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**BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH**

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| 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 ALBERT J. LEE, PH.D.

**ON BEHALF OF**

**VOTE SOLAR**

September 15, 2020

REDACTED AND PUBLIC VERSION

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# I. INTRODUCTION

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

A. My name is Albert J. Lee. My business address is 601 New Jersey Avenue NW, Suite 400, Washington, DC 20001. I am the Founding Partner and Economist at Summit Consulting, LLC. I provided my full qualifications and CV in my Revised Affirmative Testimony filed May 8, 2020.

**Q. On whose behalf are you testifying?**

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

# II. BACKGROUND

**Q. Have you previously submitted testimony before the Utah Public Service Commission ("PSC" or "Commission")?**

A. Yes, I submitted testimony in Phase 1 of this docket on April 10, 2018 based on my review of the statistical sample design proposed by Rocky Mountain Power ("RMP" or the "Company") for capturing the deliveries, production, and export statistics for commercial and residential customer generation ("CG") in the state of Utah. I provided live testimony regarding my opinions at the Phase 1 hearing of this proceeding on April 17, 2018. I submitted Affirmative Testimony in Phase 2 of this matter on March 3, 2020 and Revised Affirmative Testimony on May 8, 2020 ("Lee Revised Affirmative"). Additionally, I submitted Rebuttal Testimony in Phase 2 of this matter on July 15, 2020 ("Lee Rebuttal").

## III. SUMMARY OF PREVIOUS TESTIMONIES

**Q. Please summarize the Lee Testimony submitted on April 10, 2018.**

A. In my 2018 testimony, I was asked to review RMP's proposed load research study ("LRS").[1] That study was carried out by RMP and became, in part, the basis for the LRS relied upon in the Direct Testimony of Robert Davis submitted on March 3, 2020 on behalf of the Division of Public Utilities ("DPU") (the "Davis Direct").[2] In my 2018 testimony, I pointed out that the sample design was inappropriate because it omits a part of the population of interest, incorrectly combines two sample designs, unnecessarily uses systematic rather than simple random sampling within each strata, and was likely too small for the specified precision.[3]

**Q. Were the statistical sampling issues you identified accounted for in the final LRS?**

A. No. The issues were not adequately addressed, as I explained further in my rebuttal testimony. As a result, the conclusions and extrapolations derived from that sample, including by Mr. Davis in his testimony in this proceeding, are not reliable.

**Q. Please summarize the Lee Testimony submitted on May 8, 2020.**

A. In the Lee Testimony, I was asked (1) to collect and analyze data from residential and commercial CG customers in RMP's Utah service territory pursuant to the independent study described more fully below and (2) to calculate the state-wide estimates for production and exports for CG in the state of Utah.

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[1] I submitted this testimony on Apri1 10, 2018 as part of Phase I Docket No. 17-035-61. Vote Solar, *Rebuttal Testimony of Albert J. Lee*, Apr. 10, 2018 ("*Lee 2018 Rebuttal*"), lines 21-27.
[2] *See Davis Direct*, lines 35-45, 101-17.
[3] *See Lee 2018 Rebuttal*, lines 40-50, for the summary of my opinions in that testimony.

With respect to the second item, to estimate residential and commercial solar production for 2019, I developed two statistical models based on the 2019 data: one model for estimating production and one model for estimating exports.[4] To develop the production model, I relied on the data collected by Vote Solar's opt-in questionnaire and through the meters sampled as part of RMP's LRS. To develop the export model, I relied on the data from the sampled meters from RMP's LRS and a file containing monthly totals by customer produced by RMP's internal database. My rationale for calculating production totals as well as export totals was to align with the purpose of the RMP LRS, which according to Mr. Elder was "to better understand the intertemporal relationship between relationship between PG, delivered energy, exported energy, and the full requirements energy."[5] Not only does the inclusion of the production totals closer align with the intent of the sample selection, but it also provides a pathway for calculating the savings realized by RMP due to the power generated by the solar customers. In other words, the more energy produced by solar customers, the fewer deliveries needed from RMP, and likely the more energy returned to the grid.

**Q. Please summarize your analysis in the Lee Rebuttal submitted on July 15, 2020 regarding the MacNeil Report.**

A. I found that using the proposed export credit rates ("Schedule 137") contained in the MacNeil Testimony, the export credits reduce dramatically for the typical residential customer. As stated in my rebuttal, the proposed rates would be so low that RMP's

[4] Both models were developed and run in a professional statistical software program called Stata. Stata is widely used in academia and industry for statistical estimation. For those who do not use Stata, publicly available and free translators exist to translate the data to other formats. Furthermore, I understand from counsel that Vote Solar also provided a link to access the Stata software and provided the code files in simple text format as well as Stata format.
[5] RMP, *Direct Testimony of Kenneth Lee Elder, Jr.*, Feb. 15, 2018 ("*Elder Direct*"), lines 26-28.

proposed fees of $310 would far exceed the credits a customer would earn over their first three years of exporting energy to RMP. In essence, the typical customer would be paying to export energy back to the grid.[6] In addition, while the Schedule 137 proposal does allow for higher credits during certain "peak" hours, these peak rates would still not allow for the recovery of RMP's proposed fees. Per my calculations, it would require approximately two years for customer generators to start earning credits in excess of these fees even if all hours were compensated at RMP's "peak" rate.[7]

As an extension to the number of years of export credits to cover the cost of fees in my Rebuttal, I calculated the number of years before export credits cover the cost of initial fees and installation costs after accounting for state ($1,200) and federal (22%) tax credits, per EnergySage.[8] Assuming a 6kW unit, the estimated installation cost after state and federal incentives is $13,057. With $94 dollars in export credits per year for an average consumer, it would take 142 years' worth of export credits to cover the initial fees and costs.[9] Assuming the installation costs and accounting for avoided consumption, it would take approximately 26 years to cover the initial fees and installation costs.[10]

**Q. Please summarize your analysis in the Lee Rebuttal submitted on July 15, 2020 regarding the Davis Report.**

I found (i) the RMP sample used by Mr. Davis failed to correct for the statistical sampling errors I previously pointed out (*e.g.*, the omission of Schedule 136 customers

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[6] Vote Solar, *Rebuttal Testimony of Albert J. Lee*, July 15, 2020 ("*Lee Rebuttal*"), lines 328-38.
[7] *Lee Rebuttal*, lines 328-338.
[8] EnergySage, *Solar Panel Cost in Utah*, https://www.energysage.com/local-data/solar-panel-cost/UT/ (last updated Sept. 9, 2020).
[9] Exhibit 1-AJL.
[10] *Id.*

for the production data and the small sample size for the Schedule 135 data), and as a result cannot be used to precisely calculate exports and production, (ii) Mr. Davis failed to properly weight the sample, thus making the total export figures he calculated incorrect, and (iii) Mr. Davis did not use the actual export figures provided by RMP to perform a check on his extrapolated export totals. In addition, I found that the precision of the RMP sample used in the Davis Direct was inadequate according to the standards set forth by Mr. Davis, despite Mr. Davis claiming that the sample met the prescribed precision statistics.[11]

## IV. PURPOSE OF TESTIMONY

**Q. What is the purpose of this surrebuttal testimony?**

A. The purpose of this surrebuttal testimony is to respond to the rebuttal reports of RMP witness Mr. Daniel J. MacNeil ("MacNeil Rebuttal") and DPU witness Mr. Robert A. Davis ("Davis Rebuttal"), filed on July 15, 2020.

## V. SUMMARY OF OPINIONS

**Q. Have the criticisms of your report in the MacNeil Rebuttal Testimony or the Davis Rebuttal Testimony caused you to change your opinions as expressed in your direct testimony?**

A. No. My opinions remain unchanged. In particular, the analysis and extrapolations I performed regarding solar production and exports in the Lee Testimony provide reliable

[11] *See Lee Rebuttal*, lines 47-58.

and precise estimates of solar production and export in Utah, both by month and by hour of the day.

**Q. Did the MacNeil Rebuttal Testimony or the Davis Rebuttal Testimony cause you to change your criticisms of them, as expressed in your rebuttal report of July 15?**

A. No.

## VI. POPULATION OF INTEREST

**Q. Do you agree with Mr. MacNeil that Schedule 135 customers are different than Schedule 136 customers?**

A. Yes, that was the impetus for me including a variable in my export and production models accounting for the type of customer for the respective unit included in the model.

**Q. Given Mr. MacNeil's critique that Schedule 135 and Schedule 136 customers are different and your agreement with that assumption, do you think including them in your analyses was appropriate?**

A. Yes, I believe it was appropriate for the following two reasons:

1. Since Schedule 135 customers are part of the CG population, it is proper to include them in the calculation, and
2. I accounted for their inherent differences through the inclusion of a schedule identifier variable in my models.

**Q. Given your agreement with Mr. MacNeil that Schedule 135 and Schedule 136 customers are different, do you and he agree that Mr. Davis erred by excluding Schedule 136 customers?**

A. Yes. It appears that Mr. MacNeil and I agree that Mr. Davis erred by failing to include Schedule 136 customers in the sample he used to extrapolate population-wide production

data. In my opinion, this renders Mr. Davis's analysis flawed and unreliable, and Mr. MacNeil implicitly agrees with this conclusion by acknowledging the differences between Schedule 135 and 136 customers and using Schedule 136 customers in his own analysis.

## VII. SOLAR GENERATION DATA

**Q. Can you explain what a convenience sample is?**

A. A convenience sample is one in which only some portion of the population is included in the survey because it is easy to be reached. For example, if I wanted to estimate the average salary of statistical consultants in Washington, DC, I might only survey the employees of Summit Consulting.[12] Convenience samples are also referred to as "non-probability samples." Under this sampling design, I would not be able to provide any statistically valid estimates for average statistical consulting salaries in Washington, DC because I only made the ability for individuals near to me to be included in the sample, and those included in the sampled were not sampled at random. Based on this lack of randomness, I would be unable to calculate accurate and justifiable sampling weights.

**Q. Do you agree with Mr. Davis's assertion that the Vote Solar study is a convenience sample?**

A. No. The Vote Solar data began with a mail survey to 100% of solar customers (*i.e.*, census). In other words, each solar customer in RMP's database was contacted and provided an opportunity to participate in the study. This approach contrasts with the

[12] *See, e.g.*, Morris H. Hansen, William N. Hurwitz, and William G. Madow, *Sample Survey Methods and Theory, Vol. 1*, 1993, p. 71.

definition of a convenience sample because the full population and not simply a subset of the population had the ability to participate in a study.

**Q. Does the voluntary nature of the responses affect the data in any way?**

A. Because responses were voluntary, the Vote Solar study was subject to potential selection bias, where those whose data was collected might not be fully representative of those whose data was not collected.[13] William Cochran, in his seminal text Sampling Techniques, addresses studies like the Vote Solar and RMP studies, where "the sample consists essentially of volunteers."[14] He states that "under the right conditions … these models can give useful results" but that "they are not amenable to the development of a sampling theory" without appropriate modeling.[15] In other words, application of standard sampling extrapolation formulas may not work. Instead, a model is needed to correct for possible biases. I addressed the potential issue of selection bias through a design-based approach, where I adjusted for location, weather, time of day, month of the year, and other factors through a regression model.[16] Though also subject to selection bias, RMP's study did not make any adjustments or analysis to account for the potential issue of selection bias. In essence, RMP's LRS ignores this critique and treated the results as if they were from a statistically random sample.[17] In contrast, my model appropriately acknowledged and explicitly corrected for possible selection biases.

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[13] *See* Steven K. Thompson, *Sampling*, 1992, p. 5.
[14] William G. Cochran., *Sampling Techniques*, 1997, p. 10.
[15] *Id*. at note 12, p. 10.
[16] *See* Steven K. Thompson, *Sampling*, 1992, p. 6.
[17] *Davis Rebuttal*, lines 146-47 implies that the LRS is a "stratified random sampling of existing CG customers," but the voluntary nature of the responses means that "non-response" needs to be considered.

**Q. Can you describe why the RMP data was not a stratified random sample?**

A. Although the Davis Testimony claims the RMP data was a stratified random sample, that is incorrect for the reasons discussed in the Lee Rebuttal. Mathematically, a stratified random sample must cover the entire population. Since a portion of the data collected through RMP's LRS (*i.e.*, production) was not collected for Schedule 136 customers, the sample is not a stratified random sample since it did not cover the full population of interest.[18] Operationally, the RMP sample is a systematic sample within strata and therefore not a standard stratified random sample, which uses simple random sampling within each stratum.[19] As stated in my April 2018 rebuttal, this approach to selecting the sample is less flexible when compared to a random sample approach for situations like this when, practically, the sample size needs to be expanded to meet the precision requirements.

**Q. Can you explain why your estimates are better than the estimates from Mr. Davis?**

A. Yes. First, the model I used to estimate exports included more than 28.8 million observations and accounted for differences in schedule type, time of the year, and system location. Second, both the RMP LRS and my estimation models depend on data that could be subject to selection bias, I correct for potential bias while the estimates produced based on RMP's LRS do not. Also, my estimates for exports are very close to the actual

[18] *See* Vote Solar, *Revised Affirmative Testimony of Albert J Lee, Jr.*, May 8, 2020 ("*Lee Revised Affirmative*"), lines 73-76.

[19] *Lee Revised Affirmative*, lines 80-83. Systematic sampling is different than simple random sampling. In a systematic sampling of n items out of a population of N, a frequency k=N/n is determined. Then, every kth item is selected. For a simple random sample, n items are randomly selected. Systematic samples can be subject to issues that do not appear in simple random samples.

figures for 2019.[20] Third, when comparing my estimates to Mr. Davis's estimates, I found that my estimates for the Original 36 and Schedule 135 customers were approximately 25 times greater because Mr. Davis used incorrect sampling weights for producing total exports. Fourth, as shown in the table below, the average margin of error as a percentage of the export population estimates for the Schedule 135 Residential, Schedule 135 Commercial, and Original 36 customers ranged between [redacted] and [redacted].[21]

[20] Table 15 in Mr. Davis's March 3, 2020 testimony gives RMP total exports at [redacted] gigawatts. *Davis Direct*, lines 288-289 (Table 15). My estimated totals, provided in Exhibit 1 of my Rebuttal Report, are within [redacted] of the RMP totals. My estimates use installed capacity as of the end of 2019, thus are not intended to exactly approximate 2019 exports, but are instead meant to estimate what exports would have been with the entirety of installed capacity as of December 31, 2019. This distinction does not make a large difference.

[21] Peak hours are between 12PM and 3:00PM. The sample was designed to meet a margin of error of +/- 10% at a 95% confidence level.

**Table 1: Average Margins of Error of Mr. Davis's Estimates by Population[22]**

| Type of Customer | Average Margin of Error (During Peak Hours)[23] |
|---|---|
| [redacted] | [redacted] |
| [redacted] | [redacted] |
| [redacted] | [redacted] |

In contrast, the export model I produced had a margin of error less than [redacted].[24] Fifth, my estimates include production estimates that enable the creation of "a representative generation profile" in keeping with RMP's initial plans.[25]

## VIII. LEE'S STATISTICAL MODELS

**Q. Please describe the Davis Rebuttal's criticism regarding the reliability of your statistical models.**

A. Above I demonstrated that, contrary to the Davis Rebuttal, my models are not based on convenience samples. The Davis Rebuttal also claims that the R-squared of my models do not indicate their reliability and that anomalies in the data indicated the models may not be reliable.[26] As I explain in detail above (for convenience samples) and below (for regression analysis), both these criticisms are incorrect. Instead, the statistical results prove that the models I employed improve production and export estimates in a statistically significant way beyond simply using the average customer production and export figures. This is specifically due to the numerous considerations that I made through regression modeling, such as accounting for the weather, hour of the day,

[22] Only 7 of the 468 (approximately 1.5%) met the precision requirements as prescribed by Elder's design.
[23] Exhibit 2-AJL. Calculations performed in Workpapers 13-, 14-, and 15-AJL.
[24] Exhibit 3-ALJ. Calculations performed in Workpaper 16-AJL.
[25] RMP, *Redacted Rebuttal Testimony of Kenneth Lee Elder, Jr.*, Apr. 11, 2018 ("*Elder 2018 Rebuttal*"), lines 217-22.
[26] *Davis Rebuttal,* lines 102-32.

location, and other factors. The model output provided in my work papers showed the details regarding the intuitiveness of my results and the statistical significance of each model's inputs.

**Q. Can you explain why you disagree with the criticism of the Davis Rebuttal regarding R-squared?**

A. The R-squared of a regression is a simple measure of the percentage of variability explained by the model. The Davis Rebuttal incorrectly states that "an R-Squared value of 0.6 to 0.7 is a low indicator of the model's ability to explain the dependent variable."[27] Instead, the text simply states that R-squared is one of many measures and the text is silent regarding how high an R-squared should be.[28] As noted in my previous reports and work papers, I found the R-squared for the production and export models to be 74% and 60%, respectively. These R-squared values are statistically significant and imply more than half of the variability in exports and production in individual solar units is explained using the models.[29] Over my twenty-plus years of building, reconstructing, and independently reviewing statistical models, an R-squared at these levels, combined with statistical significance, implies the model is substantially better than using a simpler approach that does not involve using a regression model.

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[27] *Davis Rebuttal*, lines 105-06.
[28] *See Davis Rebuttal*, note 13 ("The general advice is not to rely too much on the value of $R^2$. It is simply one measure of the adequacy of a model. It is more important to judge a model by whether the signs of the regression coefficients agree with economic theory, intuition, and the past experience of the investigator.").
[29] Davis was unable to independently test the veracity of the models produced because he did not have the appropriate software to access the files. Had he been able to do so, he would have been able to see the reliability of the models through the statistical significance of key model variables. As previously noted, the software used was Stata, which is known and proven statistical software package normally used in performing statistical analysis.

**Q. Can you explain why you disagree with the Davis Rebuttal criticism that anomalies in the data indicate the model is not reliable?**

A. The Davis Rebuttal identified the fact that there were instances where exports were greater than production in Vote Solar Exhibit 1-AJL 3-6-2020.[30] Based on my experience working with administrative databases in private and public sectors and the research I've performed, a small number of outliers and data errors are expected.[31] For example, Mr. Davis notes in his direct testimony that he found errors in the raw RMP LRS data that resulted in export data being present when production data was not, and the results were adjusted by deleting certain instances of such anomalies.[32] The Davis Direct Testimony nonetheless concludes that "the missing data intervals were relatively infrequent and did not appear to have any significant effect on the results."[33] The data anomalies I observed were similar and affected a small fraction of the data. Specifically, the [redacted] instances the Davis Rebuttal refers to are among the [redacted] hour and day combinations for which production and exports were estimated, and thus represent only [redacted] of all data values.[34] When comparing the export totals without forcing the values to be equal to or less than production to the values provided in my report, I found that total exports were reduced by approximately [redacted] due to this capping. In addition to being inconsistent between LRS data anomalies and Vote Solar ones, the Davis Rebuttal

[30] The Davis Rebuttal incorrectly references [redacted] instances from an outdated version of my Affirmative Testimony. *Davis Rebuttal*, lines 112-13. As stated in my Revised Affirmative Testimony, there are 276 instances of data anomalies.
[31] *See, e.g.*, Roxanne Connelly, Christopher Playford, Vernon Gayle, and Chris Dibben, *The role of administrative data in the big data revolution in social science research*, Social Science Research, 59 (2016): 1-12.
[32] *Davis Direct*, lines 149-62.
[33] *Id.* at lines 161-62.
[34] This is calculated from Exhibit 1 of my affirmative testimony, cited in the *Davis Rebuttal*, line 108.

incorrectly states that these unexpected values are a "consequence of a model with limited predictive value that over-predicts exports in some instances."[35] The Davis Rebuttal is incorrectly implying that a model that sometimes over-predicts is therefore unreliable. This claim is unjustified because any real-word model will at times predict values that are too high and sometimes predict values that are too low. What distinguishes a good model is that the high and low predictions average out, so that there is no bias. Furthermore, nothing in the Davis Rebuttal implies that the Lee models are in any way biased.

**Q. The Davis Rebuttal states that there is no evidence that there are differences between Schedule 135 and Schedule 136 customers.[36] Do you agree?**

A. No. As I pointed out in the Lee Rebuttal, the differences between nameplate capacities of Schedule 135 and Schedule 136 are statistically significant.[37] The table below provides the comparison of the average nameplate capacities between the schedules of customers.

**Table 2: Average Nameplate Capacities by Schedule & Type of Customer[38]**

| Type of Customer | Average Schedule 135 Capacities (kW) | Average Schedule 136 Capacities (kW) | Difference in Average Capacities |
|---|---|---|---|
| Residential Customer | [redacted] | [redacted] | [redacted] |

The graph below shows the comparison of the average age (calculated as the number of days since installation for each unit in the population and January 1, 2020) between the Schedule 135 and Schedule 136 customers based on the type of customer. As shown, the

[35] *Davis Rebuttal,* lines 132-34.
[36] *Davis Rebuttal,* lines 140-43.
[37] *Lee Rebuttal*, lines 214-22.
[38] Exhibit 4-AJL.

Residential Schedule 135 figure far exceeds the number of days for the Schedule 136 customers (*i.e.*, Residential – approximately 3.5 times & Commercial – 4.5).

The MacNeil Rebuttal also points out that Schedule 136 customers might be closer to future Schedule 137 customers than they are to Schedule 135 customers, thus tacitly disagreeing with the Davis Rebuttal and implying that the limited RMP study of Schedule 135 customers is inadequate, as I have already concluded in the Lee Rebuttal.[40] The MacNeil Rebuttal criticism, if correct, would mean my models are conservative, since they use a weighted average of current installations.[41] According to Mr. Davis's statement in his April 2018 testimony, "Bias may be added to the study due to system degradation because older, grandfathered systems, and newer transition customer systems

[39] *Id*.
[40] *MacNeil Rebuttal*, lines 166-81.
[41] Thus, to the extent that Schedule 137 customers produce and export more electricity, my model is conservative in its estimates. However, I see no reason to speculate as to the exact nature of future installed capacity, and therefore I simply use the currently installed solar for my estimates.

will differ in performance."[42] In addition, Mr. Peterson in his Direct Testimony in March 2018 acknowledges, based on the vintage of the solar units, that older units could experience "some degree of technological obsolescence or other systematic differences from the new sample."[43]

**Q. How does Mr. Davis's refusal to account for the differences in the Schedule 135 and Schedule 136 customers impact his analysis?**

A. Based on the review of the Davis report, he is unable to produce the Full Requirements estimate for the entire Utah CG customer base because of the lack of production data for the Schedule 136 customers, and then not adjusting the Full Requirement figures in his report to account for their inherent differences.

**Q. Do the RMP experts dispute the values your model produces related to this proceeding?**

A. No. Both the Davis Rebuttal and the MacNeil Rebuttal acknowledge that my export estimates appear to comport with RMP's data at a high level.[44] However, because of the larger sample size used for my model, as well as the various adjustments I used, my figures are highly likely to be more precise.[45]

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[42] *Davis Direct*, lines 104-06.
[43] DPU, *Direct Testimony Phase One of Charles E. Peterson*, Mar. 22, 2018 ("*Peterson Direct*"), lines 112-14.
[44] *MacNeil Rebuttal*, lines 152-56 and *Davis Rebuttal*, lines 153-54.
[45] The statistical significance of the regression models indicates that they have higher precision than a simple extrapolation without adjustments. Regarding sample size, all else being equal, the margin of errors is generally inversely proportional to the square root of the sample size. For example, formulations and discussion of sampling error, *see* Arnold I. Barnett, *Applied Statistics: Models and Intuition*, 2015, p. 194.

## IX. CONCLUSION

**Q. What are your concluding thoughts when considering the criticisms levied by the MacNeil and Davis reports?**

A. My conclusions considering Mr. MacNeil's criticisms are as follows:

1. The inclusion of the Schedule 135 customers in the population of interest used in my analyses comports with the initial purpose of the RMP study design by Mr. Elder.
2. The correction I used in my models by accounting for different customers allowed me to ensure my models effectively quantified the inherent differences between the Schedule 135 and Schedule 136 customers.
3. The further examination I performed on the solar cost recovery analysis for the typical Utah customer provided an additional reason to conclude Mr. MacNeil's export credit rate determination is unreasonable.

My conclusions considering Mr. Davis's criticisms are as follows:

1. It is a mischaracterization to call the Vote Solar LRS sample a convenience sample because each solar generating customer in Utah had a greater than zero chance to be included.
2. Since participation is voluntary, my model-based approach accounts for the differences between the Schedule 135 and Schedule 136 customers and other characteristics.
3. Davis used incorrect sampling weights, thus making the export estimates produced by my models have a higher statistical validity.

4. The reliability of the models I produced is evidenced by the R-squared statistics and the number of statistically significant predictors.
5. The precision of the export model I produced demonstrates a higher degree of precision than Mr. Davis's estimates produce.

**Q. Do the opinions from the Lee Affirmative Testimony and Lee Rebuttal Testimony remain unchanged?**

A. Yes.

**Q. Does this conclude your surrebuttal testimony?**

A. Yes

## 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:

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