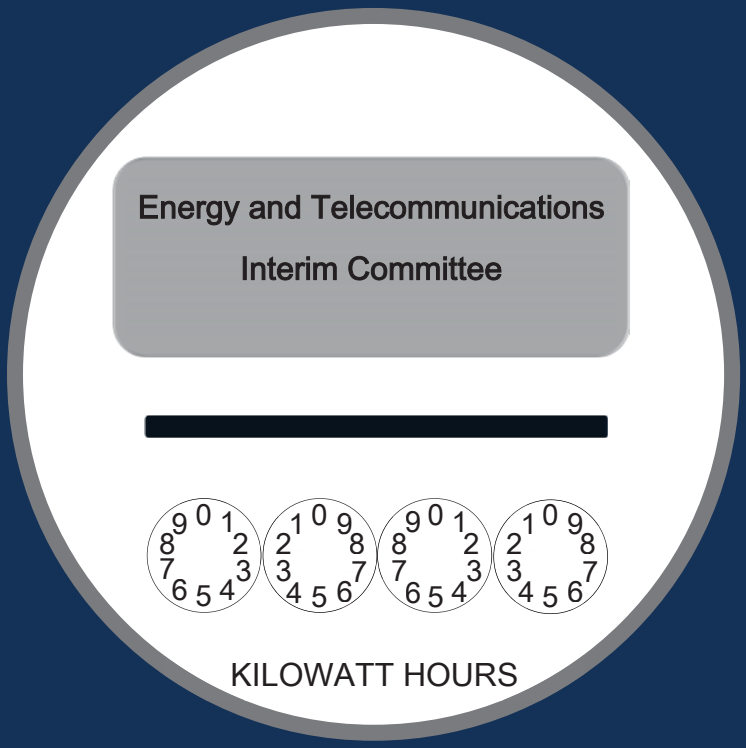
Net Metering in Montana

A Report to the 65th Legislature



September 2016

Energy and Telecommunications Interim Committee Members

Before the close of each legislative session, the House and Senate leadership appoint lawmakers to interim committees. The members of the ETIC, like most other interim committees, serve one 20-month term. Members who are reelected to the Legislature, subject to overall term limits and if appointed, may serve again on an interim committee. This information is included in order to comply with 2-15-155, MCA.

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This report is a summary of the work of the Energy and Telecommunications Interim Committee, specific to the ETIC's 2015-2016 net metering review as outlined in the ETIC's 2015-16 work plan and Senate Joint Resolution 12 (2015). Members received additional information and public testimony on the subject, and this report is an effort to highlight key information and the processes followed by the ETIC in reaching its conclusions. To review additional information, including written and audio minutes, and exhibits, visit the ETIC website: www.leg.mt.gov/etic.

A full report including links to the documents referenced in this print report is available at the ETIC website: www.leg.mt.gov/etic

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Introduction

Under Montana's 1999 net metering policy, there is an underlying agreement that the costs of net metering are in general equal to the benefits — that the policy is equitable. The policy established that agreement with a caveat that if costs and benefits became unbalanced the Montana Public Service Commission (PSC) can exercise limited authority to address the matter. Renewable energy advocates and utilities, at the time, compromised to establish limits on the size of systems, to establish month-to-month carryover of credits, and to set annual termination of credits. Net-metered customers would be credited at the full retail rate.

During the 2015 legislative session, multiple bills were introduced to increase net metering in Montana. The policy discussions before the 2015 Legislature, however, shifted to a discussion of costs and benefits. The issue of equality was repeatedly discussed in terms of net metering costs and benefits, and the potential shifting of those costs and benefits based on policy changes. Senate Joint Resolution 12 (SJ 12) was introduced and passed by the 2015 Legislature with the goal of gathering additional information about the costs and benefits of net metering in Montana. The resolution ranked second in a legislative poll of interim study priorities and was assigned to the Energy and Telecommunications Interim Committee (ETIC). The ETIC adopted a work plan dedicating most of its time to a net metering analysis.

Discussions before the 2015 Legislature focused on the issue of increasing net metering, and the ETIC focused on the question of whether Montana's current net metering policy, current rate design, or both are adequate and attempted to tackle appropriately shared costs and benefits.

The ETIC found that as net metering increases in Montana — there were about 1,500 net-metered generators in the NorthWestern Energy service territory in 2015 compared to about 370 net-metered generators in 2008[1] — questions about the 1999 policy will continue to be raised. Similar to the 2015 session, the ETIC also quickly encountered broad philosophical questions on the issue — for example, distributed generation versus centrally owned resources, fossil fuels versus renewable resources, and overall reliability and stability of the grid in the

[1] *Information taken from NorthWestern Energy Universal System Benefits Activities 2009 Annual Report, Renewable Resources and NorthWestern Energy Universal System Benefits Activities 2015 Annual Report, Renewable Resources.*

future. In an effort to avoid the same debate that muddied many of the discussions before the 2015 Legislature, the committee tasked NorthWestern Energy (NWE), the Montana Renewable Energy Association (MREA), and Montana-Dakota Utilities (MDU) with defining a framework for an updated future to net metering in Montana and working toward a collaborative resolution to overcome some of the philosophical divides. The three entities focused on:

- implementation of interconnection standards and rules that ensure safe and reliable utility delivery and net metering systems;
- modifications to metering technology and practices for net metering systems;
- timing and framework of a net metering cost-benefit analysis; and
- consumer protections for existing generators under future net metering policies.

During the summer of 2016, those entities reached agreement on three bills to address the issue of interconnection and metering technologies. The ETIC agreed to the three draft proposals, which require biennial review of interconnection rules, eliminate a homeowner electrical permit exemption for grid-tied generators, and clarify the PSC role in reviewing metering technologies. Those drafts (LCNET1–LCNET3) are here. In addition, the committee put forward two bill drafts addressing broader net metering policies (LCNET4 and LCNET5).

The ETIC posted this report and the five bill drafts for public comment and received more than 400 comments. The committee reviewed those comments in September and voted unanimously to bring the first three proposals before the 2017 Legislature as LC423-LC425.

The question of costs and benefits, however, became a question to be answered in the future. Entities did not reach a consensus on when and how to analyze costs and benefits to ensure all utility customers are treated equitably moving forward. The ETIC discussed requiring a cost-benefit analysis by the PSC when net-metered customers represent 1% of a utility's retail sales. The committee did not pursue that issue, but in September 2016 agreed to legislation that requires existing net-metered customers be grandfathered into current rates if the PSC in the future changes net-metering rate classifications. The legislative proposal is LC426.

The ETIC also agreed to legislation increasing the cap on net metering in Montana from 50 kilowatts to 250 kilowatts for certain customers. The committee discussed increasing the cap for all tax-exempt customers, but settled on an increase for government entities. The proposal is outlined in LC427.

ETIC Findings and Recommendations

- Montana's rural electric cooperatives, governed by each cooperative's own board of trustees, should establish parameters for net metering systems in their territories. State net metering laws should not be extended to include rural electric cooperatives.
- Montana offers a variety of tax, grant, loan, and other net metering incentives. The current level of incentives is adequate, and changes to existing incentive programs — including Montana's universal system benefits (USB) program, which includes some funding for renewable resource projects and applications — are not needed.
- Interstate grid modernization and removing impediments to marketing Montana resources will be an essential component — a core competitive advantage — for Montana to produce low-cost, reliable clean energy, and to deliver that energy to local and regional markets.
- Decoupling Montana's utilities from the requirement to sell more electrons to generate profits is an important first step to moving to a modernized interstate grid that values energy efficiency and a diverse portfolio of distributed energy resources.
- Montana has a rich resource of emerging technologies and business leaders who will contribute substantially to Montana's energy future.
- Removing obstacles to qualified innovators in Montana's energy industry — letting the free market work — will be critical to our shared goal of ensuring low-cost, reliable, and clean power is generated here in Montana for distribution to near and far markets in the coming decades.
- The PSC should review and update, if necessary, utility agreements and requirements pertaining to interconnection standards on a regular basis. **(LC423)**
- A homeowner electrical permit exemption contained in existing statute should not apply to electrical work on grid-tied generators. **(LC424)**
- The PSC should evaluate alternative metering technologies for customers based on grid operability, relatability, and billing considerations. **(LC425)**
- If the PSC changes the current rate structure for net metering, existing customers should be grandfathered into existing rates. **(LC426)**
- Customer-generators that are government entities should be allowed to install net metering systems up to 250 kilowatts in size. **(LC427)**

Background

Net metering involves an electric customer installing a renewable generator at their home or business. Surplus energy generated by the customer-generator goes back on the utility electric system, and the customer receives credit at retail rates for the electricity put back on the system. The customer's meter measures the electricity the customer uses from the utility system less the electricity the customer's system puts back. The terms net-metered generation and distributed generation are often used interchangeably.

Forty-four states have authorized net metering, and utilities in three additional states—Idaho, South Carolina and Texas—have implemented net metering programs. Net metering regulations differ from state to state, and many vary dramatically. In Montana net metering also differs from utility to utility, which is not uncommon. A look at various net metering polices in other Western states is available here.

Members of the ETIC visit NorthWestern Energy's Battery Storage Project in Helena during a Sept. 2015 meeting.

Net metering is available on both the NorthWestern Energy and the Montana-Dakota Utilities systems. Montana's rural electric cooperatives also offer net metering. Montana's net metering statutes codified in Title 69, chapter 8, part 6, MCA, only apply to NorthWestern Energy. Rural electric cooperatives are explicitly exempt from those requirements. MDU is exempt, in large part, as result of the deregulation and partial reregulation of Montana's energy laws in 1997 and 2007. In state law, 69-8-201(4), MCA, furthers this distinction, carving MDU out of Title 69, chapter 8, entirely, with a few exceptions.

Montana's net metering law was enacted in 1999. Renewable installations of less than 50 kW capacity are eligible for net metering on NWE's system. NWE has about 1,500 net metered systems. Montana-Dakota's net metering program is governed by a PSC approved net metering tariff that took effect in June 2008. The provisions of the tariff are similar to the provisions of Title 69, Chapter 8, part 6, MCA, in that capacity is limited to 50 kW and credits are allowed to

carry over for a one-year period. MDU currently has four net-metered customers connected on its Montana system.

Rural electric cooperatives, governed by each cooperative's own board of trustees, establish parameters for net metering systems. In general, cooperatives in Montana agree to allow net metering for customers with generators up to 10 kilowatts in size.

There are many different approaches to state and utility policies with regard to net metering terminology, capacity limits, eligible technology, and net metering credit retention. Capacity limits regulate the system size of net-metered installations. Capacity limits can be determined by a kilowatt-based limit or a percentage limit. As noted, Montana law limits capacity for systems connecting to NWE's system at 50 kilowatts.

State policies also have addressed how long customers can maintain or "roll over" bill credits for net-metered electricity. Most states, including Montana, credit excess generation to the next monthly billing period or allow distributed generation customers to select this option. In Montana and in accordance with current law, at the end of an annual billing cycle the utility eliminates any kilowatt-hour credit balance from the customer-generator's account without compensation.

In recent years, a number of states also have differentiated how net metering policies apply to different customer types. Montana law contemplates the use of conventional net metering, or individual net metering, which connects a generating source to single meter, like a house or building. In other states, expanded net metering policies allow generating sources to be connected to multiple meters or multiple properties. These policies are often referred to as aggregate net metering.

A major factor in the net metering conversation revolves around costs. The net metering law, which applies to NorthWestern, allows the PSC to analyze whether the company will incur direct costs to interconnect net metering systems and to determine whether net costs should be imposed on customer-generators. To date the PSC has not formally completed such an analysis.

As the committee studied net metering, members heard from stakeholders about whether net metering costs a utility more or less than other supplies and what it costs the rest of the ratepayers, if anything, who don't use net metering. Net metering also can reduce both utility

revenues and utility costs. Often these costs and savings can be a factor of the equation used by the stakeholder to make a determination of overall costs and benefits.

Costs and Benefits

The ETIC was charged with determining whether Montana's current net metering policy, and the underlying rate design used by regulated utilities and cooperative utilities, leads to overcompensation or undercompensation, if at all, of net-metered customers. In June 2015, the ETIC sent Montana's regulated utilities, rural electric cooperatives, and the renewable energy industry a set of specific data requests. The ETIC in September 2015 got its first look at the analysis provided by stakeholders.

In analyzing the responses provided to the ETIC, there was little to no agreement among the stakeholders regarding whether net metering creates a cost shift between net-metered customers and customers who do not net meter. There was even less consensus on how to quantify the factors that are necessary to make a determination about cost shifting. A sampling of the responses:

- "NorthWestern has not determined that there are any significant tangible benefits of net metering on its system in its existing form." – NorthWestern Energy
- "Based on our initial analysis it is clear that the economic benefits of net metering far outweigh the revenue impact of net metering." – Montana Renewable Energy Association
- "Net metering arrangements generally do not provide benefits to the system as a whole." – Montana-Dakota Utilities
- "TASC strongly believes that it is premature for Montana to devote the resources necessary to develop a methodology to rigorously analyze the benefits and costs of net metering at this time." – The Alliance for Solar Choice (TASC)

The conflicting views are not unusual and are not unexpected in a review of net metering. Increased net metering reduces utility sales, and in many cases utilities are hesitant to fully recognize the benefits of net metering. The renewable energy industry recognizes benefits that a utility simply may not account for in an assessment of distributed generation.

The Interstate Renewable Energy Council, Inc. (IREC) has published a report that offers information on the methods used in 16 utility-specific studies related to distributed generation.

The report outlines a standardized methodology for valuing generation. The report notes that recent studies of distributed generation or net metering vary based on the assumptions, parameters, and methodologies used. They provide several examples. In Arizona a utility-funded study of net metering found a net solar value of less than 4 cents per kilowatt hour (kWh), and an industry-funded study in Arizona found a net solar value that exceeded 21 cents per kWh. Austin Energy has valued solar at 12.8 cents per kWh — compared to a utility in San Antonio 80 miles away that has valued solar at 5.1 cents per kWh.

IREC finds that valuations in many cases may differ, but it makes recommendations in terms of valuation methodologies to consider. IREC notes that "one point of agreement is that distributed solar generation-related energy benefits are well accepted."[2] IREC also reached three major conclusions:

1. Distributed generation primarily offsets combined-cycle natural gas facilities, and that is what should be reflected in avoided energy costs.
2. Installations are predictable and should be part of utility forecasts for capacity needs. Distributed generation should be credited with capacity value upon interconnection.
3. Societal benefits like job growth, health benefits, and environmental benefits should be included in valuations largely because those are many of the reasons net metering policies are enacted in the first place.

The responses provided to the ETIC about costs and benefits are available here. The committee heard from NorthWestern, MDU, the Montana Rural Electric Cooperatives Association, the Montana Renewable Energy Association, The Alliance for Solar Choice, Renewable Northwest, and the International Brotherhood of Electrical Workers.

The outcome of any analysis depends on the basic assumptions. Those assumptions were very different in the responses received by the ETIC, making an estimation of costs and benefits nearly impossible to forecast. A staff analysis of the questionnaires and responses is available here. Follow-up analysis and questions provided by the Montana PSC, Consumer Counsel, and the Department of Environmental Quality are available here. Because the questionnaires raised more questions than answers, the ETIC ultimately tagged the smaller group discussed previously — the MREA, NorthWestern Energy, and MDU — with working together on a set of

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[2] "A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation," Interstate Renewable Energy Council, Inc. Ràbago Energy, LLC, October 2013.

potential recommendations on the issue. During the process, ETIC member Sen. Pat Connell also requested bill drafts for potential introduction during the 2017 legislative session that focus on net metering. His drafts, LC 10 and LC 11, focus on electrical interconnection requirements and the prevention of any cost-shifting. An overview of his drafts can be found here. The drafts were also the subject of much ETIC discussion throughout the interim.

Rate Design

SJ 12 required the ETIC conduct "a review of the methodologies for valuing power including power produced by the net metering facility and transferred to the utility and power produced by the utility and sold to the person net metering."

Under Montana's current net metering policy, customers are charged for the electricity that they consume or buy from the utility and credited for the kilowatt hours that they put back onto the grid through their generating system in excess of what they consume. Customers are credited at the full retail rate charged to the customer for consumption, with monthly bills netting the difference between how many kilowatt hours were produced and how many were consumed.

Compensation polices or rate designs can be mixed based on different circumstances. Some states and utilities have adopted policies that compensate net-metered customers differently based on the size of a net-metered system, on credits carried forward over a month or a year, or on overall net metering caps. "For example, Minnesota determines net excess generation policies based on the capacity of the distributed generation system while New York differentiates net excess generation policies based on technology."[3] The information in this report is an overview of options, but it is not an exhaustive list of potential rate designs and other regulatory tools.

Net Metering Rate-setting Tools

"Net metering" is a billing mechanism intended as an incentive for distributed, renewable generation. The underlying goal of the net-metered customer is to pay off the cost of installing

[3] http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates

and purchasing a system and to eventually profit from that system in terms of purchasing less electricity.

Owners of net-metered systems are credited for the electricity they produce but don't use, or in other words their net usage. The customer pays the net total of electricity used from the utility minus electricity put back on the grid. A key issue related to net metering is the rate the utility pays for the electricity to the net-metered customer.

A. Retail Rate

While there are a number of variations, customers under net-metered billing are most often reimbursed for their electricity at the full retail rate. In Montana, generation is credited to net-metered customers at the retail rate.

Retail electricity rates include the wholesale cost of electricity and the costs of planning and maintaining the electrical grid. Some entities argue that when net-metered customers receive the full retail price for their electricity, they are not paying the utility for the use of the transmission grid and the services required to provide all customers with reliable electricity. These entities contend that with retail rates, those costs are shifted onto their neighbors who do not net meter. Others argue that the full retail rate is appropriate based on the benefits net metering provides to the overall system.

B. Avoided Cost Rate

The use of avoided cost for net metering is often discussed in conjunction with policies that determine how long customers can roll over or maintain credits for excess net-metered energy — an incentive included in many net metering policies. In Montana, and as it applies to NWE customers, on “January 1, April 1, July 1, or October 1 of each year, as designated by the customer-generator as the beginning date of a 12-month billing period, any remaining unused kilowatt-hour credit accumulated during the previous 12 months must be granted to the electricity supplier, without any compensation to the customer-generator”, in accordance with 69-8-603, MCA.

Avoided cost means the cost at which the utility would either generate the power itself or purchase it from another source. For residential net-metered customers, some states and utilities reconcile excess energy annually by multiplying excess kWh remaining by the "avoided cost of energy". The determined amount is applied to a net-metered customer's account as a monetary credit. "Each state uses a different specific calculation to set avoided-cost rates — for

example, reflecting market characteristics and whether it is a long-run or short-run avoided cost."[4]

C. Demand Charges

A demand charge is aimed at more equitably charging each customer for the service required from the grid closer to that customer's true cost of service. To address the cost of service associated with a net-metered customer's distribution system, some utilities have proposed a basic load capacity charge per kW for residential net metering customers and small commercial net metering customers. "Demand charges are based on maximum electrical demand over time. If electricity were water, demand charges would be based on the size of the pipe, not on how much water flows through it. High demand charges, particularly those calculated over periods of months or years, significantly undermine the economics of commercial solar systems."[5] A demand charge is usually calculated as a rate applied to the maximum amount of energy required by the net-metered customer in a month.

Prior to agreeing to eliminate proposed net metering tariffs from its rate case before the Montana PSC in 2016, MDU proposed a new demand charge on electric customers who own or lease net-metered systems. It would have imposed a residential demand rate of $1.50/kW of billed demand. Small commercial customers also would have paid a demand charge based on the applicable rate under their existing tariff. The billed demand was calculated based on the customer's maximum 15-minute demand in the current month.[6]

D. Fixed Customer Charges

A fixed charge for net-metered customers is implemented in an effort to recover the fixed infrastructure costs that are not tied to volumetric usage. To remove the transmission and distribution components, for example, from the retail rate paid to net metering customers, some utilities may allow retail rates for excess generation but increase a monthly service charge for residential net metering customers and for small commercial net metering customers. "There are currently 48 to 50 rate cases that propose some kind of new increased residential fixed

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[4] "Ratemaking, Solar Value and Solar Net Energy Metering -- A Primer", Solar Electric Power Association.

[5] http://www.seia.org/policy/distributed-solar/utility-rate-structure

[6] Docket No. D2015.6.51, Application of Montana-Dakota Utilities Co. for Authority to Establish Increased Rates for Electric Service in the State of Montana.

charge designed to make up for infrastructure costs not being met by existing rates, said Rusty Haynes, a policy manager at EQ Research."[7]

Fixed charges are generally low and designed to strictly cover direct customer costs. Utilities generally are paid for supply and infrastructure based on the amount of electricity customers use. Some utilities are decreasing variable charges and increasing fixed charges, providing revenue that doesn't fluctuate based on kWh sales. Utilities argue that such a system is appropriate because the majority of their costs are fixed costs. Opponents say that fixed charges reduce incentives for energy efficiency and penalize those who use less energy or have invested in net metering systems.

Alternatives to "Traditional" Net Metering Rate Design

As the debate about net metering heats up across the U.S., utilities and the renewable energy industry are examining other options to appropriately compensate net-metered customers. The alternative is a significant shift from net metering and retail rates. "The negative and polarizing tone of the state-by-state struggle over net metering leaves little room for an honest evaluation of the problem, or the development of a simple, yet comprehensive long-term solution. For example, the solar industry frequently glosses over the fact that net metering can, at times, result in cost shifts. In addition, utility consternation over the ‘cost shift’ of net metering is clearly selective in nature — nearly all utilities offer large discounts to industrial or low-income customers, or allow customers to avoid paying for the true cost of electricity supply on peak. All of these cost shifts are effectively financed by other ratepayers, and are much larger than the 'subsidy' for net metering."[8]

Some entities argue that net metering is a stable and simple model. Others argue that utilities are fighting to limit net metering policies, and while some of their claims are political, it may be appropriate to revisit overall compensation policies. "Net metering offers the additional benefit of administrative simplicity. A single meter capable of sensing energy flow in both directions can be used. No separate calculation is required for the cost or value of the solar generation. Traditional net metering also creates some problems. First, simple netting of energy assigns a

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[7] "A good rate design is hard to find: Experts push utility-solar compromise", Utility Dive, Herman K. Trabish, September 2015.

[8] "The Minimum Bill: A First Step to Fair Utility Rates in a Distributed Energy Age", PV Solar Report, Jim Kennerly.

retail value to local solar energy (at least up to the point of consumption during the netting period), but that value is not necessarily representative of the true value of solar."[9]

A. Value-of-Solar

A value-of-solar tariff is a departure from traditional net metering. It is more complex than net metering, in which a meter simply spins backwards. "A value-of solar tariff clarifies how much energy is sold in each direction (customer to utility and utility to customer) and at what rate the energy is valued."[10]

In general, customers purchase their energy at the utility's retail rate, but customer-generators are compensated for their energy generation at a separate "value-of-solar" rate that is based on dollars per kWh. The rate is intended to capture the benefits of net metering to stakeholders net the costs. The tariff typically relies on a value-of-solar calculation that is annually updated and captures the value of net metering to the utility for a unit of customer-generated energy. It is a break-even value for the net-metered resource. Value-of-solar tariffs also include a netting process, so a utility can recover its costs for serving the customer-generator before applying a credit for the power produced.

Utilities are often supportive of value-of-solar tariffs, noting an ability to separate the amount of power generated by a net-metered customer from the amount of electricity consumed. The tariff also can include utility-specific costs and benefits. Concerns about value-of-solar tariffs are that arriving at a "value" and determining a fair compensation rate can be challenging. In addition, when rates are revisited annually there is a level of uncertainty for customer-generators.

B. Buy All-Sell All or Feed-In Tariff

A feed-in tariff is similar to a value-of-solar approach and also can include aspects of avoided cost. Feed-in tariffs require one extra power meter in order to measure outflow of electricity from a customer-generator's home. With two meters or a smart bidirectional meter, electricity consumption and electricity generation are measured and priced separately.

In some instances a utility provides services to a net-metered customer at retail rates but purchases net metering energy generation from customer-generators at avoided cost or wholesale rates. Determining the rate at which the utility purchases net-metered energy can be controversial. The rate can be based on avoided cost, or wholesale rates, or can be more

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[9] *http://www.solarindustrymag.com/issues/SI1302/FEAT_04_The%20Value%20Of%20Solar.html*

[10] *http://www.nrel.gov/tech_deployment/state_local_governments/basics_value-of-solar_tariffs.html*

comparable to a value-of-solar amount. With a feed-in tariff, some owners of distributed generation can be subject to an income tax on the amount received from utilities. In addition, renewable advocates raise concerns that it can put federal investment tax credits used by the owners of renewable generation at risk.

Utilities often support a feed-in tariff because it allows them to retain sales and revenue. They pass on all the costs associated with purchasing electricity to the customer-generator through the rate.

C. Minimum Monthly Billing

Minimum bills create a baseline bill that all customers pay for up to a certain threshold of monthly usage. A minimum charge also can be structured to maintain the full value of net metering by carrying over credits displaced by the minimum charge in high-production months to lower-production winter time.

GTM Research, the leading expert on the minimum monthly billing concept, concludes that it offers electric utilities a level of certainty that customers will pay at least the minimum bill charge each month, which meets a utility's need to plan and cover fixed costs. With an appropriately established minimum bill, the renewable energy industry also is assured that net metering remains intact and the economics of projects are "minimally" impacted.

GTM Research finds that the minimum bill concept, while similar to a fixed-charge, has only one-third of the impact of the equivalent fixed charge. They explain the billing method as follows:

- If the net energy use is positive, bill for the net energy use at the volumetric electricity rate.
- If the net energy use is negative, bill the customer for zero kWh used and calculate the excess net metering credit. The customer pays the minimum bill charge for the month and carries over any excess net metering credit.
- For the next month in which net energy use is positive, apply any net metering credits down to the minimum bill charge. Carry over any remaining net metering credits.[11]
- Advocates of minimum billing note that it is even more effective when paired with decoupling and time-of-use pricing.

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[11] *http://www.greentechmedia.com/articles/read/why-the-massachusetts-net-metering-compromise-could-be-a-model-for-other-st*

D. Decoupling

Decoupling separates a regulated utility's profits from its total electric or gas sales, so a utility isn't incentivized to sell more electricity or gas. Decoupling is a mechanism used to encourage regulated utilities to support energy efficiency for their customers, but it also can be a tool for incentivizing net metering. With decoupling, utility revenue is established based on an amount needed to cover established costs. Rates are allowed to change with consumption to meet the revenue target. "If utilities' incentives are changed to encourage them to conserve energy rather than sell it in ever-increasing amounts, they become free to encourage energy efficiency improvements and on-site generation among their customers, while continuing to earn healthy profits for their shareholders. When rates are decoupled from profits, utilities and customers are incentivized to work together to conserve energy and build new generation assets as efficiently as possible. Under those conditions, often the best choice for new generation is distributed generation like solar."[12]

In February 2014, the Natural Resources Defense Council (NRDC), a leading environmental organization, and the Edison Electric Institute issued a joint statement focused on decoupling utilities' revenues from the volume of electricity sold. NRDC's support is based on pursuing distributed generation and energy efficiency. From a utility perspective, decoupling can limit the losses a utility incurs due to reduced sales and can stabilize shareholders' returns. Balanced decoupling policies do not shift all fixed cost recovery out of variable unit rates and into fixed monthly or meter charges. Under decoupling, "true-up" adjustments are generally very small, and often caps are included to minimize the magnitude of adjustments. A review of decoupling in Montana is included in a separate report available here.

[12] *http://www.seia.org/policy/distributed-solar/utility-rate-structure*

Safety and Reliability

SJ 12 required the ETIC to review safety and system reliability issues related to net metering. The review included a discussion of the "tangible impacts to line personnel when operating the system with interconnected net metering systems; and testing frequency of devices required at net-metered systems for line personnel and public safety, specifically testing requirements to prevent net-metered systems from back feeding the grid during grid power disruptions." SJ 12 also required the ETIC to review the capacity of net-metered systems that would necessitate real-time communication from net metering systems to the grid operator to properly operate the grid and to assess the benefits, if any, of requiring smart inverters or reviewing electrical code standards to mitigate operational problems, if any, resulting from high saturation of the utility's power delivery system by net metering systems. A report that discusses safety, broader operational matters, and the use of new technologies to address these issues is available here.

ETIC Chairman Keith Regier, right, visits with a representative of the Montana Electric Cooperatives' Association at the Flathead Electric Solar Utility Network community solar project near Kalispell.

In Montana the technical rules and procedures that allow a net-metered customer to interconnect with a utility's system are in 69-8-604, MCA. The PSC also has adopted rules for regulated utilities to follow for interconnection but not using its net metering rulemaking authority.[13]

[13] *Administrative Rules of Montana, 38.5.8401-38.5.8413.*

Standards and Guidelines for Safety

Interconnection standards or procedures are required to ensure the safety of the public, emergency responders, and electric utility workers. These standards must protect the customer-generator's assets, as well as the utility's assets. The majority of state and federal interconnection rules and procedures for net-metered facilities are based on safety and engineering standards from the Institute of Electrical and Electronic Engineers (IEEE) and Underwriters Laboratories (UL). They also incorporate the requirements of the National Electrical Code (NEC). While the standards are viewed as providing a baseline for interconnection and some technical considerations, the standards do not necessarily address broader interconnection issues.

Safety and reliability concerns can often be addressed by requiring verification that generation does not exceed a certain percentage of the minimum feeder load and by requiring customer-generators to perform annual testing in which the net-metered facility is disconnected from the public utility's equipment to ensure that the inverter stops delivering power to the grid. In addition, requirements can include a customer-generator perform all manufacturer-recommended testing or maintenance and require facilities include a lockable disconnect.[14]

Nearly every utility requires a customer-generator meet the NEC and applicable state and local codes. Utilities and cooperatives in Montana are no exception. A significant number of utilities also require a manual, lockable disconnect switch that is accessible to utility workers. In most cases, utilities also require net metering facilities to be inspected and tested before being interconnected to the grid. Beyond the high-level requirements, utility requirements can vary greatly. For example, some utilities require each customer-generator to have a separate transformer and other utilities require synchronizing devices. While some of the standards and procedures are also considered "universal", it is noteworthy that as technology advances and changes, standards and procedures don't always keep up. One solar power advocate, for example, reports that external disconnect switches are unnecessary and an additional cost for systems less than 10 kW. "This is because all inverters that meet IEEE standards automatically detect a power loss and shut down avoiding the safety concerns that a line worker will come into

[14] Institute of Electrical and Electronics Engineers (IEEE). (2003) 1547---2003 IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems.

contact with a line energized by an interconnected PV (photovoltaic) system or other power producing distributed generation system."[15]

Beyond the standards and procedures, interconnection policies used in various states and by various utilities for net metering vary — sometimes greatly — in how those standards and procedures are applied to customer-generators. Some utilities, for example, mandate liability insurance, property easements, and legal indemnification requirements. Metering calibration charges, engineering study fees, or standby charges also are required in some instances. Some public utility commissions and state legislatures, for example, have determined that liability insurance requirements are burdensome. A more detailed review of issues concerning liability insurance requirements and indemnification is available here.

Some utility and state policies establish standard timelines for completion of steps required for interconnection. Montana's rules for regulated utilities include specific timelines for interconnection depending on the size of a system. The timelines are aimed at accommodating the needs of utilities to process requests while ensuring a customer-generator's request is handled within an appropriate timeframe. "For developers, the interconnection process is one of the most time-consuming and costly aspects of developing a generating facility."[16]

Montana Interconnection Agreements

In July 2010, the PSC adopted interconnection rules, effective August 13, 2010, for small generators. The rules were updated "to provide an efficient, transparent, and uniform process by which small generators may connect to the electrical grid and to implement Section 1254 of the Electricity Modernization Act of 2005". The rules, which apply to both MDU and NorthWestern Energy, establish four levels of review for interconnection. Level 1 is a "fast track" review for systems that are 50 kW or less. Level 2 is an "expedited" review for systems 2 MW or less. Level 3 establishes a process for interconnection requests to radial distribution circuits where power is not exported. Aggregate load also must be less than 50 kW and use reverse power

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[15] "Freeing the Grid: Best Practices in State Net Metering Policies and Interconnection Procedures", Interstate Renewable Energy Council and Vote Solar Initiative, November 2012, page 18.

[16] Kevin Fox, Sky Stanfield, Laurel Varnado, and Thad Culley, Keyes Fox & Wiedman LLP; Michael Sheerhan, Failte Group LLC, and Michael Coddington, National Renewable Energy Laboratory, "Updating Small Generator Interconnection Procedures for New Market Conditions," National Renewable Energy Laboratory, U.S. Department of Energy, December 2012, page 2.

relays or other protection functions. Level 4 provides for interconnection under 10 MW that doesn't fall under the other three levels.

Net-metered facilities in Montana are limited in size to 50 kW for NorthWestern and MDU customers. More traditional net-metered customer-generators would likely interconnect using the Level 1 review process. The interconnection rules establish technical qualifications for a system 50 kW or less, including a requirement than small generators have an external utility disconnect switch for all interconnections.

While the rules establish a solid process for interconnection that applies to both NorthWestern and MDU and applies to net-metered customers, neither utility is complying with the rules in terms of net metering. Technical aspects are currently included in interconnection agreements for Montana utilities, but net metering applications for NorthWestern are handled separately from interconnection requests. Requirements that standard forms, fees, and certain other paperwork aspects of the rule — as applied to net metering — are not currently addressed by Montana's regulated utilities.

In late 2015, after the PSC determined that its rules regarding interconnection were not being enforced, the commission reached out to both NorthWestern Energy and MDU. Both utilities are in the process of updating their interconnection agreements and guidelines for interconnection of net-metered facilities. The PSC will ensure that those agreements comply with PSC rules. The new interconnection agreements are expected in 2016.

NorthWestern Energy currently spells out guidelines for net metering in a net metering request form. Montana-Dakota Utilities, through a Public Service Commission tariff, also requires customer-generators to sign an interconnection agreement. Both MDU and NorthWestern are revising those forms and agreements to better address safety, reliability, and to create consistency for customers.

Rural electric cooperatives in Montana have adopted a uniform net metering policy with interconnection guidelines, although individual cooperatives may choose to modify this policy. As an example, the Sun River Electric Cooperative's interconnection application requires a certified professional engineer to review and approve a customer-generator's facility. The review includes "safety considerations relevant to both parties, the feasibility of such interconnection

and benefits of such, for both the member and the cooperative." The agreement also requires indemnification and liability insurance.[17]

Advancing Interconnection Standards

The IEEE and UL standards previously discussed are focused largely on matters of safety and reliability. However, there are additional technical issues related to net-metered facilities. For example, the standards often implemented by utilities typically require a net metering facility's inverters disconnect from the grid at any sign of instability. While promoting safety, the standards can undermine the ability of photovoltaic power, for example, to contribute to grid stability. Smart or advanced inverters are considered by many in the industry to be the key to addressing this issue. An inverter changes direct current to alternating current. This is a critical component for a net metering facility. Renewable energy facilities rely on inverters to connect to the grid. "With smarter inverters capable of contributing to grid stability, utilities stand to gain the monitoring and control they need to successfully integrate PV power on a large-scale distributed basis."[18]

A smart inverter is capable of bidirectional communication. Advanced or smart inverters have the ability to:

- Maintain a net-metered facilities connection to the grid, rather than disconnecting during minor voltage disturbances;
- Produce power and generate or consume reactive power to assist during voltage swings; and
- Facilitate real-time communication, allowing utilities or customer-generators to remotely access systems to meet the needs of the grid.

In 2014, the IEEE amended its standards to allow for advanced capabilities for voltage regulation support and voltage and frequency ride-through. The IEEE is continuing to work on

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[17] *Sun River Electric Cooperative Interconnection Application and Sun River Electric Cooperative, Inc., Policy #314 Customer Owned Generation, December 2008.*

[18] *"Laying the Foundation for the Grid-Tied Smart Inverter of the Future," Advanced Energy, 2011.*

updates to its standards to better address advanced inverter capabilities. The IEEE process is expected to be completed before 2018.[19]

There are also a number of studies ongoing in the country, led primarily by the U.S. Department of Energy, as well as within various utilities and utility and solar organizations to examine the use of advanced metering. “As the penetration level increases for PV generation, and as more sophisticated rules for interconnection emerge, it has become clear that harnessing these inverter capabilities will be key to the successful implementation of large-scale PV generation in distribution systems.”[20]

The Western Electric Industry Leaders (WEIL) organization, a group of utility executive leaders, has endorsed the use of advanced inverters and has urged their installation on all new PV. “We feel that this change is well worth the small cost to the consumers who choose to use solar installations. For a solar installation costing $12,000, these new smart inverters will only cost about $150 more than the current inverters, approximately 1% of the overall cost.”[21]

While the use of advanced meters appears to be a potential benefit to the owners of distribution systems, the technology also raises questions for customer-generators to consider. Customer-generators with smart inverters ultimately provide ancillary services to utilities, can incur additional operating costs, and may lose private power generation. There are also policy considerations related to requirements for advanced inverters, “including compensation to generators for grid services provided, requirements for availability of grid services by inverter-based systems, system disconnect and operation standards, and inverter ownership structures.”

If net-metered facilities are required to use smart inverters to contribute to voltage control on the distribution circuit, there are questions as to whether the customer-generator should be paid for their service to the grid. If smart inverters also require a customer-generator to curtail generation, then options also may need to be developed to compensate customer-generators for lost revenue. Advanced meters also are not the only answer to integrating a growing number

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[19] Thomas Basso, IEEE 1547 and 2030 Standards for Distributed Energy Resources Interconnection and Interoperability with the Electricity Grid, National Renewable Energy Laboratory, U.S. Department of Energy, December 2014.

[20] Colin Schauder, “Advanced Inverter Technology for High Penetration Levels of PV Generation in Distribution Systems,” National Renewable Energy Laboratory, U.S. Department of Energy, March 2014, page 5.

[21] Western Electric Industry Leaders, letter to governors, commissioners, and legislators, August 2013.

of net-metered facilities to the grid. “Other mechanisms to support increasing levels of distributed generation, such as grid upgrades and the adoption of energy storage will have to be considered as well. Nevertheless, advanced inverters represent an option that is available, operational, and potentially cost-effective in the near term.”[22]

Montana’s net metering policy does not include any capacity or saturation limits related to interconnection; however, the interconnection rules adopted by the PSC clearly contemplate some saturation at least in specific distribution areas. NorthWestern Energy estimates its 2016 peak load at about 1,225 MW. Net-metered facilities represent about 7.7 MW on the NorthWestern system. It is unknown at this time if net-metered facilities are concentrated on certain distribution circuits in Montana and worthy of a more in-depth interconnection review. With such minimal saturation, however, it is unlikely.

Economic Impacts

SJ 12 required the ETIC to examine economic development impacts of net metering systems by reviewing revenue generated by businesses that sell and install net-metered systems in Montana, analyzing employment statistics for businesses that sell and install net-metered systems in Montana, and reviewing tax revenue generated by net metering systems, including the increased taxable value of residential and commercial properties with net-metered systems.

Net metering contributes to jobs and economic output, but capturing the specific number of jobs created or tagging exact property and income tax benefits in Montana requires extensive modeling and analysis. Certain baseline economic impacts can be established by accounting for changes in employment and tax revenues that are influenced by net metering in Montana.

According to the Solar Energy Industries Association (SEIA), which advocates for solar energy in the U.S., “net metering provides substantial statewide economic benefits in terms of jobs, income, and investment. Net metering increases demand for solar energy systems, which in turn creates jobs for the installers, electricians, and manufacturers who work in the solar supply

[22] *“Advanced Inverter Functions to Support High Levels of Distributed Solar,” National Renewable Energy Laboratory, U.S. Department of Energy, November 2014.*

chain. Today, the solar industry employs nearly 174,000 American workers in large part due to strong state net metering policies which have allowed the solar industry to thrive."[23]

Revenue Generated by Businesses that Sell and Install

The Solar Energy Industries Association analyzes state-level solar jobs in existence for each state. In 2014, SEIA determined that $4 million was invested on solar installations in Montana. It found that there are 37 solar companies working in Montana that employ about 300 people. "These companies provide a wide variety of solar products and services ranging from solar system installations to the manufacturing of components used in photovoltaic panels. Solar firms in this state can be broken down across the following categories: five manufacturers, 27 contractor/installers, two distributors, and three engaged in other solar activities including financing, engineering, and legal support."[24]

The Montana Renewable Energy Association estimates the monetary value of net metering and includes tax credits, avoided carbon dioxide emissions, and property values. "MREA's preliminary analysis shows the net monetary value to Montana's economy from the net metering systems installed to date is more than $19,699,732." **Table 1** outlines the economic impacts. The table does not account for wind installations and focuses only on NorthWestern Energy's service territory. A net present value estimate would be significantly higher. For example, the MREA analysis does not account for the benefits over the lifetime of a system or bill savings noted in the chart. "The additional economic impact of returning these bill savings to the Montana economy is not accounted for in this analysis but should not be ignored by the Legislature," according to MREA. The installation sales revenue is estimated by multiplying the average installed cost, based on an assessment by the National Renewable Energy Laboratory (NREL) by total installations each year. MREA finds that revenue enters Montana's economy through wages, equipment purchases, office rentals, building permits, corporate and payroll taxes, and other means.

NREL also has examined the effects of state policies on the development of solar markets. They found that states experienced more robust markets with the implementation of interconnection and net metering. "Although these policies alone are not usually sufficient to

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[23] *http://www.seia.org/policy/distributed-solar/net-metering*

[24] *http://www.seia.org/state-solar-policy/montana*

spur solar markets, they are foundational for distributed generation market growth." They found rapid increases in solar markets in states that had best practices for net metering and interconnection and implemented additional set-asides or programs to promote solar.[25]

Benefits and Costs	2014	2000-2014
Benefits		
Bill savings	$597,650	$2,673,305
Installation sales revenue	$3,538,384	$29,949,178
Increased residential property value	$2,830,707	$9,987,000
Value of avoided CO2 emissions	$125,337	---
Costs		
Montana income tax credits	($161,000)	($1,095,000)
USB renewable energy and R&D allocations	($1,427,821)	($19,141,446*)
Totals		
Total Benefits	$6,494,428	$39,936,178
Total Costs	($1,588,821)	($20,236,446)
Net Economic Impact	$4,905,607	$19,699,732

Table 1*: Source: MREA Net Metering Questionnaire, September 2015. *Notes allocations from 1999-2014.*

Employment Statistics

In December 2014 MREA surveyed renewable energy installation businesses and identified at least 92 full-time jobs and 71 part-time or seasonal jobs. The median salary for full-time jobs was $40,000 to $49,000, and the median wage for part-time positions was at $20-$29/hour. "The respondents hired a total of 284 subcontractors each year, including electricians, roofers, engineers, architects, excavators, and concrete contractors."

[25] *"The Effect of State Policy Suites on the Development of Solar Markets," Steward and Doris, National Renewable Energy Laboratory, U.S. Department of Energy, November 2014.*

In 2013, the Solar Foundation found solar industry employment grew by 53%, with nearly 50,000 new solar jobs since tracking started in 2010. Their research indicated that 77% of the 24,000 new solar workers since September 2012 were new jobs, as opposed to existing positions that added solar responsibilities. In terms of wages, "The typical solar installer is reported to earn between $20.00 (median) and $23.63 (mean) per hour, which is commensurate with wages paid to skilled electricians and plumbers and significantly higher than roofers, carpenters, and other construction laborers."[26]

Specific data for Montana concerning employment statistics and potential employment is offered in a report prepared by the Montana Environmental Information Center and Sierra Club. "Employment Effects of Clean Energy Investments in Montana" was released in June 2014 and prepared by Synapse Energy Economics, Inc. based in Massachusetts. In the report, employment is assessed in terms of jobs created per "average megawatt" (aMW) of energy produced over the next 20 years. The report found that for initial construction and installation, "Solar PV generates the largest job impact per aMW, by far, with 136 job-years for small-scale projects". Synapse also determined jobs associated with annual operations and maintenance of various resources measured in jobs per aMW. Small-scale solar again was the leader in job creation at 2.4 jobs per aMW.[27]

Synapse ultimately combined the construction jobs and operation and maintenance jobs into one cumulative employment impact per aMW. **Table 2** prepared by Synapse provides "start to finish" measure of the 20-year annual average jobs created per aMW. Small solar PV was the leader generating 9.2 jobs per aMW per year on average.

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[26] http://pre.thesolarfoundation.org/sites/thesolarfoundation.org/files/TSF%20Solar%20Jobs%20Census%202013.pdf

[27] "Employment Effects of Clean Energy Investments in Montana," Prepared for Montana Environmental Information Center and Sierra Club, Comings, Fields, Takahashi, Keith, June 2014.

Jobs/aMW	Construction	O&M	Total
Small PV	6.8	2.4	9.2
Large PV	3.5	1.5	5.0
Wind	0.7	0.7	1.5
Energy Efficiency	0.9	0.2	1.2

Table 2: *Source: Synapse and NREL JEDI Model (industry spending patterns), IMPLAN (industry multipliers).*

Tax Revenue Generated by Net Metering

Montana-specific information concerning increased property values based on net-metered generation is not available. The Montana Department of Revenue (DOR) does not have specific information on the valuation of homes with rooftop solar. The DOR indicates that at this time it is not aware of appraisers adding value as a result of solar PV systems.

DOR indicates that the modeling used for most appraisals is based on comparative sales. At this time in Montana, there are not enough solar installations to necessarily change the model that is used by the department to incorporate solar systems. In some southwestern states, where solar installations are much more common than in Montana, appraisers are grappling with appraisal challenges, including homes with PV leases or power purchase agreements. The Appraisal Institute offers some information on the subject. In 2012 the institute expressed its support for developing tools to assist appraisers. “Finding a way to value residential and commercial properties with PV installations is a growing challenge facing the nation’s real estate industry. As more homes and businesses turn to solar power, the need grows for ways to develop reliable and credible opinions of value of the installations and the power they generate.”[28]

Fannie Mae also is addressing increased solar values. They have offered a guideline that specifies that if a home has a solar system that is owned as opposed to leased, appraisers

[7] *http://www.appraisalinstitute.org/appraisal-institute-announces-support-for-new-solar-valuation-form/*

should analyze the system and the market where the system is located to determine if it adds value.[29]

In a report prepared by Clean Power Research for New Jersey and Pennsylvania, tax revenue enhancements from jobs created due to PV-induced economic development were considered. "In Pennsylvania and New Jersey, this low estimate amounts to respectively $39 and $40 per MWH, even under the very conservative, but thus far realistic, assumption that 80% of the PV manufacturing jobs would be either out-of-state or foreign."[30]

Tax Incentives

When contemplating taxes, various tax incentives also must be considered. In California, for example, property tax increases resulting from adding solar are prohibited, based on California tax law. Montana provides a partial abatement of property tax attributable to a solar installation using various assessment methods.

At least 30 states offer a type of property tax incentive for solar installations. In many places the incentives simply exclude the added value of distributed generation equipment, like solar panels, from the value of the property for taxation purposes. Montana offers tax exemptions for certain types of energy investments. The total amount of exemption is not estimated by the DOR because they are made up elsewhere in local mills.

Montana offers a property tax exemption for buildings using renewable energy, with certain amounts of residential and nonresidential structures exempt from property tax increases resulting from the installation of a renewable energy system. The exemption is for 10 years, based on an investment of $20,000 for single family homeowners and $100,000 for multi-family and nonresidential facilities.[31] These amounts are not estimated by the Montana DOR because they are made up in local mills.

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[29] *https://www.fanniemae.com/content/guide/selling/b2/3/04.html*

[30] *"The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania," Clean Power Research, Mid-Atlantic Solar Energy Industries Association and Pennsylvania Solar Energy Industries Association, Perez, Norris, Hoff, November 2012.*

[31] *15-6-224, MCA.*

The Montana Department of Revenue does not have specific information on the valuation of homes with rooftop solar. The DOR indicates that at this time it is not aware of appraisers adding value as a result of solar PV systems.

In Montana an alternative energy systems credit allows residential taxpayers who install renewable energy systems, such as net-metered systems, on their property to seek a tax credit equal to the investment and installation cost, up to $500 per individual.[32] In 2014 this credit was claimed by 1,070 taxpayers for a total of $617,949. It is difficult to determine how often the tax credit is used specifically by net-metered customers. The MREA estimated that if every owner of a net-metered system in Montana claimed the full credit, the total would be $161,000 in credits for 2014 or $1.1 million in credits from 2000-2014.

A federal tax credit is also available offering an energy tax credit of 30% of the total expenses, which include installation of residential or commercial renewable systems and labor expenses. There is no maximum limit for solar electric and thermal systems, and if there is excess federal tax credit, it may be carried over to the subsequent taxable year. The federal credit may continue on through consecutive years until 2016, when the residential credit is expected to expire.

Other Incentives

SJ 12 required the ETIC to conduct a review of "subsidies, if any, provided in the form of tax credits, abatements, deductions, and state and federal grant or loan programs." The review also was to include information about the use of Montana's universal system benefits (USB) program for net metering. Information about the various tax credits, deductions, and other programs is available in the form of a chart here.

The ETIC is statutorily required to review the USB program. USB requires all utilities in Montana to spend money on activities related to energy conservation, renewable energy projects, and low-income energy assistance. USB legislation was enacted in 1997 in an effort to ensure the continued existence of public purpose programs by regulated utilities. USB money is collected through customer bills and began in 1999. Montana's USB program includes funding for renewable resource projects and applications. Historically, USB money played a significant role in leveraging private net metering investments, but that role is declining.

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[32] *15-32-201, MCA.*

NorthWestern Energy's 2014 USB report noted that the fixed dollar per watt USB incentive and the process of awarding residential renewable incentives was restructured. As solar installation costs decline, the incentive also declined from $3 per watt to $1.50 per watt, according to NorthWestern. The maximum incentive remained capped at $6,000 per system, resulting in customers installing larger systems, according to NorthWestern.

Senate Bill 150, passed and approved by the 2015 Legislature, directs utilities to allocate 50% of its USB collections to low-income energy and weatherization assistance, as opposed to 17% in the past. With the legislative change, NorthWestern Energy proportionally reduced its contributions to the other USB categories, including renewable resource projects. NorthWestern has since proposed the elimination of all USB grants to commercial and private customers for net-metering projects. Nonprofit organizations, government entities, and schools may still be awarded grants for net metering projects.

Montana also provides loans to individuals, small businesses, units of local government, units of the university system, and nonprofit organizations to install alternative energy systems that generate energy for their own use or for capital investments for energy conservation purposes when done in conjunction with alternative energy systems.[33] Loans up to a maximum of $40,000 must be repaid within 10 years. The program is funded by air quality penalties collected by the Department of Environmental Quality, and the DEQ administers the program. Loans can be used for net metering.

In fiscal year 2015, DEQ received 49 applications. Forty-seven loans closed for a total of $1,185,750. One application was approved, but was not funded because the applicant's homeowners association did not approve the solar installation. Since the first loan was made in 2004, the program loaned about $8.3 million. The program is primarily used by individuals. In 2015, four applications were for commercial projects. Also in 2015, 34 of the loans were for solar photovoltaic projects, or at least included a solar PV component. Since the program began, DEQ has issued loans for about 188 net-metered projects, out of the 330 loans funded. Multiple technologies are often funded with a single loan.

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[33] *75-25-101, MCA.*