MONTANA PUBLIC SERVICE COMMISSION
REGULATORY DIVISION
STAFF REPORT

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TO: Energy and Telecommunications Interim Committee

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SUBJECT: ETIC's request of September 15, 2015, for follow-up questions to stakeholders regarding the costs and benefits of net metering in Montana.

BACKGROUND

Net metering policy was a significant energy issue during the 2015 legislative session. Legislators and stakeholders discussed how to determine the benefits and costs of net metering. Ultimately, the Legislature passed SJ 12, which tasked the Energy and Telecommunications Interim Committee (ETIC) with reviewing net metering policy and related issues, including the economic impacts of net metering and the cost shifts, if any, between net-metering customers and customers who do not net meter.

At its June 2015 meeting, ETIC adopted a series of questions to pose to investor-owned utilities, cooperative utilities, renewable energy advocates, and organized electrical workers about various elements of Montana's net metering policy.

At its September 2015 meeting, ETIC requested that the Montana Public Service Commission (PSC), the Consumer Counsel, and the Department of Environmental Quality review the responses to ETIC's net metering questions. ETIC requested that these agencies examine how stakeholders assessed the costs and benefits of net metering and provide possible follow-up questions designed to allow ETIC to evaluate the assumptions, perspectives, sources, and methodologies used by the stakeholders. ETIC seeks to better understand the costs and benefits of net metering so that it can make an informed assessment of the current net metering policy.

This report responds to ETIC's request. It was prepared by the PSC's Regulatory Division staff. The conclusions and recommendations provided in this report do not necessarily reflect the views of the PSC or any commissioner. The report first provides summary findings, followed by a high-level analysis of key issues raised in the responses received by ETIC to its net metering questions. Finally, we suggest follow up questions for ETIC to ask stakeholders.

SUMMARY FINDINGS

We focused our review on information provided by the investor-owned utilities over which the Commission has regulatory jurisdiction. In addition, we reviewed the responses provided by the renewable energy advocates. Our review produced five primary conclusions:

1. The utilities have not comprehensively evaluated the system impacts of distributed generation sources, nor have they produced sufficient data for such an evaluation. As a result, it is difficult to reliably quantify the benefits and costs of net metering from the data provided to ETIC to this point;

2. The stakeholders, including the utilities, did not fully assess alternative methods for analyzing the reasonableness of current net metering policies;

3. The benefit and cost estimates stakeholders provided are incomplete and, in some cases, reflect questionable assumptions;

4. The utilities did not provide the costs of serving net metering customers, making it difficult to determine whether and to what degree customer-generators are subsidized through participation in net metering;

5. Methods for analyzing the benefits and costs of distributed generation sources are evolving in response to distributed generation activity in other states.

While it may not be possible to fully resolve these issues during the interim timeframe, the analysis below suggests a number of questions ETIC could pose to stakeholders, answers to which may be useful for evaluating policy options.

ANALYSIS

Net metering could be evaluated from a utility system cost perspective to assess whether it results in just and reasonable charges to customer-generators, pursuant to § 69-3-201, MCA.[1] This approach would treat customer-generators as consumers of utility services and analyze what rates these consumers should be charged so that their bills reasonably cover the costs of the services received. Such an analysis would require detailed information on the usage characteristics of customer-generators as a group as well as the costs a utility incurs to provide the various services customer-generators receive based on those usage characteristics.

[1] Section 69-3-201, MCA, requires all charges (rates and bills) for public utility service to be reasonable and just.

Although the utilities asserted that net metering customers do not fairly contribute to the recovery of system costs, they did not provide the results of cost studies showing that net metering results in unjust and unreasonable charges to customer-generators. Nor do they appear to have collected the consumption data needed to conduct such cost studies.

Another way to evaluate net metering is to assess the benefits and costs of the electricity generated by net metering customers. Under this approach, net metering is deemed a reasonable billing mechanism if the benefits exceed the costs. The utilities and renewable energy advocates used this approach to respond to several of ETIC's questions. In general, we find their comparisons of benefits and costs incomplete and imprecise. This may be largely due to inadequate data, which, in turn, is likely due to the relatively small number of net metering customers in the utilities' service areas. For example, just 0.4 percent of NorthWestern Energy's (NWE) Montana customers, and only four Montana-Dakota Utilities' (MDU) Montana customers, participate in net metering. Many of the follow-up questions we suggest below are intended to help the ETIC clarify differences in the benefit and cost information provided by the stakeholders.

The utilities identified cost shifting as a major problem with net metering. NWE p. 2; MDU p. 1. When a customer installs a qualifying power generator behind the utility's meter, the customer's consumption of utility-delivered electricity declines and the utility's revenue also declines, other things equal. In a static, short-run sense, it's true that the utility's recovery of some fixed system costs shifts to non-net metering customers as rates are adjusted through the regulatory process to provide the utilities adequate revenue.[2] This phenomenon is not unique to net metering; it also occurs, for example, with both customer price-induced and utility programmatic energy efficiency activity.[3]

However, in responding to ETIC's survey, the utilities did not address how, in a dynamic, long-run sense, the expanded use of distributed renewable generators affects total utility system costs or total societal costs. In other words, to the extent net metering promotes the private investment in distributed, renewable energy sources that the Legislature has encouraged, are there long-run cost savings? If long-run savings are projected, designing mechanisms to ensure all customers share in them equitably might be preferred to prohibiting cost-shifting, as the utilities recommended.

[2] By "static" we mean an assumption that the physical and cost structures of the utility stay constant over time.
[3] Price-induced energy efficiency occurs when customers independently decide to purchase energy efficiency. Programmatic energy efficiency occurs when utility incentives and/or information motivate a customer's decision to purchase energy efficiency.

An important step toward resolving these issues is to comprehensively analyze how expanded use of distributed generators impacts the utility's future infrastructure needs and associated costs of providing service. In its comments on NWE's 2013 long-term resource plan, the Commission instructed NWE to conduct such an analysis. *Comments*, Docket N2013.12.84, ¶ 18 (May 26, 2015). (Preliminary results of that analysis might be available before the end of the legislative interim period.)

In their responses to ETIC's survey, the utilities asserted that customer-generators do not contribute adequately to fixed cost recovery, pointing out the on-demand nature of the electricity services they provide. The costs of the electricity services that utilities provide and customers receive cannot be measured adequately in terms of kilowatt-hours of energy alone; PSC rate-setting proceedings generally focus on the costs of three service categories: energy-related service, capacity-related service, and customer-related service. However, for both practical and economic reasons, many customers' bills are based primarily on their consumption of kilowatt-hours.

In simple terms, capacity-related service allows customers to change, at will, the rate at which they want the utility to provide the energy needed to operate various appliances and equipment. Utilities provide capacity service with resources that allow them to reliably satisfy whatever rate of consumption customers collectively impose, whenever they impose it.[4] The utilities asserted that, in contrast to energy efficiency, net metering does not affect customer-generators' consumption of capacity-related service, but only reduces their consumption of energy. NWE p. 18; MDU p. 4. If true, this could have implications for designing rates for net metering customers that effectively recover the costs of service. However, the utilities did not provide sufficient information to support this conclusion, and NWE has just begun to study the matter. NWE p. 21.

NWE also expressed concerns regarding the impact of net metering on regulation service requirements. It acknowledged that the issue needs further study. NWE p. 35. In fact, the variability in retail energy use without net metering contributes significantly to a utility's regulation service requirements. The question is whether and how behind-the-meter generation affects total regulation service requirements.

Both the utilities and renewable energy advocates addressed the question of subsidies. Federal and state tax incentives, as well as state Universal System Benefits programs reduce the price of solar and wind power systems. For example, information provided by the Montana Renewable Energy Association (MREA) indicates that federal and state tax incentives reduce the installed cost of a five-kilowatt solar PV system from $3.65 per

[4] Capacity-related service is also sometimes referred to as demand-related service. Demand, in this context, refers to the rate of energy consumption. Capacity refers to a utility's capability to reliably serve whatever the demand is, including the highest, or "peak," demand.

watt to $2.30 per watt, or about 37 percent. MREA p. 2. These incentives are a form of subsidy.

However, the utilities also asserted that net metering results in subsidized utility service to customer-generators. Net metering is a billing mechanism that applies when a customer installs a qualifying renewable energy generation source on property behind the utility's meter. Net metering customers are billed based on the net amount of energy delivered by the utility. Montana law promotes net metering in order to encourage renewable energy sources, stimulate economic growth, and diversify Montana's mix of energy resources. 69-8-601, MCA. Whether the net metering billing mechanism subsidizes utility service is a separate question from whether the qualifying generation sources are subsidized.

Again, the utilities did not provide the results of cost studies to show that net metering results in unjust and unreasonable charges to customer-generators, nor have they collected the consumption data needed for such cost studies. Without that information it is difficult to establish the degree to which net metering results in subsidized utility service.

Methods for analyzing the benefits and costs of distributed generation sources are evolving in response to distributed generation activity in other states. In the cover letter attached to its answers to ETIC's questions, NWE points to the Electric Power Research Institute's (EPRI) initiative regarding the integration of distributed generation. As part of that initiative, EPRI released a report that develops a comprehensive benefit-cost framework for grid-integrated distributed energy resources.[5] However, the utilities did not address, in their responses to ETIC's survey, the merits of such a framework. Nor have they applied it, or indicated that they plan to apply it, to assess the benefits and costs of distributed generation within their systems.

In addition, at its annual meeting in November 2015, the National Association of Regulatory Utility Commissioners (NARUC) created a new Staff Subcommittee on Rate Design. NARUC recognized that advances in metering technology make data available to better match costs to causation and provide customers more meaningful price signals. At the same time, growth in distributed generation is adding a new dimension to traditional electric utility rate design debates. NARUC's new staff subcommittee will:

> "…undertake necessary education and discussion, with the ultimate aim of developing a work product that identifies [a] range of options and makes available scholarly articles, consultancy reports, national laboratories' efforts, think tank proposals, and other substantive

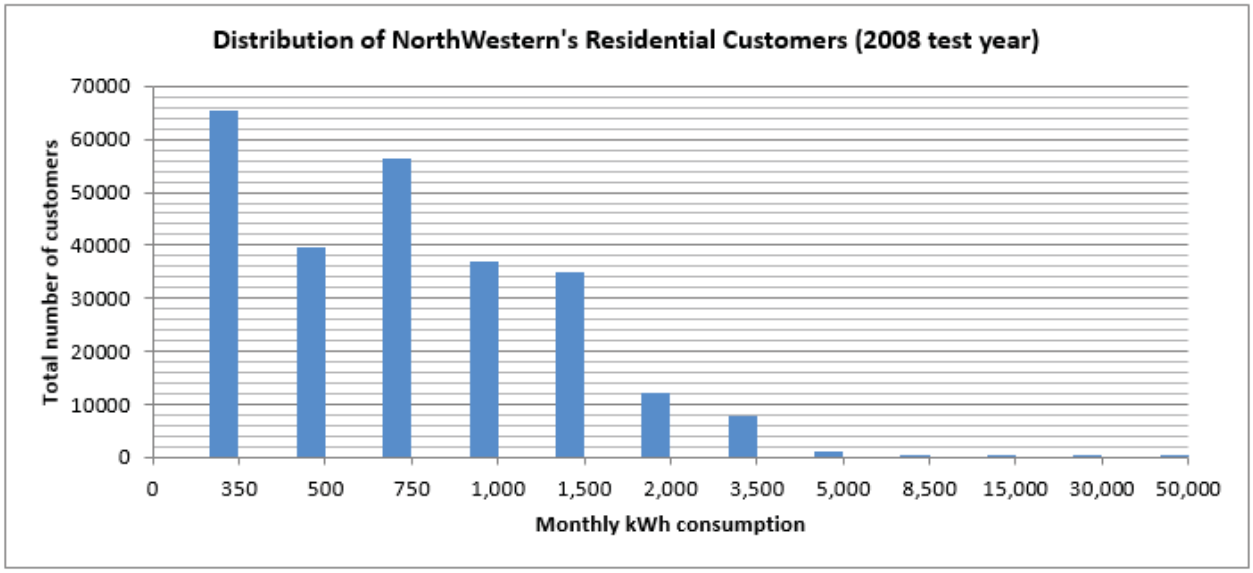
[5] *The Integrated Grid: A Benefit-Cost Framework*, Electric Power Research Institute, Feb. 2015.

approaches to rate designs that may be tailored to State needs and useful in adopting revised rate design methods.

SUGGESTED QUESTIONS FOR STAKEHOLDERS

This section suggests follow-up questions that ETIC could pose to various stakeholders. Many of the questions are directed to NWE because it, among the regulated utilities, has the most experience with net metering and its responses to ETIC's questions contained many assertions and numerical calculations. While posing these questions to stakeholders will not resolve all of the benefit-cost issues raised by their initial responses, the answers may assist the ETIC in assessing policy options.

1. ETIC's Question 4, as we interpret it, requests a frequency distribution for each customer class, along with an indication of where in the distribution an average net metering customer falls. The utilities, however, did not interpret the question similarly and thus did not provide the data that we think would be useful. Regulated utilities are required to provide such distributions to the Commission to illustrate rate impacts. For example, in the rate case docket NWE referred to (Docket No. D2009.9.129), NWE provided the following distribution for residential class energy usage.[6]



ETIC should request that the utilities provide such frequency distributions for kWh consumption, noncoincident peak KW demand, and coincident peak KW demand, if available, for each customer class. The utilities should also separately show the frequency distribution for net metered customers in each customer class. This

[6] PSC staff created the chart from the data submitted by NWE.

information will help ETIC visualize differences in the usage characteristics of net metering and non-net metering customers.

2. In their answers to Question 6, the utilities asserted that the revenue impact of net metering is a subsidy. ETIC should request that the utilities support these assertions by providing the results of marginal and embedded cost of service studies and planning studies that assess the long-run utility system cost impacts of distributed generation.

3. In its answers to Questions 7 and 14, NWE effectively asserted that net metering customers' consumption of capacity service is no different, as a group, than non-net metering customers in the same class. ETIC should request that NWE provide the load research data and analyses that support this assertion, including planning studies that assess the long-run utility system infrastructure impacts of distributed generation.

4. NWE does not separately meter the amount of energy exported to NWE's system from distributed generation. ETIC should request that NWE discuss whether there are alternative ways of reasonably estimating exported energy based on the number and capacity of generators, and the solar and wind resources available in different geographical locations.

5. In response to Questions 1 and 20(a)(4), NWE estimated that it provides about one MW of regulation service to integrate net metered power. ETIC should request that NWE explain in more detail how it determined that amount of regulation service when net metered generation is, according to NWE, not separately measured.

6. In response to Questions 9 and 11, NWE stated that it has initiated a study of net metering customers. ETIC should request that NWE specify the data it will collect in the study. For example, will it include sub-hourly energy consumption and production data for net metering customers (drivers of integration capacity requirements)? Will it allow NWE to more accurately determine the impact of net metering on participants' coincident and noncoincident peak demand? Will it include a control group of non-net metering customers? Answers to these questions could aid ETIC in considering and pursuing policy options.

7. In their answers to Question 18, the utilities addressed the operational issues associated with net metering. ETIC should request that the utilities discuss whether they have comprehensively analyzed their distribution systems, e.g., feeder-by-feeder, to identify areas where distributed generation can be accommodated without the need for significant upgrades and modifications. In addition, ETIC should request that the utilities comment on the degree to which the PSC's distributed generation

interconnection rules (ARM 38.5.8401-8413) mitigate the potential for significant distribution system cost impacts from net metering.

8. Question 10 to the utilities asked about the benefits of net metering, measured in terms of various types of avoidable costs. Aspects of NWE's answer resemble a benefit-cost comparison from a Ratepayer Impact Measure (RIM) perspective.[7] The RIM is one of several benefit-cost tests that utilities sometimes use to assess the cost effectiveness of certain resources, particularly energy efficiency programs. The PSC has long rejected the RIM as the sole measure of cost effectiveness (see ARM 38.5.8218(3)), and absent benefit-cost comparisons from other perspectives, notably Utility Cost, Total Resource Cost, and Societal Cost perspectives, NWE's analysis is incomplete.

Some of the assumptions in NWE's RIM benefit-cost comparison are questionable and/or unsupported. For example, in Exhibit 20(a)(1) NWE appears to measure the benefit of distributed generation using wholesale spot market prices. As a result, NWE calculated the benefit of distributed renewable generation installed in 2011 to be $0.029 per kWh in that year, and no more than $0.038 per kWh in the following three years. No value is attributed to generation after 2014. But in 2011, NWE determined, and the PSC agreed, that it was reasonable for NWE to pay $0.053 per kWh for 25 years to acquire its own intermittent wind generating plant. At that time, NWE determined that the benefit of avoiding market purchases for a 25-year period was at least $0.068 per kWh.[8]

Similarly, it is unlikely that NWE would say that the hydroelectric generators it purchased a year ago provide no tangible benefits to its customers because wholesale spot prices over the past year were less than the generators' per-unit average cost.

Later in its response, NWE concluded that distributed generation would not allow it to avoid future transmission and distribution capital costs, but did not support that conclusion with the results of capacity expansion planning studies, particularly regarding areas of the transmission and distribution network that may need upgrades because of load growth or other reliability issues. The same applies to NWE's conclusion that distributed generation adds to, rather than avoids, line losses.

ETIC should request that NWE provide forward-looking, comprehensive benefit-cost comparisons based on the following perspectives: Participant Cost Test, Ratepayer Impact Test, Utility Cost Test, Total Resource Cost and/or Societal Cost Test. ETIC

[7] The RIM perspective is also sometimes referred to as the non-participant perspective.
[8] Department of Public Service Regulation, *In the Matter of the Application of NorthWestern Energy for Approval to Purchase and Operate the Spion Kop Wind Project*, Docket No. D2011.5.41, Order 7159l, p 13.

should also request that NWE provide a thorough rationale for all assumptions, including supporting data and analyses.

9. In their responses to ETIC's questions, stakeholders differed on what costs and benefits should be attributed to net metering. NWE counted the federal income tax credit as a subsidy in its responses. However, in MREA's answer to Question 8, it excluded the federal income tax credit from societal benefits and costs. ETIC should request that MREA clarify how accounting for federal tax credits would change the numbers in its Table 5.

10. In response to Question 4, MREA stated that the 50kW cap is not large enough for commercial applications and listed some general examples of types of customers that would benefit from increasing the cap. NWE claimed that 99 percent of residential customers and 87 percent of commercial customers can already net meter their full loads under the current cap. ETIC should request that MREA estimate the numbers and types of customers that have been precluded from net metering by the 50kW cap and why.

11. In response to Question 7, MREA estimates a "solar time of production premium" benefit of net metering. The benefit represents the difference between solar production valued at NWE's retail supply rate and the same production valued at the retail supply rate adjusted by certain time-of-use factors from a NWE pilot program. ETIC should request that MREA clarify whether it considers the time-of-use retail supply rate a reasonable proxy for forward-looking avoidable supply costs and, if so, why.

12. Also in response to Question 7, MREA estimates NWE's lost transmission and distribution revenue for distributed generation exported to the grid. ETIC should request that MREA explain why, if it is applying the RIM test, it is reasonable to limit the lost revenue estimate to exported energy.

13. In response to Question 8, MREA lists installation sales revenue as an additional net metering benefit. For 2014, MREA estimated this revenue benefit to be $3,538,384, which approximates the pre-incentive installed cost it reported in response to Question 1.[9] ETIC should request that MREA explain why installation revenue should be considered a net economic benefit, given that the revenue to installers is also a cost to customer-generators, other utility customers (through USB charges), and tax payers (through federal and state incentives).

[9] The MREA spreadsheet calculation of the $3,538,384 benefit assumes an installed cost of 3.75 per watt.