom are you employed and in what capacity?

A. I serve as ~~Regulatory~~Managing Director, Regulatory for Vote Solar. I manage the full regulatory team for Vote Solar and analyze the development and implementation of policy initiatives related to distributed solar generation. I also review regulatory filings, perform technical analyses, and ~~testify~~participate in commission proceedings relating to distributed energy resources and renewable generation.

Q. Please describe your education and experience.

A. I have a ~~Bachelor of Science degree in Environmental Economics and Policy from~~Master of Public Policy degree from the Goldman School of Public Policy at the University of California, Berkeley, and I have been employed in the ~~utility regulatory~~energy industry since ~~2007~~1998. Prior to joining Vote Solar in ~~August~~November of ~~2015~~2017, I was employed by ~~MRW & Associates LLC ("MRW"), a specialized energy consulting firm, for eight years. At MRW~~the Center for Sustainable Energy, a non-profit energy program administration and advisory services organization, for five years. Prior to that, I was employed at Sunpower Corporation, the California Public Utilities Commission, the Alliance to Save Energy, and Lawrence Berkeley National Laboratory over the course of my career. Throughout, I focused on ~~electricity and natural gas~~energy policy and markets, ratemaking, utility regulation, and ~~energy policy development. I worked with a variety of clients including energy policy makers, developers, suppliers, and end-users. My clients included~~program implementation, particularly with regards to solar photovoltaics and clean energy. As a regulator at the California Public Utilities Commission, ~~the California Energy Commission, the California Independent System Operator, and several publicly-owned utilities. From MRW, I have experience~~I oversaw program evaluation and the cost-benefit analysis of the California Solar Initiative, the State's rooftop solar incentive program. At Vote Solar, I oversee a team of experts evaluating utility cost-of-service studies, revenue allocation and ratemaking, ~~wholesale and retail electric rate forecasting, asset valuation, and financial~~resource planning and grid modernization proceedings as well as Load Research Studies and

other quantitative analyses. A summary of my background and qualifications is attached hereto as Exhibit 1-~~BSK~~SCO.

Q. Have you previously testified before the Utah Public Service Commission ("Commission")?

A. No.

Q. Have you previously testified before other regulatory commissions?

A. ~~Yes. I have testified in proceedings before the Arizona Corporation Commission, the California Public Utilities Commission, the Idaho Public Utilities Commission, and the Montana Public Service Commission. A full list of the testimony I have filed is provided in Exhibit 1-BSK.~~No.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony in this proceeding?

A. My testimony covers four subjects. *First*, I describe the history and scope of this docket. *Second*, I introduce the witnesses who are testifying on behalf of Vote Solar and provide a summary of the topics addressed in each testimony. *Third*, I provide background on the Vote Solar Load Research Study ("Vote Solar LRS"). *Fourth*, I describe Vote Solar's proposed compensation for customer generation ("CG") exports as informed by the analyses conducted by the Vote Solar witnesses.

My lack of comments on ~~RMP's~~Rocky Mountain Power's ("RMP") affirmative testimony should not be interpreted as acquiescence or agreement with RMP. 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 new facts are introduced during discovery and hearing. I also reserve the right to express additional opinions in response to any opinions or testimony offered by other parties to this proceeding.

Q. What revisions to your initial testimony did you make?

I am submitting this revised testimony to reflect changed inputs to the analysis underlying the arguments and conclusions presented here. After the initial Affirmative Testimony was submitted, RMP indicated that they had provided incorrect input data in response to a Vote Solar Data Request. Upon receipt of new and updated data from RMP, we ran the underlying and related analyses using that data again, resulting in minor changes to certain calculations. The original analysis and, in particular, the conclusions drawn in this testimony from that analysis remain robust and consistent. Thus, this revised testimony reflects only minor adjustments to certain tables and figures and makes no substantive changes to previous versions.

III. SUMMARY OF RECOMMENDATIONS

Q. Please summarize your recommendations.

A. As described in detail below, I recommend the following:

1) The Commission should make a determination that the benefits of the net metering ("NEM") Program exceed its costs and should re-open the NEM Program to new customers as of the effective date of its order in this proceeding.

2) In the alternative, if the Commission elects to maintain the general structure of the Transition Program, as defined below, the Commission should adopt an Export Credit Rate ("ECR") of ~~22.6~~22.22 c/kWh with the following Program details:

   a) Exports should be netted on an hourly basis, rather than the current, 15-minute netting period;

   b) The ECR should be fixed for a period of 20 years for individual customers;

   c) Eligibility for each ECR vintage should be consistent with the terms of eligibility adopted for legacy access to the NEM Program under the terms of the Stipulation;[1]

   d) The Commission should eliminate the annual expiration of excess export credits; and

   e) NEM[2] and Transition[3] Customers should have the option to take service under the new ECR Program at their sole discretion.

[1] Rocky Mountain Power, *Settlement Stipulation,* Public Service Commission of Utah, Docket No. 14-035-114, Aug. 28, 2017, https://pscdocs.utah.gov/electric/14docs/14035114/296270RMPSettleStip8-28-2017.pdf.
[2] Net Metering Customers, as described more fully below, are those that will remain on the NEM Program through December 31, 2035.
[3] Transition Customers, as described more fully below, are those that submit an interconnection application during the Transition Program period.

IV. HISTORY AND SCOPE OF THE PRESENT DOCKET

Q. Please describe the history of this proceeding.

A. In 2002, the Utah State Legislature approved House Bill 7, authorizing a statewide NEM Program. NEM, as defined under House Bill 7, required "the electrical corporation to give the customer a credit for electricity generated by the customer that exceeds the amount supplied by the electrical corporation."[4] Passage of House Bill 7 and the resulting NEM Program led to consistent growth in CG resources, particularly solar distributed generation ("DG").

In 2014, ~~Rocky Mountain Power ("~~RMP~~")~~ proposed a charge on NEM Customers at the Commission, and new legislation focusing on net metering. This proposal, reflected in Utah Senate Bill 208 ("SB 208"), was passed and signed into law. SB 208 recommended that "the governing authority shall . . . [i] determine, after appropriate notice and opportunity for public comment, whether costs that the electrical corporation or other customers will incur from a net metering program will exceed the benefits of the net metering program, or whether the benefits of the net metering program will exceed the costs; and . . . [ii] determine a just and reasonable charge, credit, or ratemaking structure . . . in light of the costs and benefits."[5]

Pursuant to SB 208, on November 10, 2015, the Commission established a structure to analyze costs and benefits of the NEM Program, ordering RMP to conduct two cost of

[4] NET METERING OF ELECTRICITY, 2002 Utah Laws Ch. 6 (H.B. 7).
[5] UT LEGIS 53 (2014), 2014 Utah Laws Ch. 53 (S.B. 208); *see also* Utah Code Ann. § 54-15-105.1.

service studies, one using RMP's actual costs and the other using a hypothetical situation where "net metering customers produced no electricity."[6] On November 9, 2016, RMP filed these cost of service studies with the Commission, and based on the results, advocated for the end of the NEM Program and a new rate structure that substantially reduced the compensation to customer generators.

The Commission never held a hearing on the merits of RMP's proposal because RMP and other parties, not including Vote Solar, reached a settlement stipulation ("Stipulation") that was submitted to the Commission on August 28, 2017.[7] The Stipulation included the establishment of a NEM "cap date," under which existing NEM Customers and those that applied to the Program prior to the cap date would remain on the NEM Program through 2035. The Stipulation also established a Transition Program, establishing an interim ECR for new customer generators after the NEM cap date and until a final method for compensating exports from CG was determined.

Without making a determination per SB 208 on whether costs of the NEM Program exceed the benefits, or whether the benefits of the NEM Program exceed the costs, the Commission approved the Stipulation on September 29, 2017.[8] In its Order, the Commission stated: "[T]he Settlement does not operate to annul our obligations under Subsection One [to make a finding on NEM benefits and costs], rather it prolongs them.

[6] Utah Public Service Commission, *Order*, Docket No. 14-035-114, p. 16, Nov. 10, 2015, https://psc.utah.gov/2016/06/20/docket-no-14-035-114-2/.
[7] Public Service Commission of Utah, *Order Approving Settlement Stipulation*, Docket No. 14-035-114, p. 3–4, Sept. 29, 2017, https://pscdocs.utah.gov/electric/14docs/14035114/297036140351140ass9-29-2017.pdf.
[8] *Id*. at 1.

Given the additional load studies and other data that will be collected in the meantime, we anticipate being even better equipped to make the required findings at that future date."[9] Moreover, the Commission acknowledged that "[a]s a practical matter, we acknowledge the findings we would make in a docket devoted to fulfilling Subsection One [whether the benefits of the NEM Program exceed the costs] will be largely subsumed in the Export Credit Proceeding and the general rate cases we are likely to consider between now and the conclusion of the Grandfathering Period."[10]

On December 1, 2017, RMP filed a request for an Export Credit Proceeding to the Commission, which began the present docket.[11]

Q. Please describe the scope of the present docket.

A. As indicated in RMP's application to open this docket, the purpose of the present proceeding is to "determine the compensation rate for exported power from customer generation systems for all customers, including after the expiration of the Grandfathering Period and Transition Period."[12] Phase 1 of this docket addressed the design of RMP's load research study ("RMP LRS") and the information to be collected in the RMP LRS to inform Phase 2 of this docket where just and reasonable compensation for CG exports is to be determined.[13] The Commission issued an Order

[9] *Id*. at 9.
[10] *Id*. at 9 n.9.
[11] Rocky Mountain Power, *Application,* Public Service Commission of Utah, Docket No. 17-035-61, p. 3, Dec. 1, 2017, https://pscdocs.utah.gov/electric/17docs/1703561/298212RMPApp12-1-2017.pdf.
[12] *Id.* at 2.
[13] Public Service Commission of Utah, *Phase 1 Order*, Docket No. 17-035-61, p. 2, May 21, 2018, https://pscdocs.utah.gov/electric/17docs/1703561/3022941703561pIo5-21-2018.pdf.

in Phase 1 on May 21, 2018.[14] Additional background on Phase 1 is provided in Section VI, below.

In the Stipulation, signing parties agreed to the following regarding Phase 2 of the present docket:

> Parties may present evidence addressing reasonably quantifiable costs or benefits or other considerations they deem relevant, but the Party asserting any position will bear the burden of proving its assertions (for example, 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). The Commission will also determine the appropriate study period over which to quantify and model export credit components."[15]

In addition, the Stipulation specified: "[T]he Parties agree that nothing from the November 2015 Order or other aspects of this Docket No. 14-035-114 will: (a) limit or preclude a Party from presenting evidence in the Export Credit Proceeding identified in this Paragraph 30, or (b) be precedential in the Export Credit Proceeding or any future case." [16]

Q. Please describe how Vote Solar's testimony complies with the scope of this docket.

A. Vote Solar acknowledges that the scope of this docket is limited to the appropriate compensation method for CG exports. While additional costs and benefits result from

[14] *Id.*
[15] Rocky Mountain Power, *Settlement Stipulation,* Public Service Commission of Utah, Docket No. 14-035-114, p. 10, Aug. 28, 2017, https://pscdocs.utah.gov/electric/14docs/14035114/296270RMPSettleStip8-28-2017.pdf.
[16] *Id.* at 10.

CG that is produced and consumed behind the meter, these costs and benefits are not relevant to the design of just and reasonable compensation for CG exports. Similarly, rate design for services that customers with DG receive from RMP above and beyond what their own generation provides is outside the scope of the present docket. With this scope in mind, Vote Solar has conducted an analysis of the value of CG exports and has used the results of that analysis to inform its proposal for just and reasonable compensation for CG exports.

For purposes of its analysis to support just and reasonable compensation for CG exports in this case, Vote Solar has focused on the costs and benefits of DG solar in RMP's Utah service territory. This is a reasonable approach because the vast majority of CG in RMP's Utah service territory is solar, and the majority of future CG installations are expected to be solar.[17] Specifically, according to RMP's most recent NEM report, filed on July 1, 2019, 99.7% of NEM Customers had DG solar, and 100% of Transition Customers had DG solar.[18]

[17] *See* Exhibit 2-~~BSK~~SCO, Navigant_PG LT RA_20180815.pdf, p. 31–32, RMP's Responses to Vote Solar 6th Set Data Requests – Attach 6.16-2 (Aug. 16, 2019).
[18] Rocky Mountain Power, *Rocky Mountain Power's 2019 Net Metering Report,* Docket No. 19-035-29, Reference Docket No. 08-035-T04, p. 1, July 1, 2019, https://pscdocs.utah.gov/electric/19docs/1903529/308974RMPCustmrOwndGeneandNetMeterReptforthePerdApril12018thrMarch3120197-1-2019.pdf.

V. INTRODUCTION TO VOTE SOLAR WITNESSES

Q. Please provide an introduction to all witnesses testifying on behalf of Vote Solar.

A. As a part of its affirmative case, Vote Solar is providing testimony from a total of six witnesses, including myself. I have provided a summary of the purpose of my testimony in Section II above. A brief summary of the purpose of each of the remaining Vote Solar witnesses is provided below:

1. Dr. Albert Lee, Founding Partner and Economist at Summit Consulting, LLC, is filing testimony describing the Vote Solar LRS method and the data from the Vote Solar LRS that was provided to other Vote Solar witnesses. Additional background on the Vote Solar LRS is provided in Section VI below.

2. Dr. Michael Milligan, Principal at Milligan Grid Solutions, is filing testimony describing the avoided energy cost, avoided generation capacity cost, and avoided carbon emissions associated with CG in RMP's Utah service territory. Dr. Milligan's analysis incorporates results from the Vote Solar LRS conducted by Dr. Lee and provides inputs to Dr. Carolyn Berry's valuation of CG.

3. Mr. Curt Volkmann, President and founder of New Energy Advisors, LLC, is filing testimony describing the avoided line losses, avoided distribution capital expenditures, and integration costs associated with CG in RMP's service territory. Mr. Volkmann's analysis incorporates results from the Vote Solar LRS conducted by Dr. Lee and provides inputs to Dr. Berry's valuation of CG.

4. Dr. Spencer Yang, Principal at Bates White Economic Consulting, is filing testimony describing avoided transmission capacity costs and avoided distribution capacity costs associated with CG in RMP's service territory. Dr. Yang's analysis incorporates results from the Vote Solar LRS conducted by Dr. Lee and conclusions reached by Mr. Volkmann regarding distribution costs and line losses. Dr. Yang provides inputs to Dr. Berry's valuation of CG.

5. Dr. Carolyn Berry, Principal at Bates White Economic Consulting, is filing testimony developing Vote Solar's valuation of CG in RMP's service territory. Dr. Berry incorporates results from Dr. Lee, Dr. Milligan, Mr. Volkmann, and Dr. Yang and conducts additional analysis to develop Vote Solar's value of CG. In my testimony, I rely on Dr. Berry's assessment of the value of CG to inform Vote Solar's proposal for just and reasonable compensation for CG exports.

VI. BACKGROUND ON THE VOTE SOLAR LRS

Q. What is the Vote Solar LRS?

A. The Vote Solar LRS is an analysis of customer-owned generation in RMP's Utah service territory that examines meter data and solar inverter data to develop an assessment of how and when customer generators interact with the electrical grid. In particular, the Vote Solar LRS has been used to develop an hourly assessment of total solar production, as well as exported solar production, for customers with DG. The Vote Solar LRS has also been used to develop yield factors (kWh/kW) associated with solar production and export. This information, provided by Dr. Lee to the other Vote

Solar witnesses in this proceeding, provides the foundation for the analysis conducted to derive the value of CG presented by Vote Solar as summarized in the testimony of Dr. Berry. Dr. Berry's value of CG analysis is in turn used to inform my proposal for compensation for CG exports, as described in this testimony in Sections VII and VIII.

Q. Why did Vote Solar pursue its own LRS?

A. On May 21, 2018, the Commission issued an Order on Phase 1 of this proceeding to address the design of the RMP LRS that would inform the current phase of this docket – Phase 2 – which addresses the determination of just and reasonable compensation for electricity exported by CG.[19] In its affirmative testimony in Phase 1 of this proceeding, Vote Solar expressed several concerns with the RMP LRS that were not addressed by the Commission's decision. Vote Solar's concerns are described in more detail in Dr. Lee's Phase 1 testimony on behalf of Vote Solar, his testimony during the April 17, 2018 Phase 1 hearing before the Commission, and his Phase 2 revised affirmative testimony filed concurrently with this testimony.[20] Under the terms of the Commission's Phase 1 Order, the Commission expressed that parties may construct their own LRS samples.[21] In addition, per the Stipulation in Docket No. 14-035-114 setting forth the scope of this docket, it was agreed that any party to the present docket

[19] *Supra* n.13 at 2.

[20] ~~Lee, Albert~~Vote Solar, *Direct Testimony of Albert J. Lee, Ph.D. on Behalf of Vote Solar,* Public Service Commission of Utah, Docket No. 17-035-61, Apr. 10, 2018, https://pscdocs.utah.gov/electric/17docs/1703561/301235DirTestLeeVoteSolar4-11-2018.pdf; Public Service Commission of Utah, *Hearing*, Docket No. 17-035-61, p. 210–24, 229–33, Apr. 17, 2019, https://pscdocs.utah.gov/electric/17docs/1703561/301740RepTransApr1720185-1-2018.pdf; Vote Solar, *Revised Affirmative Testimony of Albert J. Lee~~, Ph.D. on Behalf of Vote Solar~~.*

[21] *Supra* n.13 at 19 ("To the extent a party or parties desire to construct their own load-research student sample, using inverter data and some data from PacifiCorp and CG customers, parties may coordinate with PacifiCorp to develop a process to obtain the needed information while maintaining customer privacy.").

would bear the burden of proving its assertions regarding just and reasonable compensation for CG exports.[22] The LRS provides a foundational element of any proposal for just and reasonable compensation for CG exports. As a result, because Vote Solar's concerns with the RMP LRS design were not fully addressed by the modifications placed on the study in the Commission's Phase 1 Order, Vote Solar decided to pursue its own LRS.

Q. How did Vote Solar obtain the data that was used in the Vote Solar LRS?

A. In order to allow Vote Solar to conduct its own LRS, the Commission issued an Order on a Motion for Formal Discovery, outlining a process by which Vote Solar and RMP were to confer and agree on a mailer to all CG customers of RMP that would describe the Vote Solar LRS and provide a means for customers to opt in to the Vote Solar LRS.[23]

Q. Was a mailer sent to all RMP customers with CG in Utah?

A. Yes. A letter was sent to all RMP customers with CG in the state of Utah on December 2, 2019. A copy of the letter is attached to my testimony as Exhibit 3-~~BSK~~SCO.

Q. What information did the letter provide to RMP customers with CG?

A. The letter provided information on the present docket, Vote Solar's interests in the proceeding, and a means for customers to opt-in to the Vote Solar LRS by visiting a

[22] *See supra* n.15 at 10.
[23] Public Service Commission of Utah, *Order on Motion for Formal Discovery*, Docket No. 17-035-61 Phase 2, p. 4, https://pscdocs.utah.gov/electric/17docs/1703561/308135170356 1oomffd5-8-2019.pdf.

website hosted by RMP and providing identifying information as well as permissions for the study. The content of the website was agreed to by RMP and Vote Solar. A printout is provided as Exhibit 4-~~BSK~~SCO.

As shown in Exhibit 4-~~BSK~~SCO, customers choosing to opt-in to the Vote Solar LRS were asked to provide two specific permissions. The *first* authorized RMP to release the customer's identifying information to Vote Solar (specifically, address) so that Vote Solar could link the customer's meter data on imported and exported electricity flows with his/her location. The *second* authorized Vote Solar to obtain inverter data from the customer's solar installer. The solar inverter data provided information on solar production and system attributes such as installed capacity. In his testimony, Dr. Lee describes how this data was used to generate the Vote Solar LRS results relied on by the other Vote Solar witnesses in this case.

Q. How was the information received through the study website processed?

A. RMP received all information from the study website and provided it to Vote Solar in two forms. *First*, for those customers that released their identifying information, RMP provided weekly updates to Vote Solar in the form of supplemental responses to Vote Solar's Data Request 4.1 that identified Vote Solar LRS opt-in customers' addresses to allow Vote Solar to analyze opt-in customer meter data. This information was marked confidential and is subject to the confidentiality agreement in this proceeding. *Second*, for those customers that released their inverter data, RMP provided Vote Solar with individual .pdf files for each customer that contained the information they provided in

the web form including name, address, contact information, and solar installer. A blank example is provided as Exhibit 5-~~BSK~~SCO.

Q. What steps were undertaken to obtain customer inverter data?

A. Vote Solar processed the .pdf files provided by RMP into a database and sorted them by identified solar installer. Vote Solar then conducted individual outreach to solar installers identified to develop a process for Vote Solar to gain access to individual customer inverter data through the inverter companies' application programming interface ("API"). Based on conversations with the installer community, ~~I~~Vote Solar ascertained that the vast majority of CG customers in RMP's Utah service territory have either SolarEdge or Enphase branded inverters. The one other major inverter company, SMA, did not have a functioning API, preventing us from accessing customer data. Therefore, the Vote Solar LRS focuses on customers with SolarEdge and EnPhase 1nverters. Vote Solar developed code to ping Enphase and SolarEdge APIs for information on individual solar system characteristics and production for calendar year 2019. This code was used to obtain the inverter data to support Vote Solar's LRS in most instances. However, one solar installer opted to provide the needed inverter data directly to Vote Solar.

VII. NET METERING PROVIDES JUST AND REASONABLE COMPENSATION FOR CG EXPORTS

Q. Please describe the results of Vote Solar's Value of CG analysis.

A. As described in the revised affirmative testimony of Dr. Carolyn Berry, Vote Solar has quantified a 20-year levelized value of CG in RMP's service territory of ~~22.6~~22.22 c/kWh. This value is expressed in 2021 dollars and is based on a study period of 2021-2040. This approach was chosen because the compensation mechanism adopted by the Commission in this docket will be effective beginning in 2021. By quantifying a 20-year levelized value, Dr. Berry's analysis provides an assessment of the value of CG over the typical minimum expected lifetime of a rooftop solar system. A summary of the elements in Dr. Berry's value of CG calculation is provided in Table 1 below.

Table 1: Value of CG Exports in Utah[24]

Category	Value ¢/kWh 2021USD (levelized)
Utility-Based Benefits	
Energy	
Avoided Energy	~~3.65~~3.55
Avoided line losses	0.31
Capacity	
Avoided generation capacity	~~1.60~~1.48
Avoided transmission capacity	~~1.45~~1.34
Avoided distribution capacity	~~0.56~~0.52
Grid Support Services	
Ancillary services	*nq**
Financial Risk	
Fuel price hedge	~~0.20~~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	~~**10.57**~~**10.19**
Community Benefits	
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	~~**22.60**~~**22.22**

**not quantified*

[24] ~~Vote Solar, *Affirmative Testimony of Carolyn Berry*, Table 1.~~

Q. In your opinion, is this an accurate assessment of the Value of CG in RMP's Utah service territory?

A. Yes, though it is likely an underestimate of the full value. I have reviewed the testimony and methods employed by Dr. Berry, Dr. Milligan, Mr. Volkmann, Dr. Yang, and Dr. Lee that support the valuation of CG at ~~22.6~~22.22 c/kWh. I find that the value of CG at ~~22.6~~22.22 c/kWh is likely conservative as several categories of benefits have not been able to be quantified. Namely, avoided ancillary services cost, market price impacts, reliability and resiliency value, and avoided fossil fuel lifecycle costs. I also note that the valuation of CG at ~~22.6~~22.22 c/kWh is based on the Vote Solar LRS, which examined attributes of exported CG from currently installed systems. At the current moment, CG installations in RMP's Utah service territory are largely standalone rooftop solar.[~~25~~24] As the market for distributed energy storage matures, there is immense opportunity for Utahns to reap additional benefits by dispatching storage at the times when it is most valuable to grid operation, increasing efficiency in the system and facilitating cost effective reduction in fossil fuel resources on the grid.

Q. How does the value of CG compare to the average retail energy rate paid by RMP's customers?

A. Average retail energy rates vary by rate schedule as shown in Table 2 below.

[~~25~~24] There are approximately 129 customers with behind-the-meter energy storage interconnected to RMP's system. Exhibit 6-~~BSK~~SCO, Attach Vote Solar 6.3-10.XLSX, RMP's Responses to Vote Solar 6th Set of Data Requests – Attach 6.3-10 (Aug. 23, 2019). In comparison, there are roughly 33,588 NEM and Transition Customers with behind-the-meter solar PV. *Supra* n.18 at 1.

Table 2: Average Energy Charges Compared to Value of CG (c/kWh)[~~26~~25]

Rate Schedule	Retail Energy Rate	Value of CG Exports	Percentage
Residential - Schedule 1,2 & 3	10.2	~~22.6~~22.2	~~221~~217%
General Service - Schedule 6	3.7	~~22.6~~22.2	~~615~~605%
General Service Energy TOD - Schedule 6a	7.1	~~22.6~~22.2	~~317~~312%
General Service Demand TOD - Schedule 6b	3.7	~~22.6~~22.2	~~615~~605%
Large General Service - Schedule 8	3.8	~~22.6~~22.2	~~597~~588%
Irrigation - Schedule 10	6.1	~~22.6~~22.2	~~373~~367%
Outdoor Lighting - Schedule 15.1	5.3	~~22.6~~22.2	~~427~~420%
Traffic Signals - Schedule 15.2	8.4	~~22.6~~22.2	~~268~~264%
Small General Service - Schedule 23	8.9	~~22.6~~22.2	~~255~~251%

As shown in Table 2, average retail energy rates are significantly lower than the full value of CG. This is an important finding, as an evaluation of the benefits and costs of the NEM program rests on this comparison. Under a NEM Program, where exported energy is provided a kWh-based credit to offset a customer's bill at the full retail rate, the benefits of CG greatly exceed its costs on all of RMP's tariffs. Table 3 below provides an estimate of the net benefits of the NEM Program on each of RMP's rate schedules.

[~~26~~25] Average energy rates are approximate and are calculated from Schedule 136 Transition Program rates for Schedules 1, 2, and 3 by dividing by 90% and for all other schedules by dividing by 92.5%. *See* Rocky Mountain Power, *Settlement Stipulation,* Public Service Commission of Utah, Docket No. 14-035-114, p. 6, Aug. 28, 2017, https://pscdocs.utah.gov/electric/14docs/14035114/296270RMPSettleStip8-28-2017.pdf.

Table 3: Net Benefits of NEM Program

Rate Schedule	Net Benefits
Residential - Schedule 1,2 & 3	~~12.4~~12.0
General Service - Schedule 6	~~18.9~~18.6
General Service Energy TOD - Schedule 6a	~~15.5~~15.1
General Service Demand TOD - Schedule 6b	~~18.9~~18.6
Large General Service - Schedule 8	~~18.8~~18.4
Irrigation - Schedule 10	~~16.5~~16.2
Outdoor Lighting - Schedule 15.1	~~17.3~~16.9
Traffic Signals - Schedule 15.2	~~14.2~~13.8
Small General Service - Schedule 23	~~13.7~~13.4

Q. What do you recommend based on these findings?

A. I recommend that the Commission fulfill its obligation to make a determination on the relative costs and benefits of the NEM program under Section 54-15-105.1 of the Utah Code which reads as follows:

> The governing authority shall:
>
> (1) determine, after appropriate notice and opportunity for public comment, whether costs that the electrical corporation or other customers will incur from a net metering program will exceed the benefits of the net metering program, or whether the benefits of the net metering program will exceed the costs; and
> (2) determine a just and reasonable charge, credit, or ratemaking structure, including new or existing tariffs, in light of the costs and benefits.~~27~~26

Notably, while the Commission adopted a compensation mechanism for exported CG alternative to the NEM Program in Docket No. 14-035-114, it never made the determination as to whether the NEM Program resulted in net benefits or net costs.

~~27~~26 Utah Code Ann. § 54-15-105.1.

Indeed, the Commission indicated that it anticipated that evidence in this proceeding may provide the basis for such a determination.[~~28~~27]

NEM is a mechanism by which exported energy from CG is compensated at the full retail energy rate through a one-to-one kWh credit. As shown in Table 3 above, benefits from CG far exceed the costs of compensating CG customers at the retail rate. Vote Solar recommends that the Commission find that the NEM Program constitutes a just and reasonable ratemaking structure in light of these costs and benefits and re-open enrollment in the dormant program upon finalization of its order in this proceeding. Per the terms of the Stipulation, Transition Customers should be allowed to voluntarily enroll in the re-opened NEM Program at their discretion.[~~29~~28]

VIII. IN THE ALTERNATIVE, THE COMMISSION SHOULD ADOPT A FAIR ECR PROGRAM

Q. If the Commission elects to maintain the general structure of the Transition Program rather than returning to the NEM Program, what would you recommend?

A. If the Commission elects to maintain the general structure of the Transition Program, the evidence supports setting an ECR at ~~22.6~~22.22 c/kWh based on the value of CG as

[~~28~~27] *See supra* n.7 at 9; *id*. at 9 n.9.
[~~29~~28] *See supra* n.15 at 11.

demonstrated in Table 1. Vote Solar recommends that the ECR be fixed for individual customers for a period of 20 years as described in more detail below.

The Commission should revisit its evaluation of a just and reasonable ECR in RMP's future general rate cases with the first re-evaluation occurring no earlier than 2024. If an updated valuation of CG results in the determination that the ECR should be updated, I recommend that a new vintage ECR be adopted for new customers submitting interconnection applications after the effective date of the next vintage ECR.

If an ECR structure is implemented, I recommend the following (addressed in turn below):

1) Exports should be netted on an hourly basis, rather than the current, 15-minute netting period;
2) The ECR should be fixed for a period of 20 years for individual customers;
3) Eligibility for each ECR vintage should be consistent with the terms of eligibility adopted for legacy access to the NEM Program under the terms of the Stipulation;
4) The Commission should eliminate the annual expiration of excess export credits; and
5) NEM and Transition Customers should have the option to take service under the new ECR Program at their sole discretion.

Q. Please explain your proposal to net exports on an hourly basis.

A. Well-designed rates provide price signals that are understandable and actionable for customers. In comparison to retail rate net metering, it is far more complex for customers to examine the billing implications of adoption of DG under an ECR, resulting in a price signal that is inherently less understandable and less actionable. Under retail rate net metering, a customer's bill can be easily estimated based on total expected monthly load and total expected monthly solar generation. This data is readily available. Total monthly load is reported to customers on their monthly bill from RMP, and solar installers are well prepared to provide customers with expected monthly solar production based on the design of their specific system.

In contrast, under an ECR, the customer must understand how production would relate to in-home consumption throughout each day within each month. While it is less difficult for solar installers to provide customers with estimates of solar production throughout each day and month, information about in-home consumption is far more difficult to access. At the current time, RMP customers do not have access to their own usage data at an interval more granular than monthly. However, it is my understanding that the Commission has approved funding for RMP to make hourly usage information available to all customers with Automated Meter Reading ("AMR") capable meters.[~~30~~29]

Under the Transition Program, exports are measured or "netted" every fifteen minutes. In order to evaluate an investment in DG solar, a customer must estimate their in-home

[~~30~~29] Utah Public Service Commission, *Report and Order*, Docket No. 16-035-36, p. 4, June 28, 2019, https://pscdocs.utah.gov/electric/16docs/1603536/308913160353 6rao6-28-2019.pdf.

consumption at 2,920 15-minute intervals in each month and compare that estimate to assumptions about solar production at the same granularity.[31][30] Residential customers in particular will have little understanding or control over their intra-hour electric consumption habits as many drivers of residential consumption like air conditioners, refrigerators, and other major appliances cycle on and off automatically. For those load drivers that are controlled by the customer such as dishwashers, washing machines, hair dryers, and other appliances, many residential customers will find it difficult to adjust consumption within the hour, as family schedules and work schedules drive meal times and appliance use, rather than the desire to match load with solar consumption. On the production side of the equation, intra-hour variability in solar production due to passing clouds, adds uncertainty to the equation. It is impracticable for a family to attempt to adjust behavior in response to such a price signal, making the ECR under the Transition Program neither understandable nor actionable. Burdensome netting periods lead to less efficient behavior, in turn, forgoing the potential benefits of improved price signals.

In contrast to fifteen-minute netting, netting exports every hour would reduce the burden on customers and provide a price signal that is more understandable and more actionable for customers.

[31][30] This amounts to a total of over 70,000 data points needing evaluation each year (2,920 times 12 for both consumption and production), in contrast to 24 data points needing evaluation under a retail rate NEM Program. Notably, netting on a 15-minute basis is also burdensome on RMP, which must capture and process the larger volume of data.

Q. Please explain your proposal that the ECR should be fixed for a period of 20 years for individual customers.

A. The ECR should be fixed for twenty years to provide a fair and actionable price signal to customers with DG. Vote Solar is recommending an ECR that is based on a complex analysis that models avoided costs associated with CG on RMP's system. The results of this analysis are impacted by the fundamentals of the electric system and how that system may change over time. Individual families and businesses lack the tools to understand and forecast potential changes to CG value over time and, as a result, will be unable to reliably evaluate the impacts that an investment in CG would have on their personal financial situation were the ECR allowed to fluctuate.

By investing private capital in their own energy source, individual families and businesses fix a portion of their energy costs and are able to reduce their monthly expenses once their system is paid off, similar to a mortgage. Most behind-the-meter technology has a long operating life of twenty years or more. Customers may accordingly invest in their systems as part of a long-term financial plan, with anticipated savings tied to other financial needs such as retirement or college tuition. Unforeseen changes to the ECR may materially impact customers' financial plans. As a result, it is reasonable to adopt an ECR that is fixed for an individual customer for a period of twenty years from their date of interconnection.

Q. By fixing the ECR for a period of twenty years, will the Commission be placing undue burden of uncertainty on the non-participating ratepayer?

A. No. RMP provides similar certainty to its other customers as well as solar developers. On the customer side, RMP's own Subscriber Solar program allows customers to fix the price they pay for solar energy that offsets their retail electric usage for a period of 20 years, a benefit of the program that is specifically highlighted in RMP's program FAQ.[3231] For developers of renewable energy, it is extremely common for utilities to sign fixed-price contracts for a period of 20 years or more. This pricing certainty allows the developer to secure financing and is common despite the fact that it puts ratepayers at risk of "over-paying" for that energy if the contract does not look as cost-effective with perfect hindsight. In a recent example, PacifiCorp, RMP's parent company, signed a 25-year fixed price contract for solar energy from the 128 MW Milford Solar Project, a term the project's investors highlighted as follows: "The 25-year [power purchase agreement] with PacifiCorp will provide stable long-term infrastructure cashflows to our investors, something that is particularly pleasing in this low interest rate environment."[3332]

In the case of a 20-year fixed ECR, the "actual" value of CG is just as likely to fall above the ECR as it is likely to fall below the ECR. While it is technically correct that

[3231] Rocky Mountain Power, *Utah Subscriber Solar Program*, Rocky Mountain Power, https://www.rockymountainpower.net/savings-energy-choices/blue-sky-renewable-energy/subscriber-solar.html (last visited Mar. 3, 2020).

[3332] Conor Ryan, *USF Completes Acquisition, Financing of 12MW PV Project in Utah*, PVTECH (Sept. 2, 2019, 10:09 PM BST), https://www.pv-tech.org/news/usf-completes-acquisition-financing-of-128mw-pv-project-in-utah.

non-participating ratepayers may bear the risk of uncertainty, that risk is common to all utility resource acquisitions, both through fixed-price power purchase agreements ("PPAs") as mentioned above, and indeed any utility-owned asset for which cost recovery is anticipated. In addition, because CG makes up only a very small proportion of RMP's resource mix, the risk is immaterial to the average ratepayer. In contrast, shifting pricing risk to the customer-generator, whose personal financial outlook may be drastically impacted by unforeseen changes to the ECR, is very likely to chill development in CG, foreclosing the benefits CG can provide to all ratepayers.

Q. What ECR would an individual customer be provided at the end of their 20-year lock-in period?

A. At the end of the 20-year lock-in period customers would be compensated for exported energy at the then-prevailing ECR.

Q. Please explain your proposal for ECR vintage eligibility.

A. Eligibility for enrollment in each vintage ECR should be modeled on the eligibility criteria set forth in the Stipulation in Docket No. 14-035-114 for the legacy NEM Program. Specifically, customers who submit complete interconnection applications, including payment of applicable fees by the deadline date, would be eligible for a locked-in ECR under that vintage. These customers would then have twelve months from the date their interconnection application is approved to complete interconnection. As with the legacy NEM Program, ECR vintage eligibility would be maintained for subsequent customers served at the point of delivery approved for interconnection. A customer's ECR vintage eligibility will cease if: (1) the equipment

approved for interconnection is affirmatively removed from service for any reason other than on a short-term basis for replacement of equipment or repair of the equipment or underlying structure; (2) the customer makes a material modification to increase the size of the customer's generation system after interconnection; or (3) the customer chooses to voluntarily change to another available CG program. If a customer transfers ownership of the applicable property, the transferee will receive the same vintage ECR rate throughout the remainder of the lock-in period.

Q. Please explain your proposal for elimination of the annual expiration of excess export credits.

A. Under the Transition Program, any export credits remaining on the March billing cycle expire and are unable to be carried forward to offset charges for consumption in future months.[3433] With this docket, the Commission may set an ECR Program based on a full consideration of the value of CG, rather than a settled-on value derived via Stipulation. As a result, it is not reasonable to wipe credits clean for customers without any compensation. To do so can create perverse price signals that incentivize customers to waste energy on uneconomic end uses to avoid large balances of energy being forfeited to the utility.

Under the ECR Program, all credits should be monetized. At the end of each annualized billing period the customer should have the choice of: (1) carrying over credits to the

[3433] For Schedule 10 customers, excess credits expire on the October billing cycle. *See* Rocky Mountain Power, *Electric Service Schedule No. 136*, p. 1, 8, Nov. 15, 2017, https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/rates-regulation/utah/rates/136_Transition_Program_for_Customer_Generators.pdf.

next annualized billing period or (2) requesting a check from RMP for their remaining balance.[35][34] This is similar to the terms in place for the export credit program of Arizona Public Service Company ("APS"). Under the APS program, all credits are monetized every month. At the end of the year, customer balances in excess of $25 are automatically refunded to customers via a check from the utility.[36][35] Because the current CG program contains caps on installed capacity of 25 kW for residential and 2 MW for non-residential, any concerns about customers "over-sizing" CG is unfounded.

Q. Please explain your proposal that Net Metering and Transition Customers should have the option to take service under the new ECR Program at their sole discretion.

A. Continued enrollment on the NEM Program and Transition Program should be optional. NEM Customers and Transition Customers should be allowed, at their sole discretion, to opt into the ECR Program. However, once a customer transitions to the ECR Program, that customer should not be eligible to re-qualify for legacy NEM Program or Transition Program access. This is consistent with the terms of the Stipulation.[37][36]

[35][34] Section 54-15-104 of the Utah Code requires the expiration of excess credits at the end of the annualized billing period under net metering. *See* Utah Code Ann. § 54-15-104. The same restrictions do not apply to an ECR Program.

[36][35] Arizona Public Service, *Renewable Energy Riders*, APS, https://www.aps.com/en/Residential/Service-Plans/Compare-Service-Plans/Renewable-Energy-Riders (last visited Mar. 3, 2020).

[37][36] *See supra* n.15 at 11.

IX. SUMMARY OF RECOMMENDATIONS

Q. Please summarize your recommendations.

A. Taking into account the analyses and evidence reviewed in this case, I recommend the following:

1) The Commission should make a determination that the benefits of the net metering ("NEM") Program exceed its costs and should re-open the NEM Program to new customers as of the effective date of its order in this proceeding.
2) In the alternative, if the Commission elects to maintain the general structure of the Transition Program, the Commission should adopt an ECR of ~~22.6~~22.22 c/kWh with the following program details:
    a) Exports should be netted on an hourly basis, rather than the current, 15-minute netting period;
    b) The ECR should be fixed for a period of 20 years for individual customers;
    c) Eligibility for each ECR vintage should be consistent with the terms of eligibility adopted for legacy access to the NEM Program under the terms of the Stipulation;
    d) The Commission should eliminate the annual expiration of excess export credits; and
    e) NEM and Transition Customers should have the option to take service under the new ECR Program at their sole discretion.

Q. Does this conclude your revised testimony?

A. Yes.

CERTIFICATE OF SERVICE

I hereby certify that on this ~~3rd~~8th day of ~~March~~May, 2020~~,~~ a true and correct copy of the foregoing was served by email upon the following:

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