NorthWestern® Energy

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

DOCKET NO. D2018.2.12

Application for Authority to Increase Retail Electric Utility Service Rates and for Approval of Electric Service Schedules and Rules
and
Allocated Cost of Service and Rate Design

REBUTTAL TESTIMONY AND EXHIBITS

VOLUME II

April 2019

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MONTANA

REBUTTAL TESTIMONY OF AHMAD FARUQUI

On Behalf of NorthWestern Energy

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REBUTTAL TESTIMONY OF AHMAD FARUQUI
ON BEHALF OF NORTHWESTERN ENERGY
(Docket No. D2018.2.12)

I. INTRODUCTION

Q. WHAT IS YOUR NAME AND ADDRESS?

A. My name is Ahmad Faruqui. I am a Principal with the Brattle Group, an economics consulting firm. My address is 201 Mission Street, Suite 2800, San Francisco, California 94105.

Q. ARE YOU THE SAME AHMAD FARUQUI WHO SUBMITTED PREFILED DIRECT TESTIMONY ON BEHALF OF NORTHWESTERN ENERGY ("NORTHWESTERN") IN THIS PROCEEDING?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to address certain points in the corrected direct testimonies of Ms. Briana Kobor, Ms. Madeline Yozwiak, and Mr. Andrew Valainis, all of whom are witnesses on behalf of Vote Solar and the Montana Renewable Energy Association (VS-MREA). In responding to their testimony, I make the following points:

- Exports of electricity to the grid are a defining feature of Net Energy Metering (NEM) customers and a critical consideration when determining whether to create a separate rate class for customers who self-generate their power.
- Regulatory commissions in other jurisdictions have cited differences in load shapes between NEM and non-NEM customers – including exports to the grid – as a primary reason for their decision to create a separate NEM rate class.
- Subsidies for rural customers in the current rate are not a relevant justification for maintaining subsidies for NEM customers.

- Ms. Kobor incorrectly excludes net exports when performing her revenue calculations. After correcting for this conceptual error in Ms. Kobor's calculation of revenues, her conclusion that the three-part rate is no more cost-reflective than the two-part rate is found to be incorrect.
- The introduction of a three-part rate will increase the average investment payback period for rooftop solar customers from 17 years to 22 years under current rooftop solar PV costs, suggesting that the VS-MREA's claims that the rate proposal will "decimate" the solar industry in Montana are overstated.
- Demand charges are an increasingly common rate design element being considered and introduced by utilities around the country.
- Evidence supports the conclusion that customers can and will be able to understand and respond to demand charges.
- Time-of-use (TOU) rates are not an appropriate alternative to three-part rates.

II. LOAD SHAPE COMPARISON

Q. HAS VS-MREA COMMENTED ON YOUR COMPARISON OF NEM CUSTOMER LOAD SHAPES TO THE LOAD SHAPES OF NON-NEM CUSTOMERS?

A. Yes. Ms. Kobor and Ms. Yozwiak both comment on my comparison of NEM and non-NEM load shapes. In their comments, they present three main points. First, that exports to the grid should not be considered when determining whether or not to establish a separate NEM rate class.[1] Second, that NEM customer load shapes are similar to non-NEM load shapes.[2] And third, that existing subsidies for other customer segments (e.g.,

[1] Corrected Direct Testimony of Briana S. Kobor at 18:11–19:5 (March 1, 2019).
[2] Corrected Direct Testimony of Madeline Yozwiak at 3:9–12 (March 1, 2019).

rural customers) justify maintaining the subsidy currently in place for NEM customers.[3] I disagree with all three of these points.

Q. SHOULD EXPORTS TO THE GRID BE CONSIDERED WHEN DETERMINING WHETHER TO ESTABLISH A SEPARATE RATE CLASS FOR NEM CUSTOMERS?

A. Exports to the grid have to be considered when determining whether to establish a separate rate class for NEM customers. The fact that NEM customers create two-way flows of electricity on the grid is a unique and defining feature of this customer group.

Over 95 percent of the NEM customers in NorthWestern's sample exported energy to the grid during the timeframe for which there was load data. That is a core characteristic of NEM customers which cannot be assumed away, as Ms. Kobor and Ms. Yozwiak have apparently done.

As I stated in my Direct Testimony, two-way flows on the grid create a unique set of challenges. Some of these are direct costs – for instance, the possibility of distribution system upgrades when Distributed Generation (DG) adoption reaches significant levels at specific locations on the distribution system. Others are qualitative considerations, such as additional safety measures to prepare for the possibility that a distribution line has a live flow of electricity.

Q. HAVE REGULATORY COMMISSIONS IN OTHER JURISDICTIONS FOUND IT APPROPRIATE TO CONSIDER EXPORTS WHEN ESTABLISHING A SEPARATE RATE CLASS FOR NEM CUSTOMERS?

[3] Corrected Direct Testimony of Briana S. Kobor at 8:7–15 (March 1, 2019).

A. Yes. Both the Idaho Public Utilities Commission (PUC) and the Kansas Corporation Commission (KCC) recently approved the creation of a separate rate class for NEM customers. The unique load characteristics of NEM customers were cited as a reason for creating the separate rate class.

In its Order approving the creation of a separate NEM rate class, the Idaho PUC said:

> "Because of this bi-directionality, **we conclude that net-metering customers with on-site generation present unique load and usage characteristics that lend toward class distinction**. These characteristics include increased volatility in demand and load factors, **excess net-energy exportation** in the spring and summer, and more volatility in contributions to the Company's peak(s). These characteristics create a distinction that must be addressed because of their effect on circuits, voltage management, islanding, and load cycle adjustments, which makes it harder for the Company to forecast resources and load."[4] (emphasis added)

Similarly, the KCC's Order acknowledged that NEM customers have distinctly different load characteristics from non-NEM customers. It said:

> "Substantial evidence shows… that DG and non-DG customers do not have 'similar load or other cost-related characteristics,' 'similar usage,' or 'identical ... energy use.'"[5]

The KCC Order specifically states that a separate rate would be created for customers with distributed generation "on the basis of the [DG customers'] different usage patterns."[6]

Q. ARE THERE OTHER FLAWS IN THE VS-MREA'S LOGIC ABOUT EXCLUDING EXPORTS?

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[4] Idaho Public Utilities Commission, *In the Matter of the Application of Idaho Power Company for Authority to Establish New Schedules for Residential and Small General Service Customers with On-Site Generation*, Case No. IPC-E-17-13, Order No. 34046, May 9, 2018.

[5] Kansas Corporation Commission, *Order Approving Non-Unanimous Stipulation and Agreement*, Docket No. 18-WSEE-328-RTS, July 16, 2018.

[6] *Ibid.*

A. Yes. Ms. Kobor and Ms. Yozwiak appear to define delivered load as the customer's total electricity need at any point in time minus the amount of that electricity need that is served by on-site generation.[7] The problem with this definition is that it effectively values the electricity consumed on site at the full volumetric retail rate. However, during most hours, electricity generated by the rooftop solar facility typically is not nearly as valuable as the volumetric retail rate, as it is currently designed. All output from the rooftop solar facility would need to be separately metered to develop a separate compensation mechanism for the output of the solar PV facility. Or, as proposed by NorthWestern in this proceeding, the NEM rate should be revised such that the volumetric charge is better aligned with volumetric costs.

Q. ARE THE LOAD SHAPES OF NEM CUSTOMERS SIGNIFICANTLY DIFFERENT THAN THOSE OF NON-NEM CUSTOMERS?

A. Yes, NEM customer load shapes are significantly different than those of non-NEM customers. However, Ms. Yozwiak argues that the load shapes are not significantly different. To support her point, she compares the average NEM customer load shape to the 10th and 90th percentiles of the range of residential non-NEM load shapes.[8]

Q. IS MS. YOZWIAK'S LOAD SHAPE COMPARISON LOGICAL?

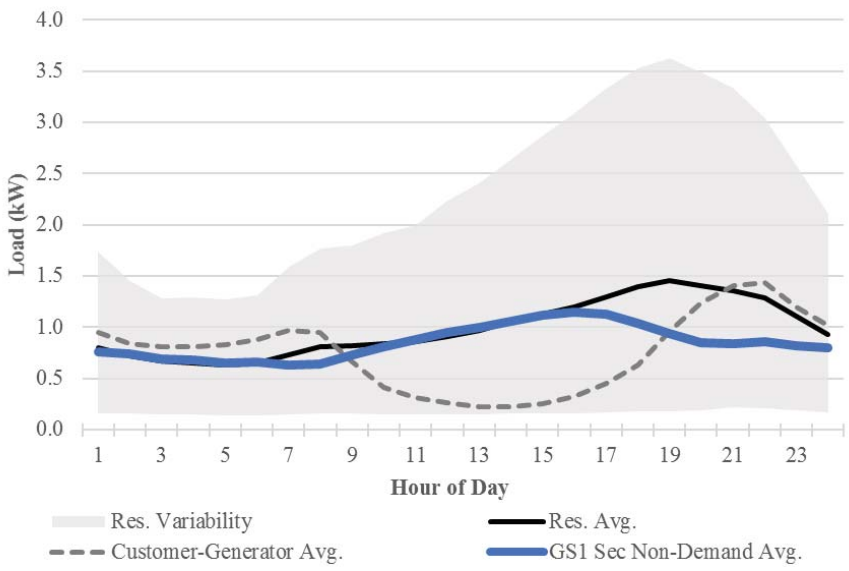
A. No. Ms. Yozwiak argues that it is not reasonable to compare average load shapes, but then goes on to use an average NEM customer load shape in her comparison. It is not reasonable to compare an average NEM load shape to the outliers of the non-NEM load distribution.

[7] Corrected Direct Testimony of Briana S. Kobor at 17:1–3 (March 1, 2019).
[8] Corrected Direct Testimony of Madeline Yozwiak at 7:16–9:3 (March 1, 2019).

Q. CAN YOU PROVIDE AN EXAMPLE TO ILLUSTRATE WHY MS. YOZWIAK'S COMPARISON OF THE AVERAGE NEM LOAD SHAPE TO THAT OF THE EXTREME ENDS OF THE DISTRIBUTION OF RESIDENTIAL NON-NEM LOAD SHAPES DOES NOT MAKE SENSE?

A. Yes. To illustrate the fallacy of Ms. Yozwiak's comparison, consider that the average Small Commercial and Industrial (C&I) load shape would fall within the 90th and 10th percentiles of residential load, similar to her representation of the NEM customer load profile. Yet, the Montana Public Service Commission (PSC) has determined that there is sufficient basis for a separate Small C&I rate class. Figure 1 illustrates this comparison.

Figure 1: Average Hourly Load Shapes, August 2017

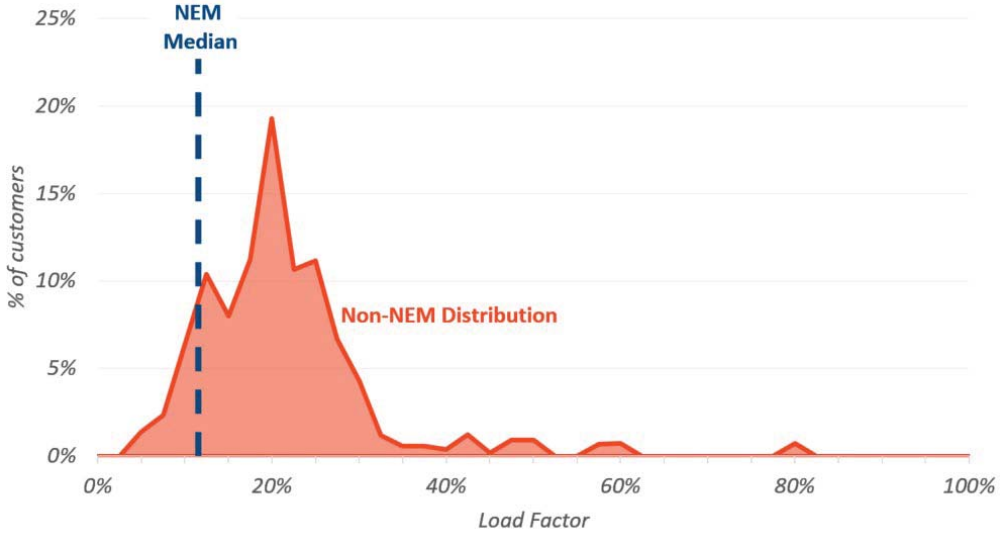


Q. HAS MS. YOZWIAK'S TESTIMONY PAINTED A CLEAR PICTURE OF WHERE THE TYPICAL NEM CUSTOMER FALLS WITHIN THE DISTRIBUTION OF RESIDENTIAL NON-NEM LOAD SHAPES?

A. No, Ms. Yozwiak's testimony does not paint a clear picture of where the typical NEM customer falls within the distribution of residential load shapes. In Figure 2 below, I compare the average NEM customer's load factor to the distribution of load factors for the residential non-NEM load research sample. The figure shows that the typical NEM

customer sits in the tail end of the distribution. The median load factor for NEM customers is 11%, which is roughly half of the median load factor of 20% for non-NEM customers.

Figure 2: Distribution of Residential Load Factors



Further, Ms. Yozwiak's own analysis supports my conclusion that NEM customer load shapes are not representative of non-NEM customers. In a sample of 180 residential customers, she could identify only 11 (5.5%) which – according to her own definition, and *excluding exports* – represent a load shape similar to the average NEM customer load shape.[9] NEM customer load shapes are outliers in the residential sample.

III. COST SHIFT

Q. DO THE UNIQUE LOAD SHAPES OF NEM CUSTOMERS LEAD TO THE UNDER-RECOVERY OF COSTS FROM THESE CUSTOMERS UNDER THE EXISTING RATE DESIGN?

A. Yes. Ms. Kobor states that cost should be the basis for determining whether to create a separate rate class for a given group of customers, thereby arguing that load shape differences are not an appropriate justification for a separate rate class.[10] First, both

[9] Corrected Direct Testimony of Madeline Yozwiak at 10:5–7 (March 1, 2019).
[10] Corrected Direct Testimony of Briana S. Kobor at 16:16–20 (March 1, 2019).

NorthWestern's Embedded Cost of Service (ECOS) study and Navigant Consulting Inc.'s ("Navigant") Value of Solar study have determined that costs are significantly under-recovered from NEM customers under the existing rate structure. As stated in my direct testimony, the magnitude of cost under-recovery is $402 per NEM customer per year according to NorthWestern's ECOS study and $464 per NEM customer per year according to Navigant's Value of Solar study.[11] These findings of a cost shift support the creation of a separate NEM rate class.

Additionally, the distinguishable and unique load shapes for NEM customers that I have identified support the proposal for a separate rate class. These distinctly different load shapes impose requirements and costs on the system that are different from those of other residential customers. Differences in load shapes are important to identify, as doing so shows that a defined group of customers imposes costs on the system which should be recovered from those same customers. Currently, those costs are being recovered from non-NEM customers rather than from the customers that cause the costs.

Q. MS. KOBOR DISCUSSES THE SUBSIDY FOR RURAL CUSTOMERS EMBEDDED IN THE EXISTING RATE STRUCTURE. IS THIS A RELEVANT COMPARISON TO THE NEM SUBSIDY?

A. No. Ms. Kobor states that the existing rate provides a greater subsidy to rural customers than it does to NEM customers.[12] She cites this as a reason for not changing rates for NEM customers. There are several problems with her comparison.

Q. WHAT ARE THE PROBLEMS WITH THE COMPARISON OF RURAL CUSTOMERS AND NEM CUSTOMERS?

[11] Direct Testimony of Ahmad Faruqui at 19:9–13 (September 28, 2018).
[12] Corrected Direct Testimony of Briana S. Kobor at 122:3–6 (March 1, 2019).

A. First, it is illogical to cite one source of inequity in the current rate design as justification for promoting another source of inequity. Rate reform efforts, such as NorthWestern's proposal in this proceeding, are initiated specifically to reduce or eliminate these problems.

Second, as a practical manner, it is important to consider what impact these subsidies have on customer behavior. It is implausible that the electricity subsidy for rural customers would influence a given individual's decision about whether or not to live in a more or less rural location in NorthWestern's service territory. However, the subsidy for NEM customers is a highly relevant factor in customers' decisions to invest in rooftop solar. The NEM subsidy is a driver of uneconomic behavior, while the rural subsidy is not. Mitigating the NEM subsidy will encourage customer behavior that leads to lower total system costs.

Third, the NEM subsidy is dynamic in the sense that rooftop solar adoption is increasing as costs continue to rapidly fall. The observed trend toward increasing adoption of rooftop solar around the country supports the notion that this is an emerging factor in rate design that will continue to increase in significance.[13]

Q. GIVEN THE DYNAMIC NATURE OF THE NEM COST SHIFT, DOES IT MAKE SENSE TO ADDRESS THAT COST SHIFT NOW?

A. Yes. There are significant benefits to correcting the NEM subsidy before rooftop PV is adopted in larger numbers. At limited levels of adoption, it is easier to address issues such as grandfathering of existing NEM customers. The impacts of grandfathering on customers - and the contentiousness of the issue - grow as more customers adopt rooftop

[13] Additionally, I note that NorthWestern has an electric line extension tariff which requires new customers to pay for at least a portion of the cost of the line extension to their home or facility. This is one existing mechanism that addresses the rural versus urban customer discrepancy.

PV. The same also applies to customer education. It is easier to educate customers about their rate options when the vast majority are in a similar situation rather than when they have become bifurcated.

Correcting the NEM rate design now also provides more certainty to customers who may be considering investing in rooftop PV. For the various reasons I discussed in my direct testimony, net metering with flat volumetric rates is not sustainable and will require a change to the NEM compensation mechanism. This inevitable change is occurring in other jurisdictions throughout the U.S., where net metering policies are being ended (e.g., Arizona, Hawaii) and/or the underlying NEM rate structure is being modified (e.g., Nevada). Reforming the NEM rate now will take some of the uncertainty out of the decision-making process for customers who are considering whether or not to invest in rooftop solar.

Mr. Valainis suggests that NEM rates should not be reassessed until aggregate net metering capacity reaches 5% of NorthWestern's peak demand.[14] I do not agree with this assessment, for all of the reasons I just provided. Additionally, Mr. Valainis does not provide valid support for his assertion. First, he cites Figure 1 in his testimony as evidence that the 5% NEM capacity threshold is relevant, but the figure is entirely qualitative, with no mention of a 5% threshold. Second, the Lawrence Berkeley National Lab study from which that figure is taken is focused on technical matters related to distributed generation integration; it does not address the issue of cost under-recovery from NEM customers.

[14] Corrected Direct Testimony of Andrew J. Valainis, at 6:11 and 17:1 (March 1, 2019).

IV. CUSTOMER BILL IMPACTS

Q. HAVE YOU REVIEWED MS. KOBOR'S CALCULATIONS OF REVENUES COLLECTED FROM THE CURRENT AND PROPOSED RESIDENTIAL RATES?

A. Yes, I have. She has made a conceptual error in her calculations which, when corrected, changes her conclusions.

Q. WHAT IS THE CONCEPTUAL ERROR IN MS. KOBOR'S CALCULATION OF REVENUES?

A. When calculating revenues and customer bills under the existing and proposed rates, Ms. Kobor ignores exports to the grid.[15] Whether to include exports when calculating bills and revenues is not a matter of opinion. It is clearly defined under NorthWestern's NEM policy, which is based on Montana law,[16] that exports are to be counted. The exports are netted against the customer's consumption. If net consumption is negative at the end of the billing period, it is rolled over to the next billing period as a bill credit. Thus, it is incorrect to exclude exports when examining customer bills.

Q. IS THE ERROR YOU HAVE JUST DESCRIBED DIFFERENT THAN THE ERROR THAT MS. KOBOR CORRECTED THROUGH A MARCH 1, 2019 ERRATA FILING?

A. Yes.

Q. HOW DOES CORRECTING THIS ADDITIONAL ERROR CHANGE MS. KOBOR'S CONCLUSIONS?

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[15] Corrected Direct Testimony of Briana S. Kobor, at 41:11–13 (March 1, 2019).

[16] Mont. Code Ann. § 69-8-603(1) requires "[t]he utility shall measure the net electricity produced or consumed during the billing period."

A. I have identified two areas in which Ms. Kobor's conclusions materially change after correcting the error. First, the correction changes her conclusions about the cost reflectivity of the three-part rate. Second, the correction changes her conclusions about cost recovery from NEM customers.

Q. HOW DOES MS. KOBOR'S ANALYSIS OF COST REFLECTIVITY CHANGE AFTER APPLYING THE CORRECTION?

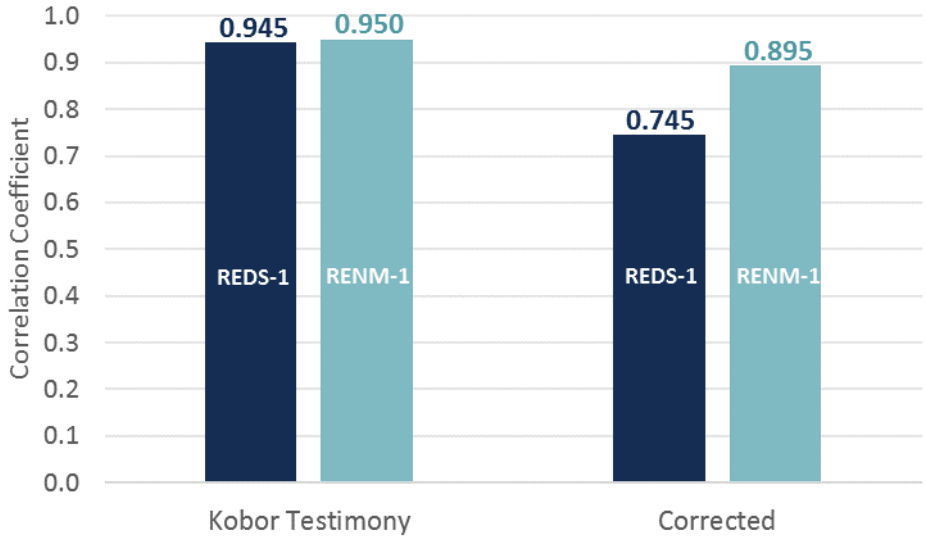
A. In her testimony, Ms. Kobor compares revenues recovered from each NEM customer to the cost to serve each NEM customer, for both the proposed three-part rate (RENM-1) and for the proposed two-part rate (REDS-1). She calculates the correlation between revenues recovered and cost to serve, and presents this as a measure of the cost reflectivity of each rate.

Prior to applying my correction, Ms. Kobor calculates a correlation coefficient of 0.945 for REDS-1 and 0.950 for RENM-1 and cites this as evidence that the three-part rate does not provide a "meaningfully better" approximation of costs than the two-part rate.[17]

After applying my correction and accounting for exports in the bill calculation, these correlation coefficients change. The new values are 0.745 for REDS-1 and 0.895 for RENM-1. The correlation between cost and revenues is now significantly higher for the three-part rate than for the two-part rate. By her own measure, the three-part rate is 20% more cost-reflective than the two-part rate. This difference is summarized in Figure 3.

[17] Corrected Direct Testimony of Briana S. Kobor at 134:8–10 (March 1, 2019).

Figure 3: Corrected Correlation Coefficient for REDS-1 and RENM-1



Q. HOW DOES MS. KOBOR'S ANALYSIS OF COST RECOVERY CHANGE AFTER APPLYING THE CORRECTION?

A. Ms. Kobor's testimony states that the proposed two-part rate (REDS-1) would recover 95% of allocated costs from NEM customers, while the proposed three-part rate would recover 121% of costs.[18] After accounting for exports in the revenue and cost calculations, the results change significantly. The proposed two-part rate would recover only 72% of allocated costs from NEM customers, while the proposed three-part rate would recover 96% of allocated costs. Thus, the three-part rate would provide more complete cost-recovery than the two-part rate, without over-collecting.

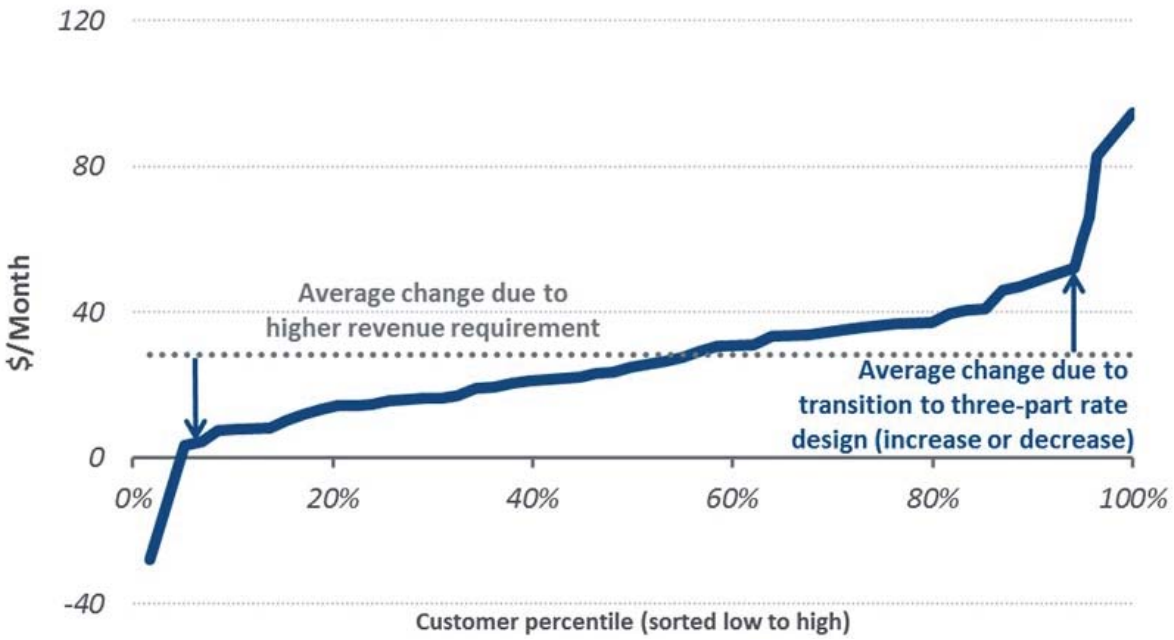
Q. HAVE YOU ESTIMATED THE BILL IMPACTS FOR NEM CUSTOMERS UNDER THE PROPOSED THREE-PART RATE?

A. Yes. Figure 4 compares average monthly bills of future NEM customers under the current two-part rate to their bills under the proposed three-part rate. The analysis is based on load data for 49 existing NEM customers, and therefore assumes that future NEM customers will have the same characteristics as existing NEM customers. Note that this analysis

[18] Corrected Direct Testimony of Briana S. Kobor at 42:10 (March 1, 2019).

assumes that residential NEM customers do not change their load profile in response to the price signals in the three-part rate. I would expect bills to decrease relative to these estimates after accounting for price response.

Figure 4: Average Monthly Bill Change for Each Customer in NEM Sample



There are two distinct bill impacts that will result from NorthWestern's proposal. The first is the impact associated with moving to a rate that is specifically based on the ECOS study for NEM customers. This transition will increase bills for all residential NEM customers not grandfathered under the current rate structure, in order to partially mitigate the existing cross-subsidy from residential non-NEM customers.[19]

The second impact is the change in *rate design* associated with moving from a two-part rate to a three-part rate. The change in rate design alone will reduce bills for some customers and increase bills for others, relative to the bills they would have experienced under the current rate structure upon installing distributed generation. Those residential

[19] As per Montana law, customers who interconnect distributed generation prior to the Montana PSC's establishment of a new customer class will continue to remain on the currently applicable tariff, rather than being subject to the proposed new tariff. Section 69-8-612, MCA.

NEM customers with load profiles that are flatter than the NEM class average will benefit from the three-part rate design, whereas those with peakier load shapes will experience a bill increase.

NorthWestern's proposed three-part rate design is revenue neutral. In other words, in the absence of any change in customer load shapes, the three-part rate would collect the same revenue as a two-part rate that is based on the NEM customer-specific revenue requirement. Some customer bills will increase by less than the class average, or even decrease, as a result of the change in rate design, and some will increase by more. On average, the rate design change will not lead to a change in revenues (*i.e.*, average rates).

Q. WHAT WILL BE THE IMPACT OF THE THREE-PART RATE ON THE PAYBACK PERIOD FOR CUSTOMERS WHO ARE CONSIDERING THE INSTALLATION OF ROOFTOP SOLAR PANELS IN NORTHWESTERN'S SERVICE TERRITORY?

A. I have calculated the payback period for a customer who is considering investing in solar under the current two-part rate and compared that to the payback period under the proposed three-part rate. The payback period is the number of years it would take for the cumulative bill savings from an investment in rooftop solar to equal the cost of the investment.

Given the trend toward larger rooftop solar installations, I relied on Ms. Kobor's pre- and post-DG billing determinants for all customers with capacity installed greater than 4 kW. I assumed an average installed cost of rooftop solar of $2,492 after applying the 30% federal investment tax credit, based on 2017 solar cost data provided to me by NorthWestern.

I estimate that the average payback period for a rooftop solar investment under the current two-part rate would be 17 years. Under the proposed three-part rate, that would increase to 23 years. Assuming customers respond to the three-part rate by managing their demand – an assumption that is supported by the literature, as described in my direct testimony – the payback period would be reduced by one year to 22 years. As the cost of rooftop solar continues to decline, I would expect these payback periods to decline as well.

Q. WHAT DO YOU CONCLUDE ABOUT THE IMPACT OF NORTHWESTERN'S PROPOSED NEM RATE ON THE ROOFTOP SOLAR INDUSTRY?

A. On average, the payback period on an investment in rooftop solar could be expected to increase by a few years at 2017 solar PV costs. In my analysis, the average increase is from 17 years to 22 years. This change in payback period is due to the removal of an unintended subsidy that is currently being provided to NEM customers under the existing flat rates. According to Mr. Valainis, NorthWestern's NEM rate proposal would "decimate the solar industry in Montana."[20] I have not seen any empirical support for this claim in the intervenor testimony. My quantitative analysis suggests that such results are not likely to materialize.

V. THE ATTRACTIVENESS OF RESIDENTIAL DEMAND CHARGES

Q. DO YOU AGREE WITH MS. YOZWIAK'S CHARACTERIZATION OF MANDATORY RESIDENTIAL DEMAND CHARGES AS "UNCOMMON"?

A. No. The introduction of mandatory or default residential demand charges needs to be placed in context. Currently, the only "common" default rate design in the U.S. is a flat volumetric rate. This has been the case for decades. In part, that is because, until recently,

[20] Corrected Direct Testimony of Andrew J. Valainis at 9:8 (March 1, 2019).

residential customers did not have the metering technology necessary to include time-varying rates or demand charges.

Declines in technology costs have enabled utilities to cost-effectively deploy interval meters to residential customers. With these recent upgrades to metering technology, and with the rising need to address growing cross-subsidies that are embedded in the existing flat rate structures, utilities are just beginning to modernize their rate designs. From that standpoint, the introduction of demand charges for residential customers has been a common theme in those tariff modernization activities.

In addition to the introduction of mandatory demand charges by Westar and Salt River Project (SRP) in just the past few years, residential demand charges are also now being piloted by Xcel Energy in Colorado and by ConEdison in New York. Eversource's original proposal to introduce demand charges for customers with distributed generation was approved by the Massachusetts Department of Public Utilities in 2018. In Idaho, the PUC approved the creation of a separate rate class for customers with distributed generation, and I would expect demand charges to be among the rate options considered in the Idaho PUC's new proceeding on rate design for customers with on-site generation. Given the very recent activity in this area, I anticipate that the trend toward residential demand charges will continue to gain interest across the industry.

Further, as I stated in my direct testimony, demand charges are widely prevalent in commercial and industrial rates, where the necessary metering infrastructure is already in place, and often on a mandatory basis. This has been the case for decades.

Q. DO YOU AGREE WITH MS. YOZWIAK'S CHARACTERIZATION OF DEMAND CHARGES AS "UNPOPULAR"?

A. No. In some cases, approval of utility proposals to introduce residential demand charges has been challenged in court or through state legislative activity. These challenges have primarily been driven by certain advocacy groups that want to continue to subsidize rooftop solar through rate design. While those lobbying efforts have been successful in some cases, they do not reflect opposition by a broad population of customers, but rather opposition by a specific group with a vested financial interest in the outcome.

I note that not all advocacy groups have opposed residential demand charges. Staff of the Environmental Defense Fund (EDF) have published a report supporting the redesign of rates for NEM customers, and identifying a three-part rate as one option for doing so.[21] A reason for their support is that demand charges will provide economically efficient price signals that encourage load management, such as adoption of demand response technologies.

Q. DO YOU AGREE WITH MS. YOZWIAK'S SUGGESTION THAT CUSTOMERS WILL NOT BE ABLE TO UNDERSTAND OR RESPOND TO DEMAND CHARGES?

A. No. Ms. Yozwiak has dismissed the findings of prior studies on customer response to three-part rates, saying those studies were old or only based on voluntary rates.[22] But regardless of whether the rate offering was voluntary or mandatory, and regardless of the year in which the studies were conducted, the studies demonstrate that customers can and will respond to demand charges.

While there may be limitations on the extent to which the findings of a voluntary study can be precisely extrapolated to the entire population, the general finding that customers

[21] See http://blogs.edf.org/energyexchange/2016/07/06/how-more-transparent-electricity-pricing-can-help-increase-clean-energy/.

[22] Corrected Direct Testimony of Madeline Yozwiak at 22:10–15 (March 1, 2019).

are price responsive is still applicable to this broader population of customers. Recent pricing pilots have specifically proven that point. For instance, the Sacramento Municipal Utility District (SMUD) conducted a pricing pilot comparing price responsiveness of customers in a voluntary pricing program to those in a similar program with default enrollment.[23] The study found that the average price responsiveness of the default participants was lower but still statistically significant. In fact, the *aggregate* load impacts would be higher for the default population due to greater overall enrollment, which more than offsets the smaller per-customer load reduction.[24]

There is a logical disconnect in suggesting that the same NEM customers who are capable of understanding the complexity of 20-year rooftop solar leases or purchases could not understand the concept of demand charges. Understanding the economics of a rooftop solar lease would involve projecting future utility bill increases or decreases, lease rates, the impact on home resale value, maintenance, lease cancellation penalties, and other factors. Yet customers have made the decision to agree to these terms. Conceptually, it is difficult to understand why NEM customers would be able to deal with this complexity but not with the notion of a simple demand charge. The same applies to customers who purchase the PV systems outright.

In approving Westar's three-part rate proposal, the KCC agreed with the view that customers can respond to demand charges: "The Commission finds that there is no merit

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[23] Jennifer Potter et al, "Smart Pricing Options Final Evaluation," prepared for the U.S. Department of Energy, September 5, 2014. https://www.smartgrid.gov/files/SMUD-CBS_Final_Evaluation_Submitted_DOE_9_9_2014.pdf.

[24] Ahmad Faruqui, Ryan Hledik, and Neil Lessem, "Smart by Default," *Public Utilities Fortnightly*, August 2014.

to the assertion that [residential distributed generation] customers are disadvantaged by any alleged difficulty in understanding or responding to the three-part RS-DG rate."[25]

Q. HAS MS. KOBOR PROPOSED AN ALTERNATIVE TO NORTHWESTERN'S PROPOSED THREE-PART RATE?

A. Yes, Ms. Kobor proposes a TOU volumetric charge as an alternative to a three-part rate.[26]

Q. IS MS. KOBOR'S PROPOSAL AN APPROPRIATE ALTERNATIVE TO A THREE-PART RATE?

A. No. Purely volumetric TOU rates have several disadvantages relative to three-part rates – disadvantages, which are similar to those in the current two-part rate offering.

There are three types of costs: customer-related, capacity-related, and energy-related. Volumetric TOU rates can capture the energy-related costs if they vary by time of day, by day of the week, by month, and by season. Customer-related costs are costs that are driven by the number of customers on the system and include costs related to providing metering, billing, and customer service (such as staffing of call centers) and they often include the cost of installing the line drop from the nearest pole and sometimes also the cost of nearest pole transformer. Capacity-related costs consist of those costs related to distribution, transmission, and generation. Transmission and generation capacity are sized based on expected peak demand. Distribution costs depend in part on the customer's connected load (which can be approximated by the customer's non-coincident demand) and the customer's peak demand at the time of the distribution system peak.

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[25] Kansas Corporation Commission, *Order Approving Non-Unanimous Stipulation and Agreement*, Docket No. 18-WSEE-328-RTS, July 16, 2018.

[26] Corrected Direct Testimony of Briana S. Kobor at 9:8–10 (March 1, 2019).

Thus, a rate based on a purely volumetric TOU charge would recover customer-related and capacity-related costs through a volume-based rate. Reductions in mere volume are still likely to create insufficient recovery of fixed costs that are redistributed in a utility's next rate case. Well-designed demand charges have the potential to more closely align the rate structure with the cost structure.

That said, volumetric TOU charges and demand charges can be viewed as complements rather than substitutes. TOU rates are most appropriately used to reflect the time-variation in the cost of energy. They are rarely used to reflect time-variation in the cost of the grid (kW demand). The best rate design would capture the costs of the grid with demand charges and the costs of energy with an energy-based time-of-use rate. This is fairly standard practice in the industry for commercial and industrial customers. The primary barrier to doing this for residential customers historically has been a lack of the necessary metering infrastructure.

VI. CONCLUSION

Q. DO YOU HAVE ANY CONCLUDING COMMENTS?

A. As I discussed in my direct testimony and in this rebuttal testimony, net metering with flat volumetric rates amounts to an outright subsidy from non-NEM customers to NEM customers. The aggregate subsidy will grow as the number of NEM customers grows, encouraged by the subsidy. A transition to three-part rates for NEM customers would address this issue and ensure that costs are being recovered from customers in a way that is equitable and cost-based.

The purpose of introducing three-part rates is not to "hurt" the rooftop solar industry but to remove distortions in the price signal and provide customers with an incentive to

manage their electricity consumption in an efficient manner. Whether or not to subsidize residential rooftop solar is a decision for the Montana PSC. However, such subsidies, if they are provided, should be transparent and should happen outside the rate design for energy, generation capacity, transmission, distribution, and customer service provided by the utility (an example of this is the federal investment tax credit which at 30% represents a very significant incentive for customers to install rooftop solar). The purpose of rates is to accurately reflect the underlying cost structure, and, accordingly, NorthWestern's proposal to introduce a three-part rate represents a significant improvement in the existing rate design.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.