The Practical Applications of Net Energy Metering (NEM)

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Recommendations:

Currently the Net Energy Metering (NEM) law in accordance to Montana state policy caps the amount of energy reimbursable by utility companies for personal production of energy. The goal of the capstone class policy group is to put forth two possible recommendations to support legislation by Congressman Mike Phillips that improves upon the NEM policy. The first option is to keep a hard cap on the generation of renewable energy, but to raise the cap from 50 kW to 100kW. This would be beneficial for commercial and industrial applications that exceed energy production of 50kW. Raising the cap from 50kW to 100kW seems like a small change, however, it would provide the opportunity for commercial and industrial entities to reduce their carbon footprint. The stipulation of this first option is that the generator of the energy is allowed to 'spread the wealth' to neighboring properties in an attempt to provide a larger network of clean energy. This form of aggregate net energy metering allows utility energy customers the opportunity to utilize renewable energy generation in locations where their resources for personal energy production and distribution are limited.

The second option is to remove the cap on how much energy a private producer can be compensated for from the utility companies. While this would fare extremely well with the customer in an attempt to reduce their non-renewable energy consumption, it does not fare well for the energy companies. By completely allowing a private producer to partially utilize the grid for themselves, there will be some harm to the investor-owned utility companies and fossil fuel industry. The second option would contain a provision to remove the ability for a private producer to sell/ provide for surrounding properties and require them to only deal with the public energy companies themselves. We feel the two options give enough flexibility to both the user and the energy companies along with enough room for negotiation for future endeavors.

What is Net Metering?

The ultimate goal of renewable energy is for the general public's energy use to be self-sustaining. Doing so allows the users to plug energy back into the grid, and potentially eliminate or reduce their energy bills. People can get reimbursed by their energy provider for the energy they generate by three mechanisms: feed in tariffs, net purchase and sales system, and net metering (Yamamoto 2012). This paper will focus primarily on net metering, however, the differences between all three are important to keep in mind as a matter of perspective. With the first mechanism (feed-in tariffs) the energy company agrees to pay for *all* energy generated by the renewable source at a set rate for a certain number of years, determined by the agreement between the private producer and utility company. During that period, the energy company is buying all of the home-produced energy while the user still pays their energy bills in full through the agreement date (Yamamoto 2012).

In the net purchase and sale model, the energy generation is compared on a moment-by-moment basis. During a given period of time (hourly, daily etc.), any surplus produced by a household above what they require is credited back to the house on their next bill. Net Metering or NEM on the other hand is only done on a month-to-month basis. Unlike the purchase and sales model, the meter is only checked once a month along with the normal energy bill. If the energy produced exceeds what was used, the energy will be credited back to the household. If the household fails to exceed their consumption, they are then charged for the difference (Yamamoto 2012).

Renewable energy was a popular trend back in the mid 90's. An article in a 2005 issue of the Electric Journal called '*The Giant Headache that is Net Metering*' points out that PV solar panels started to emerge in particularly well lit regions that stayed light during long summer days and longer times during the winter months. Net metering was created for energy companies to monitor and reward those with the money to install and maintain solar panels. However the application of PV panels quickly outgrew the idea of net metering, so much so that some schools in California were, in a sense, fully utilizing the idea to their benefit. The schools would stockpile credits from the panels during the summer months when their energy usage was at a minimum and apply them during high usage months, in essence beating the system (Electricity Journal 2005).

Recently, stipulations have been put in place to circumvent these issues. Policies were created to stop schools from banking credits all summer to spend during the school year in their attempt to reduce their energy bill to nearly nothing. In a similar sense the credits individuals or private entities receive have stipulations that all credits used have an expiration, putting a limit on how long and how many a user can accumulate. Once past the expiration date, the user goes back to zero credits to start accumulating again. Overall, the goal of the energy companies is not to punish the user for having their own source of energy, but to "encourage private investment into renewable resources" (Stoutenborough & Beverlin 2008).

State Regulation:

Net metering policies have been established in 44 states in the U.S. (Durkay 2014). In Montana, the net metering law was enacted in 1999 for all customers of investor-owned utilities. These include companies like NorthWestern Energy and Montana-Dakota Utilities systems. In 2008, the policy was revised to include 26 Montana electric cooperatives. Each member of an energy cooperative is part owner and investor of the energy company (Berry 1994).

As of 2013, the main topics of Montana State Code 69-8-103 are as follows:

"Net metering system" means a facility for the production of electrical energy that:

(a) uses as its fuel solar, wind, or hydropower;

(b) has a generating capacity of not more than 50 kilowatts;

(c) is located on the customer-generator's premises;

(d) operates in parallel with the utility's distribution facilities; and

(e) is intended primarily to offset part or all of the customer-generator's requirements for electricity.

To summarize, there is a generating capacity cap of 50 kilowatts for systems that generate energy by solar, wind or hydropower that feed into the utility company mainframes. 50kW is enough to power 8-10 homes in Montana. These systems have to be located on the property of the customer who is producing the energy as a way to offset their electricity costs. These systems also need to work alongside the utility transmission and distribution lines in

order to capture the energy created and to send it through the utilities energy grid. The cap for energy cooperatives is a 10kW capacity system. Energy produced by the renewables in the member-owned cooperatives can come from multiple locations as well as be used for multiple locations unlike the utility system policy. The cap is lowered for energy cooperatives likely because of the business competition they create between utility companies and themselves.

There have been attempts to raise the cap for commercial and industrial businesses whose inputs of electricity exceed 50kW. In 2012 Senator Mike Phillips proposed an amendment (SB 247) to the Montana Code 69-8-103 during the state senate legislative session. Section 2 of this policy allows energy companies to absorb customer credits earned after the 12-month billing period is over. The amendment consisted of eliminating all of section 2 and raising the electricity production cap of 50kW to 100kW. Another policy that was considered to be eliminated was a statement that allows customers to produce energy and sell it to the utility company only if it is on the land they are using the electricity on or abutting, contiguous land. The Phillips amendment was not passed in the Montana State Senate in March of 2013, although the final count was close, with 24 votes for and 26 votes against the amendment.

Pros:

There are benefits for both the private producers and energy companies in allowing a greater amount of power generation by renewables. The consumer makes the initial investment in the renewable energy system (most commonly PV solar panels) which is generally the most expensive part of generating clean energy. Once the initial investment is made, the energy company allows the individual to generate their own clean energy which is then returned to the grid in return for credits which can be applied towards lowering their energy bill (Stoutenborough & Beverlin 2008). The individual pays off the initial investment with hopes of seeing a positive gain and return on that investment. The monetary return is not necessarily the reason people install renewable systems. The personal choice to live sustainably is often more important than the monetary investment in renewables (Ekundayo et al. 2011).

The advantage for the energy company is more theoretical: the excess energy produced by the customer is less than what is required for that given area. No reliance exists on the amount of power a customer produces in order to run a utility system efficiently. The likelihood

that a utility company will turn around and down size their power generation for the sake of a few houses is relativity slim. The reduction in power needed to a certain area does lend itself well to the idea that the power company is cutting down on its carbon emission in that area and making positive strides to encourage more individuals to start generating their own clean energy (Gupta et al. 2009).

Cons:

Most of those opposed to NEM are utility companies for a number of reasons but there are also features of the process that can disincentivize customers from participating as well. The utility companies are concerned with losing revenue due to a loss of subsidies for the energy generated for them by their regular consumers. The state policies governing NEM also harm public energy producers because of the limits on energy production for credit and potential energy credit losses.

Utility customers that generate energy can send it back to their utility company via the electrical grid for credit. Energy credits can equal the value of their payments per kWh cost of energy from the utility company as a retail price paying customer of the utility company. Utility companies believe that customers participating in NEM are inadvertently receiving subsidies. The retail prices that the utility company generates includes the cost of transmission and distribution, administration, and profits in addition to a utilities energy cost (Wan & Green 1998). The renewable energy that the public creates only feeds energy into the grid. They do not contribute to the maintenance of the grid or the work on the power lines that connect the systems. Since the power companies are normally subsidized by the federal government for their work and maintenance, the customer inputting energy is instead getting the subsidy (Adeyeye et al .2009).

Special materials and equipment are needed to connect the privately produced energy to the power company's mainframe which can lead to safety concerns because the energy company's infrastructure is not accustomed to adding publically generated energy to their bigger production systems. The customer has to pay for the installation and connection of their renewable energy system with the utility company's mainframe but after the installation, the maintenance at the mainframe connection point is the responsibility of the utility companies.

By having more than one connection point for energy input into the grid, the chances of energy shorts and problems with the system increase exponentially.

The downside to the consumer is that even though the energy they are feeding into the system is equal to the price of the energy they would be consuming, their maintenance and start-up costs of the renewable energy system are not added into the equation. The subsidy they are supposedly getting transferred from the energy company is drawn down by other costs to the renewable energy unit. Even though some residential and commercial units are partially subsidized, it rarely covers the full cost of the solar panels or other renewable energy features (DEQ 2013). Another disadvantage to the customer is the credit accumulation from their excess energy production is set at 12 months. Once the 12-month period has passed, any extra credits are granted to the utility company for no compensation (DSIRE, 2014). Big commercial and industrial businesses suffer because they need more than the 50kW capacity limit to run their buildings. By having the cap on energy credits, the amount of potential renewable energy produced decreases because the businesses would not economically be able to sustain a higher energy production system without getting paid back for all the energy it produced. The Montana net metering law also tends to be a problem for consumers because it confines locations that these systems can be used on for credit. Farmers that have lands not adjacent to their housing and electrical usage locations cannot use the energy produced on those lands for energy credits. This creates a huge deterrent to landowners that have valuable property capable of producing a lot of renewable energy. Both consumers and utility companies can experience negative feedbacks from net metering that can disincentivize their use and production of renewable energy.

In general, we feel that NEM policy needs to change in order to benefit more of society. This is currently being pursued by members of both parties in Montana State Legislature for the 2015 legislative session. Even though there are pros and cons to NEM, we believe that there are more benefits to raising or eliminating the current cap of 50kW. We also realize that at this time it may not be completely feasible to get rid of the cap; however, strides should be taken to raise the cap to make it more beneficial for private producers.

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