

NET METERING: GETTING BEYOND THE CONTROVERSY

David Schmitt

Indiana University School of Law-Indianapolis 2010

Introduction

Net metering is a relatively new technology with many controversies over the implementation of the program. The definition of “net metering” is a mechanism that measures the amount of electricity produced by a customer’s generator. It is one of several legal and policy tools that are used by regulators and legislatures to promote the use of renewable energy.¹

The federal government, states, cities, and utilities have either adopted or have proposed net metering regulations. Many of these new or intended regulations will effect the implementation of net metering in the various entities. As of today, the implementation of net metering is predominantly at the state level although many states differ on their approach to net metering.

The biggest controversy regarding net metering is the method of calculating the reimbursement to the customer for the electricity produced by that customer’s generator. However, other aspects of net metering may also become controversial as net metering grows in popularity. These controversies include who can net meter; which utilities must offer net metering; the size of the customer’s generator; how much capacity system wide for net metering is available; what technologies qualify for net metering; who owns the renewable energy credits produced; and if meter aggregation is available to the customer. The status of net metering in a particular state is determined by the concern over utility bypass, the desire to have private investment in renewable energy, and other policy concerns. Since net metering is now decided at the state level, the effectiveness and design of the program is dependent on the individual state.²

There are important questions that must be resolved by the states before net metering is

implemented. Each state must decide “whether to subsidize DR [distributed resources] via net metering, and how to fairly charge for the cost of interconnection and use of the grid.”³ In addition, the states must determine how to structure their program so that it meets the goal of providing private distributed renewable energy in a way that does the least harm to utilities. How each state answers these questions will determine how the state implements net metering.

The controversies over net metering are best attributed to the fact that it and other distributed resources are disruptive technologies. This disruption may be similar to the introduction of cell phones and the effect on the business model of the telecommunications industry.⁴ These disruptive technologies are changing the way utilities, consumers, and the community view the way in which electricity should be generated. Net metering will represent a financial gain for those engaged in distributed renewable energy generation because it allows them to receive the highest price for the energy they generate.⁵

Defining the differences between Net Metering and Net Billing

There are various definitions of net metering. An Ohio court defines net metering as “measuring the difference in an applicable billing period between the electricity supplied by an electric service provider and the electricity generated by a customer-generator which is fed back to the electric service provider.”⁶ Net metering is also defined by the Public Utilities Regulatory Policies Act (PURPA) as a “service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.”⁷ For this paper, net metering is defined as a policy whereby the utility reimburses the customer-generator for the net electricity produced by the customer in a given billing period.

With net metering, the same meter is used to measure both the electricity used and produced by the customer. In contrast, there exists the concept of separate billing, or net billing (henceforth net billing will be used for both) which uses two meters instead of net metering's one meter. In net billing, one meter is used to measure the power flowing from the utility company, and the other meter measures the power produced by the customer.⁸ The result of using two meters is the ability to use separate rates for each meter. These rates are then calculated and the resulting dollar amounts are setoff from each other, and the net amount is the price the customer has to pay.⁹ The difference between the two billing methods is seen in the following example: assuming that in a given billing period, the customer and the utility each produce the same amount of electricity. Under the net metering approach, the customer owes nothing to the utility company. However, under the net billing method, the customer owes money to the utility company.¹⁰ This happens because the customer is paying the retail rate for the consumed electricity but the power that is produced by the customer is purchased back by the utility company at a lesser rate.¹¹ Net billing has higher administrative expenses associated with it than net metering.¹² Net billing has not been the favored method by states as all states have elected to use net metering.

Why Is Net Metering Controversial?

Communities and customers tend to either favor net metering or are indifferent about its implementation. Utilities tend to be more hostile towards its implementation. The primary reason why net metering is controversial with many utilities is it affects the revenue the utility receives from its customer base. The utilities other concerns with net metering range from cross-subsidization, utility bypass, to other issues. These concerns have caused utilities to either actively oppose net metering or try to limit its effect on the utility.¹³

The utility is concerned because net metering customers may not be paying for the upkeep of the grid thus forcing the utility to seek other ways to recoup the lost revenue. These customers are known to the utilities as “free riders”. These free riders cause the utility company to either (1) absorb the cost of the transmission and distribution costs of the free rider; (2) pass along the costs to the non-net metering customers; or (3) assess a fee against the net metering customer.

A current example of the problems associated with net metering happened with a utility company in Colorado. Xcel planned on charging customers a fee on those who installed solar systems after 2010. The fee would be assessed to the customer’s peak electrical consumption.¹⁴ Xcel argued that the generating customers are free riding on the investment of the utility company as these customers do not pay any generation or transmission fees.¹⁵ However, Xcel would be liable to provide backup power when the solar panels could not meet the demand.¹⁶ As Tom Henley, an Xcel spokesperson explains, “These customers are connected to the grid and yet they’re not paying for the infrastructure.”¹⁷ Therefore, the electrical utilities believe that customers who engage in net metering receive more benefits than the non-net metering customers. This analysis is disputed by renewable energy and net metering activists who argue

that it helps Xcel when energy demands are the highest, which happens in late afternoon.¹⁸

Opponents fear that the fee is a penalty for green customers and that it may create a negative incentive on solar power production.¹⁹ Xcel disputes this claim arguing that solar power produces the most electricity at noon which is not the time of peak demand.²⁰

Other utility groups also have concerns with net metering. A spokesperson for the Edison Institute, an association of investor owned utilities, said,

[e]ventually their [the customer-generator's] neighbors and others who do not have the same facilities are going to be in a situation where they are going to have to make up the difference... Local distribution utilities are completely regulated up and down the line. The job of the state regulator is to make sure everyone pays his or her fair share of maintaining the system which is arguably regarded as a kind of social good.²¹

Utilities are concerned with the customers paying their fair share of the cost of transmission, distribution costs, and upkeep. Others have stated “[p]ut simply: If homeowners are putting power onto the grid, they want to get paid – kilowatt for kilowatt – for that power. But utilities argue that these homeowners still rely on power from the grid some of the time and need to pay their fair share for upkeep of transmission lines.”²²

Other problems confronting net metering are the dilemma between the utility company wanting its customers to pay for transmission and distribution costs, and customers wanting the utility company to pay them the retail rate for the customer produced electricity. These issues cause the utilities to discourage net metering.²³ The utility can discourage net metering through different utility policies that govern net metering's approval and implementation.²⁴ On the other hand, the existence of net metering and interconnection can be of valuable importance to the decision of a customer electing to buy renewable energy, even at a premium.²⁵ The controversy will only grow as net metering gains in popularity.²⁶

What are the benefits of net metering?

Net metering has many positive aspects for customers, utilities, and the community-at-large. These benefits range from lower administrative cost for the utilities, lower bills for the customers, and increased investment in local renewable energy for the community.

The customers, for a variety of reasons, may choose to implement net metering. The two primary reasons that customers elect to implement net metering are fear from service interruption and economics, with fear being the single biggest factor.²⁷ This fear can be from a variety of events such as brownouts (like California in 2001) or weather (the New England ice storms in 1998).²⁸ For the economical factor, the biggest inducement for the customer is the existence of higher electricity rates.²⁹

In addition to the aforementioned reasons, customers may choose net metering for other factors. Some of these other factors include environmental protection and sustainability.³⁰ A financial incentive of net metering is that it lowers “the economic threshold for small renewable energy facilities” to where they can be competitive for consumers.³¹ Net metering also addresses a perceived equality issue between utilities and customers when utilities charge retail rates to the customer but in turn the customer receives the avoided cost rates for electricity they produce.³² Avoided cost rates are the costs the utility avoids when it buys electricity from a non-utility power plant. Another advantage of net metering for customers is that a net metering program never ends as opposed to other incentives that customers receive for investments in renewable energy generation such as tax credits.³³ An additional benefit is that net metering allows the customer to maintain their regular consumption pattern, otherwise, they would have to either alter their consumption pattern or invest in expensive and inefficient energy storage devices.³⁴

Net metering proponents contend that net metering has numerous additional benefits for the utility and community. First, utilities benefit from a net metering program because the

program is easier to administer than the alternative of taking customer-generators on a case-by-case basis.³⁵ This would be very expensive and time consuming for a small increase in the amount of available electricity.³⁶ Secondly, proponents argue that under net metering, a utility does not have to produce or purchase electricity on the spot market since net metering customers are reliable sources for renewable energy production.³⁷ In addition, the proponents claim that it is easier for the utility to maintain voltage in rural electric utility lines.³⁸ Another way that both customers and utilities benefit from net metering is if there are enough customers net metering (under an advantageous financial arrangement), then the return on investment is better for a distributed system of generation.³⁹ Net metering achieves this by smoothing out the irregularity of demand and the availability of renewable energy in the most economical way for all stakeholders.⁴⁰ The community recognizes the benefits through increased local property values and expanded business opportunities.⁴¹ Proponents make a case that these direct benefits to the utilities, customers, and the communities outweigh any of the costs associated with net metering.

In addition to these direct benefits to the customer, utility, and community, proponents contend that net metering has a host of indirect benefits. Though an indirect benefit for the utility, net metering eliminates “customer-generators’ incentive to instantaneously consume all the electricity being generated.”⁴² “In the absence of net metering, the rational customer-generator will try to maximize simultaneous use of [the customer’s] own generation,” which means the rational customer will either consume all electricity produced or risk losing it.⁴³ This strong incentive of the customer to consume all of their produced electricity does not help the utility or consumer because both parties are hurt in the end, “as both the utility and the customer are likely to prefer having the customer-generator feeding excess power to the grid during the peak period and deferring the additional demand until an off-peak period.”⁴⁴ Net metering

circumvents this incentive by allowing customers to bank excess electricity, which is produced as credits to be used at a later date.⁴⁵

The last indirect advantage the utility recognizes from net metering is the benefit of having generator capacity in close proximity to customers. Studies conducted by both experts and utilities show “direct, measurable economic benefits to the utility of having generation located close to the end user.”⁴⁶ The studies concluded that a utility benefits when a distribution system is operating at near capacity and within close proximity to a customer generator. The “distributed benefits are comparable in scale to traditional energy and capacity benefits.”⁴⁷ Net metering encourages the capturing of these benefits by utilities from customer generators.⁴⁸

Net metering is also an advantageous policy for state legislatures and regulators. First, net metering helps to break down market barriers that renewable energy development faces.⁴⁹ Furthermore, it allows states to implement renewable energy projects without state funding, which is especially important as some states are presently facing a budget crisis.⁵⁰ This puts this incentive’s cost burden on the utility and its shareholders and is one of the appeals of net metering to lawmakers and regulators.⁵¹ If states do not use net metering, then states have to use the typical incentives of research and development grants, tax credits, etc. to promote renewable energy.⁵² Net metering also may provide a boom for distributed resources as it provides the highest output for these resources.⁵³ Another policy benefit of net metering is its simplicity of use for all, as once the meter is installed no further regulatory action is needed.⁵⁴ Lastly there exists non-economic policy reasons which are environmental protection and self-sufficiency for the community, utility, and consumer.⁵⁵ Net metering at its core, is a policy that is designed to increase opportunities for “retrieving the value of electricity delivered to the grid, which expands the market for renewable energy.”⁵⁶ Net metering has many advantages to both the customer and

the utility. In addition net metering helps states fulfill the need for private investment in renewable energy generation.

What are the costs of net metering?

For most utilities, net metering presents a minor annoyance because net metering is not a significant factor with their customers. As net metering gains market share, the concerns of the utilities will be more prevalent (some experts have stated this will happen when net metering becomes ten to fifteen percent of a utilities peak load).⁵⁷ When this happens, the utilities will be driven by concern over grid infrastructure, safety, and their diminishing revenue.⁵⁸ This diminishing revenue will also influence these former concerns.⁵⁹

Critics argue that the revenue lost by the utility company from net metering makes the program prohibitive. Proponents claim that this position is unfounded. Proponents liken this claim to the similar argument used by critics against energy efficiency, where utilities are concerned with the lost revenue caused by the customer's new efficiency.⁶⁰ Proponents also argue that the critics concerns are unwarranted because most people do not net meter as it is in the early stages of development.⁶¹

Other arguments used by critics are the issues of cross-subsidization by customers and the complexity of net metering. Cross-subsidization is when one customer subsidizes another customer's electric bill. In essence, critics argue that the utility is being required to pay not only for the electricity produced, but the other costs associated with power production.⁶² Critics argue that this causes net metering to distort the prices of electricity for customers who do not engage in net metering.⁶³ Proponents respond to this criticism by claiming that customers already cross-subsidize each other.⁶⁴ These subsidizations vary between customers. Examples of existing cross-subsidization are homeowners who subsidize new homeowners and customers who

conserve electricity-subsidizing customers who waste electricity at peak demand.⁶⁵

Furthermore, the subsidy may not be as high as the utilities suggest.⁶⁶ Next, the subsidy according to proponents is between customers and not the utility.⁶⁷ Thus, the subsidy's impact on utility revenue remains fairly small.⁶⁸ Furthermore, any subsidy is diminished and may even be become a net benefit when the environmental benefits of customer-generators who produce electricity with renewable energy generators are considered.⁶⁹ Depending on how the environmental benefits are calculated, they can either equal the subsidy or actually erase the cross-subsidy completely.⁷⁰ However, many renewable energy and environmental advocates have trouble convincing others to include social cost externality pricing into the policy making process.⁷¹ The fact there exists many ways to calculate these social costs and benefits make these calculations more difficult for the advocates.⁷² Lastly, critics claim that net metering is too complex for the smaller utilities to manage.⁷³ Net metering to proponents is an easier system to implement and less costly than a more complex system (such as net billing) with additional equipment and personnel.⁷⁴

Another criticism of net metering is the fear of utility bypass by the customer-generator.

"Utilities are likely to face few direct costs from allowing net energy metering. When the system's peak output is less than or comparable to peak building demand, no modifications to the local feeder or distribution facilities are likely to be needed."⁷⁵ However, if market penetration of net metering becomes substantial, "utilities are likely to be concerned about the revenue losses associated with increased self-generation or bypass by their customers."⁷⁶ There is a concern that when customers install customer generators or take conservation measures on their premises, "the utility loses revenue needed to cover the fixed costs of its investment in capital expenditures on plant and equipment."⁷⁷ The effect of lost revenue on the utility is that it "is compelled to

seek higher rates from its remaining customers to recover the fixed costs. This creates an undesirable spiral as higher rates encourage additional self-generation and bypass, leading once again to higher rates for remaining customers.”⁷⁸ Utility bypass represents the biggest fear of the utilities and is why they oppose net metering.

The fear of the utility companies is not misplaced. In the 1980’s, a large number of industrial utility users found that co-generating a part of their power requirement was less expensive than buying all of the power from the electric utilities.⁷⁹ As it is currently, the fear then was that customers who co-generated would adversely affect the utilities’ investments in plant and equipment.⁸⁰ The response to co-generation by the utilities and regulators was offering rate reductions for large volume customers who present bypass threats.⁸¹ Utilities fear a net metering program may lead smaller customers to bypass the utilities as the large industrial users did in the 1980’s.

Some proponents believe the fear of utility bypass is overstated. Most utilities assume that when a customer engages in net metering, the utility will receive no benefit from the customer’s generator.⁸² Proponents disagree with this analysis stating that “[f]oremost among the direct benefits of net metering is eliminating the need to account separately for electricity produced by customer-generators.”⁸³ This is accomplished through less man-hour in reading meters and equipment upgrades. Customers still pay a utility bill; however, it is a reduced bill.⁸⁴ A study by experts shows savings by the utility are approximately equal to any loss by the utility.⁸⁵ Lastly, proponents point out that most states have a system-wide cap that is well below the threshold where net metering starts to have an effect on the utility’s revenue.⁸⁶

Additionally, critics argue that net metering is not as beneficial as proponents would suggest and that it may violate federal law or regulations. Some of these issues cited are safety

concerns, violation of Public Utility Regulatory Policies Act (PURPA) and non-adherence to the Federal Energy Regulatory Commission (FERC) orders regarding payments to a QF, which is a non-utility owned power plant.⁸⁷ Critics next contend that net metering misrepresents actual generation and customer generator information when large numbers of customers adopt net metering.⁸⁸ According to the critics, net metering has additional concerns that need to be addressed by the states.

States approach net metering differently by weighing the concern over utility bypass to the advantage of net metering's goal of promoting private investment in renewable energy.⁸⁹ Each state, utility, and community balances this concern and adopts policies addressing the issues.

The concern over net metering can be contributed to the fact that it is helping to form a major shift in the electric utility industry's business model. Net metering is controversial because it is a paradigm shift for the electricity generation industry, as net metering and other distributed resources are disruptive technologies. A disruptive technology is one that has the ability to fundamentally transform a market or industry.⁹⁰ Disruptive technologies tend to create new markets through newly created needs or which current technologies cannot meet.⁹¹ Examples of previous technologies that were disruptive technologies were the internet, the aviation industry, and the railroad industry. Distributed resources, such as net metering have the potential to completely change the utility's way of producing and transmitting electricity.⁹² As with all disruptive technologies, the customer may not demand it right away, but will migrate to it when it suits them.⁹³ The adaptation of distributed technology by customers starts with customers who want functionality, then reliability, and then finally price.⁹⁴ When the disruptive technology completes the last phase and enters the mainstream this is when the conventional way of doing things will be threaten.⁹⁵ Net metering is in the earlier stages of this diffusion as a disruptive

technology, but when it becomes mainstream, net metering will force a new way of thinking for utilities, consumers, and the community about how the utility industry is structured.

How Has The Federal Government Addressed Net Metering?

a. What Federal legislation currently exists?

Federal legislation and federal agencies involvement in net metering is quite limited now as the federal government has allowed states and other stakeholders, such as utility companies and cities to implement their own net metering programs. The Federal Energy Regulatory Commission (FERC) has commented on net metering stating the commission will not become involved in the state's implementation of net metering. The few statutes that address net metering on the federal level are the Public Utility Regulatory Policies Act (PURPA) and the 2005 Energy Policy Act. Before the implementation of PURPA, there were few non-utility generators.⁹⁶

PURPA requires utilities to provide an interconnection with any qualified facility (QF), which requests such a connection. PURPA was enacted to encourage the following goals:

(1) a program providing for increased conservation of electric energy, increased efficiency in the use of facilities and resources by electric utilities, and equitable retail rates for electric consumers, (2) a program to improve the wholesale distribution of electric energy, the reliability of electric service, the procedures concerning consideration of wholesale rate applications before the Federal Energy Regulatory Commission, the participation of the public in matters before the Commission, and to provide other measures with respect to the regulation of the wholesale sale of electric energy, (3) a program to provide for the expeditious development of hydroelectric potential at existing small dams to provide needed hydroelectric power, (4) a program for the conservation of natural gas while insuring that rates to natural gas consumers are equitable, (5) a program to encourage the development of crude oil transportation systems, and (6) the establishment of certain other authorities as provided in title VI of this Act.⁹⁷

Net metering helps with the first and third goal of PURPA, which are conservation and rate equality.⁹⁸

Under PURPA, a small power production facility can qualify for QF status if it is a generating facility of 80 megawatts (MW) or less, and whose primary energy source is a renewable energy source.⁹⁹ All customer generators are 80 MW or less and so their facility may qualify for QF status. The main purpose of PURPA is to encourage alternative energy sources and reducing the nation's dependence on fossil fuels.¹⁰⁰ PURPA provides that all qualified facilities are paid at the avoided cost of the utilities. PURPA defines avoided cost as "the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source."¹⁰¹ Furthermore, when Congress passed PURPA, it identified two problems that plagued the implementation of non-utility owned generation: "(1) traditional electric utilities were reluctant to purchase power from, and sell power to nontraditional electric generation facilities; and (2) regulation of non-traditional facilities by state and federal utility authorities imposed undue financial burdens on the non-traditional facilities, thereby discouraging their development."¹⁰² PURPA was designed to increase energy diversity and to promote renewable power.

Two cases decided by FERC limited reimbursement of QFs by the utilities at the avoided cost of the utilities. These cases are *Orange & Rockland* and *Connecticut Light & Power Company*. In *Orange & Rockland*, FERC held that New York cannot require utilities to pay higher rates than the avoided cost rates for New York based QF's who are on interstate electric grids.¹⁰³ In *Connecticut Light & Power Company*, FERC came to the same conclusion as in *Orange & Rockland*. In this case, a Connecticut municipal waste recovery facility was unable to recover the retail rate they were charged by the utility, but were only able to recover the avoided cost rate.¹⁰⁴

These two cases, according to some experts, may hinder the implementation of net metering. As with most states, net metering statutes require the customer generator to be credited at the retail rate. However, some experts believe that these cases may not affect net metering because states may implement net metering under their own authority and not under PURPA.¹⁰⁵ Secondly, according to other FERC decisions, states may set their own incentives for specific technologies.¹⁰⁶ Furthermore, the experts contend that even if a net metering program is under PURPA, then a customer and utility can engage in the exchange of electricity.¹⁰⁷ In essence, the customer generator is trading the electricity produced now for electricity used later.¹⁰⁸ There have been a few public utility commissions in 1997 (Maine and Minnesota) stated that net metering did violate PURPA as it did not require reimbursement at cost higher than avoided costs, and that the *Connecticut Light & Power Company* decision did not apply to retail sales.¹⁰⁹ FERC's and PURPA's requirements on avoided costs may have minimal effect if any on how net metering is implemented by the states.

b. How does the Federal Energy Commission view net metering?

There are a series of cases in Iowa that address whether or not a utility must offer net metering. Specifically, the cases involved Midland Power Cooperative where the company was previously required by FERC to offer net metering to its customers.¹¹⁰ After the passage of the 2005 Energy Policy Act, FERC reversed its decision holding that the commission did "not believe it appropriate that [it] go to court to require Midland to provide net metering when Congress enacted a specific provision of law that directs Midland to consider whether or not to provide net metering on its own."¹¹¹ When the facility owner appealed this decision to the Federal D.C. Court of Appeals, the court dismissed the appeal holding that if the owner wanted to bring an enforcement action it needed to be filed in district court.¹¹²

The *Midland* decision, which requires net metering, is criticized as some argue that it stretches the precedent it relied upon. These critics contend that the decision violates previous FERC orders and that it wrongly holds that net metering is not a sale of electricity.¹¹³ The main thrust of this argument is that FERC ignored the physical realities of transfers of electricity, and basically used an accounting decision to support a policy conclusion.¹¹⁴ FERC came to their decision in part because they said distributed generators are retail customers and thus the sales by distributed generators are retail in nature.¹¹⁵ However critics disagree stating “[w]hile the transmission to a utility cannot be retail, even if the seller of power also is, at times, a retail customer.”¹¹⁶ FERC cites several previous decisions in support of its decision in *Midland*. The most important decision is *PJM Interconnection*. In this decision FERC decided whether or not self-generation is a sale of electricity.¹¹⁷ Furthermore, the critics contend that electricity can never be banked due to simple physics, therefore an exchange is an improper way of classifying the transaction.¹¹⁸ Supporters of the FERC decision argue that no value was assigned to electricity as meters are read only at the end of the billing period. As a result, value cannot be assigned to the generated electricity, which makes a sale of electricity impossible.¹¹⁹ Though *Midland* may suffer many criticisms on its foundation, it still has many positive benefits such as the support of customer based renewable energy.¹²⁰

c. What have been the effects of the 2005 Energy Policy Act

The 2005 Energy Policy act has had a significant impact on the way states conduct net metering. The main effect of the 2005 Energy Policy Act was to require all states to at least consider net metering.

Section 1251 of the 2005 Energy Policy Act requires all states and non-regulated utilities to consider adopting net metering if they have not implemented this program.¹²¹ The Act requires

states to consider adopting a program within two years of passage of the 2005 Energy Policy Act.¹²² This process of consideration must be completed within a three year time period.¹²³ In addition, § 1251 also requires states, within the same time frame, to decide to require utilities to minimize their dependency on one energy source.¹²⁴ Net metering also helps the utilities meet the 2005 Energy Policy's Act goal of making states and utilities diversify their energy portfolio.

d. Has the federal government implemented its own net metering rules?

The federal government has debated on whether or not to have their own net metering program to either supplement or replace the state's program. In 2007, two bills were introduced in Congress. These bills represent the most recent federal attempt to implement a federal net metering program.

One of the bills considered was "The Home Energy Act." Under this program, net metering was limited to two percent of the utility company's system capacity.¹²⁵ In addition, the "Home Energy Act" capped all electricity produced by one single source at one percent.¹²⁶ The bill provided for a kilowatt for kilowatt approach for electricity generated by the customer.¹²⁷ The "Home Energy Act" allowed for fuel cell, solar, wind, biomass, geothermal, anaerobic digestion or landfill gas, or any combination of these systems. The system had to be 1,000 KW or less of generation capacity. This bill stalled in the House Subcommittee on Energy and Air Quality.

The other bill was called 'Energy for Our Future Act.' This bill did not limit net metering to an overall system cap, but limited customer-owned generators to a "maximum generating capacity of 10 kilowatts or less that is fueled by solar energy, wind energy, or fuel cells; or a facility on the site of a commercial electric consumer with a maximum generating capacity of 500-1000 kilowatts or less that is fueled solely by a renewable energy resource, landfill gas, or a

high efficiency system.”¹²⁸ It also required a kilowatt for kilowatt credit for customer owned generators.¹²⁹ This bill also stalled in the House Subcommittee on Energy and the Environment.

If either of these bills would come out of committee and signed into law, it would represent a complete reversal of the federal government’s involvement in net metering. It would thrust FERC and the federal government back into the net metering debate where FERC and the federal government have tried to withdraw and allow states to experiment with their own net metering laws.¹³⁰ Furthermore, a federal net metering standard may not be needed as a majority of states already have net metering regulations in place. However, by imposing a federal mandate on states, the utilities would have a standard net metering policy that would be uniform throughout the country.

How Do States Implement Net Metering?¹³¹

States vary on the implementation of net metering, though there are few similarities between them.¹³² One similarity is that all states require customer-generators to meet the applicable safety and power quality standards set out by the National Electric Code or other standard setting agencies.¹³³

However, there are a multiple of differences in net metering programs among the states. “These differences reflect the programs that work the best for the consumers of a given State. These variations ensure that the consumers of each State receive just and reasonable rates, at fair terms and conditions.”¹³⁴ These differences can range from who can net meter, what type of power generation qualifies for net metering, what limits are in place on the generation plant, what is the availability of meter aggregation, what is the status of the ownership of renewable energy credits, what if any system wide limits on net metering are in place, and what utilities must offer net metering. In addition, some utilities and localities have different net metering

requirements in addition to the state's requirements. Much of the discussion around net metering involves the debate over the cost allocation of the distribution portion of electricity generation.¹³⁵ These differences in the structure of net metering can affect whether there are enough incentives (particularly economical ones) to change from purchasing electricity to becoming a customer generator of renewable energy.¹³⁶

1. What energy sources qualify for net metering?

States vary on the kind of power generation which qualifies for net metering. Nearly all states allow customer generators that only use renewable energy to qualify for net metering, though some states like Arkansas allow non-renewable generators to qualify if they meet specific qualifications.¹³⁷ Some states allow only a particular energy source, such as solar power, while other states adopt a more expansive approach to include many types of renewable power generation and cogeneration. These differences may be the result of the type of energy generation each state wants to encourage. For example, California allows many types of energy generators including solar, wind, fuel cells, and biogas from manure, bio-solids and animal waste to qualify for net metering.¹³⁸ Indiana limits net metering to three types of renewable energy generators which are wind, solar and small hydroelectric plants.¹³⁹ States like Florida allow hydrogen, biomass, solar, geothermal, wind, ocean, and waste heat (cogenerational) to qualify for net metering.¹⁴⁰ In addition to solar and wind, Illinois allows for many more renewable energy resources to qualify for net metering. These include anaerobic digestion of food or livestock waste, small hydroelectric, fuel cells using renewable fuels, crops grown for energy generational, and micro-turbines powered by renewable fuels.¹⁴¹ Some states limit the type of renewable resource while other states adopt a much broader approach to power generation.

States choose the type of generators they want to encourage for net metering based upon which technology the state wants to develop through private investment. However, states need to avoid an overly restrictive definition of net metering as it may prevent customers from maximizing the benefits of net metering.¹⁴² An overly restrictive definition can prevent the state from exploiting private investment in their renewable energy resources.¹⁴³ The system and customer cap placed upon the size of the generator is also determinative of what energy source will thrive under a net metering program, and consequently this needs to be taken into account when designing a net metering program.¹⁴⁴ To encourage a particular technology, the state may modify or adopt capacity limits to promote a specific energy source.¹⁴⁵ State policy makers need to be aware of unintended consequences when they chose what kind of generation they want to encourage.

2. Which utilities are affected by net metering?

In some states, only certain utility companies are required to offer net metering. All states that have net metering programs require all investor owned utilities to have net metering. The differences in utility company requirements appear in regards to co-ops, municipal utilities, and some specific utilities. There are many reasons why states only require certain utilities to offer net metering.

Connecticut is an example of a state that only requires one kind of utility to offer net metering and that is an investor-owned utility.¹⁴⁶ Delaware, by contrast, requires all utilities to provide net metering.¹⁴⁷ Connecticut and Delaware provide two contrasting regulations on state's requirements of which utilities have to offer net metering.

Some states, however, do not clearly separate which utilities may or may not be required to provide net metering. California requires all utilities except for the Los Angeles Department

of Water and Power (LADWP) to offer net metering to solar and wind customers.¹⁴⁸ However, investor owned utilities are required to offer net metering to their customers who, in addition to solar and wind, can use biogas and fuel cells.¹⁴⁹ California has three classes of utilities which must provide net metering to their customers.

Michigan also requires net metering to be offered to three different kinds of utilities. However, these utilities are different than the utilities in California. The qualifying utilities in Michigan are investor-owned utilities, electric cooperatives, and alternative electric suppliers.¹⁵⁰ Michigan defines an alternative electric supplier as “a person selling electric generation service to retail customers in this state. Alternative electric supplier does not include a person who physically delivers electricity directly to retail customers in this state.”¹⁵¹

Alaska is a unique state in how it determines which utility is required to offer net metering. Alaska requires utilities to offer net metering when a utility has 5,000,000 kWh or more in retail sales.¹⁵² This requirement is different from other states as many states restrict net metering by the type of utility company and not by the utility’s retail sales. The differences among the states in requiring certain type of utilities to offer net metering is an example of states determining what suits their resident’s best interest.¹⁵³

3. Who can qualify for net metering?

Each state may differ on the sector or customer class which qualifies for net metering. Some states may allow one particular class of customer to enroll in net metering while other states allow all utility customers to enroll in the program. When states select which sectors should be able to net meter they must consider the power sources they want to encourage, the benefits to the potential customer, the potential grid costs, and other factors as some sector’s characteristics will make the process to connect more difficult or expensive.¹⁵⁴

The Kansas net metering program allows residential, commercial, industrial, schools, governments, and institutions to enroll in the net metering program.¹⁵⁵ Other states such as Louisiana, limit which class of customers can qualify for net metering. In Louisiana, only those of the residential, commercial, and agriculture classes can qualify for net metering.¹⁵⁶ New Mexico, however, only allows a residential customer to qualify for net metering programs.¹⁵⁷ “The eligibility criteria customers must meet to qualify for net metering should be developed carefully to avoid unintended consequences.”¹⁵⁸ When states select which customer class that can enroll in a net metering program, the selection is dependent upon whether or not the state wants to limit the possibility of utility bypass to one class of customers or that net metering will have unintended consequences for that sector.

4. Are there limits placed on the size of a customer generator’s plant?

In most states, there is a size limit to the customer generator. The size of the generator can be of vital importance because it determines how much electricity the customer can put back on the grid.¹⁵⁹ The customer wants to put the highest percentage of electricity back on the grid because this is where they receive the most benefit for the electricity they produce.¹⁶⁰ There are two reasons why net metering programs limit the size of customer generators. They are: (1) to promote system reliability and (2) to ensure that the generator is properly sized to serve the customer’s load and not to sell electricity to the utility thereby becoming a QF.¹⁶¹ These limits vary by state and may be predicated by either customer class or type of utility.

Colorado limits net metering to the amount of electricity a customer can generate in two different ways. If the utility is an Investor Owned Utility (IOUs) then the customer can have a system that is 120 percent of the customer’s average consumption rate.¹⁶² However, if the customer is either a municipal or a co-operative utility then it is limited to twenty-five kilowatts

(KW) for non-residential customers and ten KW for residential customers.¹⁶³ Colorado differentiates between investor owned utilities and municipal and co-operative customers for the purpose of the size of the generator.

New York's net metering law is different than Colorado's net metering law as it limits the size of the generator by both class and type of power generator used. New York allows either 2 MW or peak load limit for non-residential solar or wind (which ever is less), 500 kW for agricultural wind or biogas, and 25 KW for residential solar or wind.¹⁶⁴ In this regard, New York is one of the few states that limit customer generators by the size and type of power used.

Some states limit all customers to a certain level of power generation. In Connecticut, the state limits power generation to two megawatts for every consumer.¹⁶⁵ This is one of the highest limits allowed by any state. Indiana, on the contrary, is at the lower end of the spectrum with a limit of only 10 KW per customer generator.¹⁶⁶

Capacity limits prevent a customer from being able to produce enough energy to satisfy all their needs. This limit prevents an individual customer from bypassing the utility entirely, thereby making the customer contribute in part to the utility's continual investment in the transmission and distribution of electricity.¹⁶⁷ The cap on a customer's individual generator minimizes the adverse impact of a single net metering customer.¹⁶⁸

5. Are there system wide capacity limits to net metering?

Most states set a system capacity limit to a certain percentage of the utility's previous year's output. The purpose of system wide capacity limits is to provide a ceiling on the expansion of net metering. "Imposing a cap on net metering can minimize potential adverse rate impacts while providing the incentive necessary to encourage additional investment in renewable energy technology."¹⁶⁹ Of course, this does not mean that a customer can be a customer

generator, but would prevent him from receiving credit from the utility for what they produced.¹⁷⁰ System caps are one method states try to use to help alleviate the fears of the utilities.

In California, the system capacity limit is 2.5% of the utility's peak demand.¹⁷¹ California also limits how much electricity is produced from two different kinds of power sources. These limits are 50 MW for biogas digesters and 112.5 MW for fuel cells.¹⁷² California is a typical state in regards to states limiting net metering to a certain percentage of the utility, but differs in that it has separate limits for two types of power generation.

Like California, Delaware limits net metering system capacity based upon the peak demand generated by the utility. In this state, the utility has to offer only 1 % of the peak demand from the previous year, though utilities may elect to allow more at their choosing.¹⁷³ Georgia, like Delaware, also caps the amount based upon the previous year's peak demand. For Georgia, that cap is .2%. Indiana places a cap on the utilities as well. However, in this state, the cap is placed on a season of usage. In Indiana, this is determined during the most recent summer's peak load and the cap is 1%.¹⁷⁴ Again, like other states, Indiana allows the utility to exceed the limit at their discretion. Another state, Kentucky, uses a different method in that the state uses an hourly peak load from last year as their maximum.¹⁷⁵

Hawaii and Maryland have different approaches in that the states limit the system capacity by either utilities or by megawatts. Hawaii allows Hawaii Electric and Light Company and Maui Electric Company to have 3% of utility's peak demand. The limit for Kauai Island Utility Cooperative and Hawaiian Electric Company is only 1% of peak demand thereby capping the system limit.¹⁷⁶ Maryland puts a system cap of 1,500 MW for net metering programs.¹⁷⁷

However, some states have no system capacity limits for customers. Ohio is one state with no system capacity limit though there are limits placed on the size of customer generators.¹⁷⁸

States may choose their capacity limit based upon competing goals of minimizing utility bypass and the promotion of private investment in renewable energy. Caps are in place to help alleviate the utilities' fears that too many customers will engage in net metering with the result being a repeat of the bypass scare faced by the utilities in the 1980's.¹⁷⁹ The cap needs to be large enough to warrant private investment in renewable energy by the customer otherwise the goal of net metering will not be achieved, nor will it have much participation due to lack of effective economic incentives.

6. Who owns the renewable energy credits?

Renewable energy credits (REC's) represent a subject that most states have not yet addressed, but it is becoming a highly contested issue between utilities and consumers on who owns the REC's of consumer generated electricity.¹⁸⁰ Renewable energy credits are produced when renewable energy is produced.¹⁸¹ These credits can be bought, sold, and traded on exchanges so that utilities may satisfy the renewable energy portfolio standards of the state. Depending on how the Renewable Energy Portfolio and REC's are structured, it may make utilities less confrontational about net metering.¹⁸² States have different approaches in allocating the REC's, and of the states that address ownership, these states fall into one of the following categories: utility owned, customer owner, both utility and customer owned, or some other kind conditional ownership where the utility gains control of the renewable energy credits if certain conditions are met.

Generally speaking, most people agree that when an agreement is voluntary between the generator and the utility that the ownership of REC's should be a separate issue negotiated between the parties.¹⁸³ However, when a utility is either mandated or forced to buy renewable electricity the question of ownership must be answered through either legislature or the regulatory authority.¹⁸⁴ If the question of ownership is not answered, then the resulting uncertainty hinders the REC's markets, thereby causing conflict between the buyer and sellers of REC's as their ownership is unclear.¹⁸⁵

This uncertainty led FERC to issue a declaratory judgment in 2003, where FERC ruled that REC's that were generated by QF's were not necessarily transferred to the utility under § 210 PURPA.¹⁸⁶ FERC declared that the avoided costs required by PURPA only related to the energy and capacity aspects, but not the renewable qualities of the energy absent contractual language to the contrary.¹⁸⁷ This decision by FERC has now shifted the debate to the states.¹⁸⁸ This ruling has changed how some states have addressed the REC's issue.¹⁸⁹

REC's and net metering have not received as much attention as REC's involving QF's for a variety of reasons.¹⁹⁰ Part of the reason for this is that of economic as QF's produce more REC's than net metering. An exception to this is if a solar or distributed set aside has been implemented in the renewable portfolio standard then the REC's from net metering may be just as controversial.¹⁹¹ In states where the legislature and/or the regulatory commission have been silent on the ownership position of REC's, the likely understanding is that the customer generators own the REC's unless it is transferred explicitly to the utility.¹⁹² Ownership of REC's represents an unclear area for net metering.

In some states, the renewable energy credits are owned by the utility. In other states, REC's are owned by the customer. An example of a state where REC's are owned by the utility

is Kansas.¹⁹³ In this state, the utility either owns the REC's to meet the state's renewable portfolio standard, or the utility sells the REC's to another utility. However, in Massachusetts, the customer is the sole owner of the REC's and can sell the REC's to another utility.¹⁹⁴

There are some states where both the utility and customer jointly own the renewable energy credits. Delaware and North Dakota are two states where both the utility and customer have control over the renewable energy credits.¹⁹⁵ However, this type of ownership of REC's is a rarity among the states.

Some states allow conditional ownership of REC's by a utility or customer. Changes in ownership occur when certain conditions exist. North Carolina is a state where the utility owns the renewable energy credits outright unless the customer chooses to meter under an unfavorable demand tariff.¹⁹⁶ Colorado is another state where the customer originally owns the renewable energy credit but must relinquish the REC's for twenty years if exchanged for incentives.¹⁹⁷ The same thing occurs in California when a customer receives payment from the utility for the remaining net excess generation at the end of a twelve month billing period. The utility then owns the customer's REC's associated with the net excess electricity.¹⁹⁸

For the states that address REC ownership, utilities are concerned with acquiring REC's to meet renewable portfolio standards. Giving customers ownership of the REC's adds value to their generators which allows the customer to sell these REC's to other utilities. By giving the customer the REC's, the customer has one more incentive to invest in renewable energy at his or her own expense.¹⁹⁹ RECs are an asset that customers can sell from their investment in renewable energy.

However, utilities may still fear bypass since customers are receiving the RECs and credit for the electricity.²⁰⁰ If the utility had produced the renewable energy themselves, then they

would receive the full retail rate of the electricity and the RECs for the electricity produced.

Some states have introduced programs to remedy this impasse by allowing co-ownership of the renewable energy credits, or by instituting some type of transfer program that allows utilities to obtain ownership/retain ownership if certain conditions or obligations are met by the utility.

7. Can customers aggregate their meters?

Meter aggregation is the idea of combining meters and is a relatively new idea that many states have not addressed in their net metering statutes. Pennsylvania defines meter aggregation as “[t]he combination of readings from and billing for all meters regardless of rate class on properties owned or leased and operated by a customer-generator for properties located within the service territory of a single EDC [electric distribution company]. Meter aggregation may be completed through physical or virtual meter aggregation.”²⁰¹ Meter aggregation is commonly called “community net metering” or “neighborhood net metering.” “Community net metering” or “neighborhood net metering” allows joint ownership of customer generators by different customers.”²⁰² Meter aggregation of meters is a relatively new phenomenon for net metering.

Some states such as Pennsylvania, Rhode Island, and Vermont allow meter aggregation in some form. Pennsylvania only allows for virtual meter aggregation, while Rhode Island allows meter aggregation for certain customer classes.²⁰³ The places that can elect aggregate net metering in Rhode Island are cities, towns, schools, farms, non-profit affordable housing, and the Narragansett Bay Commission. The customers under these categories can only aggregate up to ten meters. Vermont is another state which allows group net metering.²⁰⁴ Few states have considered the possibility of aggregating the meters in their net metering proposals.

Aggregate net metering allows individuals to pool their resources together and invest in a system which may be unaffordable if the individual had to buy the generator independently. By

allowing aggregate net metering, the states provide more incentives for personal investment in renewable energy, which is one of the primary goals of net metering.²⁰⁵ Meter aggregation may benefit the poor and those who are living in town-homes, apartments, or condominiums, as they could join together, pool their resources, and benefit from being able to net meter. Meter aggregation is a relatively new concept and has been adopted by only a few states.

8. How does the owner receive reimbursement from the utility for the electricity produced by the customer's generator?

The calculation of the value of electricity produced by a customer is perhaps the most controversial aspect of net metering. The question is not whether to pay the customer generator, but at what rate they should receive.²⁰⁶ The method of calculation will have a direct impact on the utility's revenue. In addition, what rate a customer can receive will determine whether or not net metering is of beneficial use to the customers.²⁰⁷ Furthermore, the use of the retail rate of electricity to credit the customer-generator can cause either the utility or customers to unfairly subsidize each other.²⁰⁸

An example of this subsidy is when a customer-generator generates electricity at night and receives the full retail price for the electricity even though the value of the electricity is low for the utility.²⁰⁹ However, the reverse is true as well if the customer generates electricity during the day, but consumes it during the night. Then the customer is not receiving the full benefit of the electricity they produce, as it is now more valuable to the utility.²¹⁰ In this instance, the implementation of time of day (TOD) rates would make this subsidy disappear. Time of Day (TOD) rates allow customers to receive higher prices at peak daytime hours and lower prices at night off peak hours.²¹¹ Otherwise, both of these situations would cause inequality among the customer generator, the utility and other consumers.²¹²

The price at which a net metering customer receives for the electricity they produce can have a profound impact on whether or not net metering is economical for them. By compensating customers fairly for electricity produced there exists a strong incentive for the customer-generator to invest the necessary capital needed for a renewable energy generator and connect it to the grid.²¹³ However, if this not the case customers will become unwilling to connect any installed customer-generators or invest capital in new projects.²¹⁴

Most states require utilities to credit net metering customers at the retail rate they sell electricity. Examples of states that follow this standard are Indiana, West Virginia, and Kentucky.²¹⁵ However, states may differ in their allocation of credits to the customer at the end of a billing period. Most states allow the credits to carry over indefinitely which means the customer will never receive money from their electric generation, but only a reduced electric bill. Some states do not follow this approach and will grant the utility any excess electricity produced after a given period of time. Maine is an example of a state that allows the utility to be granted any excess electricity generated at the end of a twelve-month billing period.²¹⁶ Other states that follow a similar utility regulatory scheme are Kansas and Hawaii.²¹⁷ A few states allow a utility to be granted the uncredited electricity at the end of a twelve-month billing period.

Other states require utilities to credit the consumers at the avoided costs of the utility. This is the same method that a utility must use in reimbursing a QF under PURPA. Arizona allows the electricity produced by the customer generator to be credited to the customer at the retail rate, but any excess electricity is credited at the avoided cost rate.²¹⁸ Connecticut uses a similar method as Arizona in requiring that utilities pay retail rate and any excess is paid at the avoided cost rate.²¹⁹ However, Connecticut requires that users of solar power generators be paid

by the utilities at the time of use rate.²²⁰ The differences between the retail cost and the avoided cost can be substantial. In some places they can be as high as ten cents per kilowatt-hour.²²¹

California, Colorado, Delaware, Georgia and Ohio each calculate differently how a customer is reimbursed by the utility for the electricity produced by their generator. California requires that the customer who engages in net metering be credited at the retail rate for their electricity on a month-to-month period.²²² California then gives the customer the following three options: (1) to roll over the credits indefinitely; (2) to have the utility pay the customer at a rate set by the utility commission; or (3) if the customer does not elect either of the previous options, then the utility receives the electricity for no compensation.²²³ Colorado is similar to California in that it gives customers options in how they are credited for electricity produced.²²⁴ If the customer is receiving electricity from an investor owned utility, then the customer can elect at the end of the year to be either paid at the average hourly incremental cost for the utility or have the credits roll over indefinitely.²²⁵ However, if the customer is a member of a municipal or co-op utility, then they are required to provide annual reconciliation at whatever rates are deemed appropriate by the municipal and co-op.

Delaware and Georgia have a different way of calculating the price that a customer receives for electricity produced. Like most states, Delaware requires utilities to credit customers at the retail rate for electricity they produced in a twelve-month period.²²⁶ However, any excess generated power is paid at avoided cost and deposited into the Delaware Green Energy Fund.²²⁷ Georgia, on the other hand, differs from all other states in that they require the utility to pay the customer at a predetermined rate that is on file with Georgia's Utility Regulatory Commission.²²⁸

Ohio has a unique way of crediting customers with customer generated electricity. Customers are credited at the unbundled rate of generation and at the end of a twelve-month period, the customer may request a refund of any excess electricity generated.²²⁹ An unbundled rate is separate rates allocated to the customer for the different stages of power generation. Ohio came to this method of crediting customers for net meter generation due to the Ohio Supreme Court case *First Energy Corp. v. Public Utilities. Comm'm.*

The Ohio Supreme Court in *First Energy Corp.* stated there were four reasons why a net metering customer should not be entitled to the full retail cost of the electricity. The court found that a net metering customer of First Energy only “generates and supplies electricity; it does not provide transmission, distribution, or ancillary services. It has no allowable transition costs for which transition charges are assessed, and is not responsible for paying into the Universal Service Fund or the Energy Efficiency Fund.”²³⁰ The Ohio Supreme Court further ruled, “electric utilities have a right to receive transition revenue through the imposition of a transition charge ‘billed on each kilowatt hour of electricity delivered to the customer.’”²³¹ Customer generators never have and never will have transmission costs and, thus the utility should receive the appropriate level of compensation for the transmission of the electricity.²³² The Ohio Supreme Court was of the opinion that compensation concern was considered by the state legislature when they enacted the net metering legislation.²³³ To do otherwise, according to the Ohio Supreme Court, would be contrary to law and unreasonable.²³⁴ Another reason the Ohio Supreme Court mentions is that utilities in Ohio are required by statute to collect the accessed fee for the energy efficiency fund and remit these to the state.²³⁵ Paying the retail generators this fee would deprive the state of revenue and would give the fee to the retail customer for their own use instead of the state’s economic development.²³⁶ Next, the requirements of the universal service funds rider are

applied to all retail electricity sales, and that the rider shall not be formulated in such a manner to make one class of customer pay the majority of funds for the low-income customer assistance program.²³⁷ The court observed that not only does this “prevent First Energy from collecting this revenue from net generators; it also mandates that First Energy pay this revenue to net generators for their own use.”²³⁸ Lastly, the court looks at transmission, distribution, and ancillary services charges that the utility was allowed to charge.²³⁹ The court observed that:

“[a] customer-generator, whether a net consumer or a net generator, incurs none of these costs. The customer-generator provides no facilities or equipment to support the utility distribution or transmission system. Instead, it relies on the utility's facilities to feed back the electricity produced. Nevertheless, the commission's order directs First Energy to pay net generators for the costs First Energy incurs in transmitting and distributing the net amount of electricity the generator supplies to First Energy.”²⁴⁰

These regulatory approaches show the many different methods states use in calculating how customers are credited for the electricity that their generators produce. Most states want to strike a balance between making private investment in alternative energy attractive and allaying the concerns of utility bypass. Most states have found that crediting the customers at the retail rate balances this concern. Thus, most states allow net metering customers to be credited at the retail rate for their electricity production for an indefinite period of time. This is the preferred method used by most the states as it gives the customer the highest return on their investment. Unfortunately, this method imposes a hardship against the utility company since crediting a customer at the retail rate for customer generated electricity does not account for any transmission costs or fees on the retail sale of electricity, as *First Energy* details.²⁴¹ The utility companies fear that by crediting the customer at the retail rate, they will experience the same result as in the 1980's with cogeneration.²⁴² The City of New Orleans, when deciding to

implement net metering regulations of their own, considered the issue of retail rate compensation.

We are also concerned that using a retail rate, as the basis for compensation will more likely result in undesired cost subsidization by ratepayers that are not participating in net metering. For example, fewer kWh sales to net metering customers by a utility combined with a higher level of compensation to net metering customers may result in a shortfall in utility revenues that prevents a utility from recovering its fixed costs. Arguably that utility will seek a rate increase to offset the revenue shortfall that, if approved, would increase costs to all ratepayers but more to those that did not participate in net metering.²⁴³

If states or other government entities decide to credit customers at the retail rate they must always consider this issue when constructing their net metering program.

Some states have tried other methods to calculate the rate that utilities pay the generating customers for their electricity. The problem with avoided costs is how the utility calculates the cost of the next kilowatt used or the value of a kilowatt on the spot market. The Iowa Supreme Court in *Midland* stated that on avoided costs:

[t]here is no way that net metering will produce a reimbursement to the cogenerator that is reflective of the utility's full avoided cost. Instead, net metering in every instance reimburses the cogenerator on the basis of the utility's retail rate for electricity. This is manifestly not the cost to the utility of the electric energy that, but for the purchase from such cogenerator, the utility would generate or purchase from another source.²⁴⁴

Delaware's approach bypasses this by allocating all excess credits for electricity to its green fund. This may seem unfair to the customers who invest in the technology at their own expense as they do not see the return on their investment. This seems contrary to the primary goal of net metering which is to promote private investment in renewable energy.²⁴⁵ Georgia presents a different solution because in this state the utility commission attempts to balance all of the stakeholder's interests when setting the rates for net metering customers. Ohio attempts to equalize the costs between both parties by unbundling the bill into separate components. By

unbundling the bill, Ohio allows the utility to collect money from the transmission of the electricity and collect any of the tariff or riders that accompany the generation or transmission of electricity from all customers. With the advent of smart meters and Time of Use (TOU) rates in the near future more insight into the value of net metering and its value in regards to rates should become more apparent.²⁴⁶ This alleviates the concern of the utility over utility bypass while at the same time promotes private investment in renewable energy.

9. What are the other differences between the states?

There are still some other differences between the state's net metering laws. These differences include time of use metering, annual versus monthly netting, standard agreements, and if any insurance requirements exist.

Most states allow a customer generator to carryover net excess generated electricity (NEG) to the next month at the retail rate for a twelve-month period.²⁴⁷ This is known as annualized net metering.²⁴⁸ With monthly net metering, the customer and utility balance the accounts every month as opposed to once annually.²⁴⁹ Oregon is an example of a state that follows annualized net metering, while Delaware is a state that does monthly net metering.²⁵⁰ Annualized net metering is preferred because it takes into account that a customer's renewable energy generator can be more efficient in some months than in other months.²⁵¹ Another benefit is that utilities avoid the administrative cost of balancing the accounts every month. States differ in offering to their customers either annualized or monthly reconciliation of NEG electricity.

Liability insurance and standard agreements are other requirements for net metering that are different from state to state. This is a major battleground for small residential and commercial customer owned generators because it represents another needless cost for the customer generator.²⁵² Large generators (greater than 100 KW at commercial or industrial

customers) do not suffer from this because they either have large liability insurance or that the additional cost of insurance is not economically prohibitive as it is for residential customers who choose to net meter.²⁵³ Some states require that the customer carry liability insurance to protect the utility and its workers from any accidents caused by the customer's system.²⁵⁴ For example, Indiana requires that all net metering customers carry at least \$100,000 in liability insurance.²⁵⁵ However, this is not needed as many homeowner insurance agreements contain liability insurance.²⁵⁶ Many states have rejected this requirement or have placed limits on how much extra liability insurance is required.²⁵⁷

Indemnity is another insurance issue that is important to net metering where the customer is required to reimburse the utility for any damages caused by the customer generator.²⁵⁸ These are redundant if the utility also requires liability insurance as they both cover the same event.²⁵⁹ States that have addressed the issue of indemnification usually require that both parties mutually indemnify each other for any damages caused to the other's equipment.²⁶⁰

Standard agreements exist to assure that customer-generators are receiving the same treatment throughout the state, even if they are in different utility territories.²⁶¹ These agreements allow both parties to understand the terms and conditions in the net metering arrangement.²⁶²

Fees and costs represent another important issue between the states. Net metering customers may have to pay multiple fees which can reduce the return on investment for net metering thereby making it unattractive. Some of these fees include interconnection fees which are for engineers and inspectors to review the customer's generator, metering charges for an additional or upgraded meter, and standby charges for when the customer needs extra electricity from the grid (these exist for larger co-generation/distributed resource customers of the

utilities).²⁶³ However, many states have severely limited the implementation of these fees by the utilities.²⁶⁴ Depending on the state, costs for the meters and their support may be the responsibility of either the customer or utility depending on whether these costs are classified as investments by the customer-generator or short term costs that have long-term benefits. If there deemed to be long-term benefits, then these cost are the responsibly of the utility.²⁶⁵

Have Cities And Utilities Implemented Net Metering?

Some cities and utilities have experimented with instituting their own net metering programs in addition to or instead of a state program. Utilities may allow net metering on their own for the following reasons: (1) the utility has less equipment and administrative costs; (2) the utility is seen as being responsible for the environment; and (3) the utility is reacting to what the costumer wants.²⁶⁶ As mentioned previously, New Orleans adopted its own net metering requirements which are in addition to Louisiana's net metering law.²⁶⁷ New Orleans's net metering program sets its own criteria for its net metering program. The technologies that qualify in this city are as follows: solar, wind, biomass, hydroelectric, geothermal electric, small hydroelectric, fuel cells using renewable fuels, and microturbines.²⁶⁸ All utilities must offer net metering to every residential, commercial, and agriculture utility customer in New Orleans.²⁶⁹ The system capacity limit is 100 kW for commercial and agricultural and 25 kW for residential customers.²⁷⁰ The customer is credited at the retail rate on the next billing cycle and any excess is carried over indefinitely.²⁷¹

In Idaho, net metering is implemented by the state's utilities. Idaho Power is an example of one of these utilities. The technologies allowed by Idaho Power to qualify for net metering are as follows: solar, wind, biomass, hydroelectric, fuel cells, and small hydroelectric.²⁷² The applicable sectors are residential, commercial, and agriculture customers.²⁷³ Idaho Power limits

generators to one hundred KW for commercial and agriculture sectors, and twenty-five KW for residential and small commercial customers.²⁷⁴ The system limit is .01% of Idaho Power's 2000 level.²⁷⁵ Residential and small commercial customers are credited at Idaho Power's retail electricity rate on their next bill, while large commercial customers and agriculture customers receive eighty five percent of the avoided costs of Idaho Power.²⁷⁶

Cities and utilities, along with state programs, provide testing grounds for further development and fine-tuning of net metering.²⁷⁷ Cities and utilities like New Orleans and Idaho Power provide the opportunity for states to exam at what level net metering programs should be implemented.

Conclusion

Net metering is in its infancy. However, given time net metering will become more prevalent in the generation of electricity. With the gradual diffusion of net metering, there will be more controversy over the different aspects of net metering. The biggest controversy that still needs to be resolved is the concern over utility bypass versus the goal of encouraging private investment in renewable energy. This relationship is best observed over the present debate on how a utility company reimburses a customer for the electricity generated by the customer. Other aspects of net metering may still be at issue, such as the ownership of REC's and meter aggregation. Net metering may also need to adapt to new circumstances such as the use of electric vehicles (EV's) and the effect on electrical consumption by EV's.²⁷⁸ As explained in this paper, states, cities, utilities, and the federal government differ on their approach to net metering. As net metering progresses, each entity will have to re-analyze their decisions and adapt to the changing landscape of net metering and the ongoing interaction between trying to encourage private investment in alternative energy and the concern over utility bypass. In the end, "[t]he

rules under which net metering is provided should strike a balance between providing an incentive to a specific participating consumer, protecting the legitimate financial and safety interests of the affected utility, and not creating unwarranted subsidies born by the non-participating consumers.”²⁷⁹ Net metering will have an important future in meeting the state’s energy needs, even though it is causing disruptions in the way utilities conduct their business today. In the end de-coupling of the electric utility (separating the utility into a transmission and distribution company and an electricity generation company), adopting new methods of utility accounting or business model for utilizes may be in order to adapt to net metering in the future.²⁸⁰

¹ Valerie J. Faden, Student Article, *Net Metering of Renewable Energy: How Traditional Electricity Suppliers Fight to Keep You in the Dark*, 10 Widener J. PUB. L. 109, (2000).

² Elizabeth Brown & Sarah Busche, Nat’l Renewable Energy Lab., State of the States 2008: Renewable Energy Development and the Role of Policy 45 (2008).

³ D. Herman, EPRI, Strategic Overview of Distributed Resources 3-12 (2000).

⁴ Mike Taylor, *When Net Metering Goes Mainstream* Electric Light and Power, July and August 2009, at 40.

⁵ D. Herman, EPRI, *Supra* note 3, at 2-18 (2000).

⁶ *First Energy Corp. v. Public Utilities. Comm’n*, 768 N.E.2d 648, 650 (OH 2002).

⁷ Energy Policy Act of 2005 §1251, 16 U.S.C. § 2621 (2009).

¹⁰ *Windway Technologies, Inc* 696 N.W.2d at 304.

⁹ *Id.*

¹⁰ *Id.* at 305.

¹¹ *Id.*

¹² Christopher Cook & Jonathan Cross, Md. Energy Administration, A Case Study: The Economic Cost Of Net Metering In Maryland: Who Bears The Economic Burden? 7 (1999).

¹³ Utilities try to limit net metering customers to the amount of electricity the customer produces with their generator to levels that are either equal to or less than what they using in a billing cycle. *Id.*

¹⁴ Posting of Stephanie, Simon to Environmental Capital, <http://blogs.wsj.com/environmentalcapital/2009/07/30/xcel-to-solar-users-pay-up/>, ¶ 6, (July 30, 2009, 8:25 AM ET).

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ *Id.* at ¶7

¹⁸ *Id.* at ¶8

¹⁹ Posting of Stephanie Simon to Environmental Capital, <http://blogs.wsj.com/environmentalcapital/2009/07/30/xcel-to-solar-users-pay-up/>, ¶ 6, (July 30, 2009, 8:25 AM ET).

²⁰ *Id.*

²¹ Posting of Russell Gold to Environmental Capital, <http://blogs.wsj.com/environmentalcapital/2009/08/20/meter-reader-wading-into-the-controversial-net-metering-debate/>, ¶9, (August 20, 2009, 12:39 PM ET).

²² *Id.* at ¶3.

²³ Some utilities use special fees or minimum monthly charges for net metering customers. These fees are a concern to advocates because they can make net metering disadvantageous economically. Nat'l Renewable Energy Lab., *Making The Connection: Key Issues in Connecting a Photovoltaic System to the Utility Grid* 4 (1998).

²⁴ One of the best ways that utilities discourage net metering is a requiring an additional switch to turn the power off so that linemen can work on the lines. These extra switches depending on the system can add additional \$500 to \$10,000 in addition to the system costs. Studies completed by experts have determined that the benefits of these additional systems are negligible at best. Another way utilities can discourage net metering is to increase the delay in approving a customer to net meter. Nat'l Renewable Energy Lab., *Million Solar Roofs Case Study: Overcoming Net Metering and Interconnection Objections New Jersey MSR Partnership* 1-2 (2005).

²⁵ Christopher Cook & Jonathan Cross, *Md. Energy Administration, A Case Study: The Economic Cost Of Net Metering In Maryland: Who Bears The Economic Burden?* 2 (1999).

²⁶ The limited implementation of net metering by customers in states that have net metering can be explained by three concepts: communications, electricity rates, and interconnection. Net metering is not actively promoted by utilities and information regarding net metering is not readily available to customers. This may increase the costs associated with making renewable energy generation harder to implement because it becomes more expensive for the customers. The fact that electric prices are low while the costs for a renewable energy generator is relatively high, makes the economical benefits of net metering less desirable. In addition the problem of customers being able to obtain direct financing of the renewable energy project also leads to more difficulties. Some utilities require either additional equipments or liability insurance to be carried by the customer generator. Yih-huei Wan, Nat'l Renewable Energy Lab., *Net Metering Programs* 6 (1996).

²⁷ T.L. Forsyth & M. Pedden, T. Gagliano, Nat'l Renewable Energy Lab., *The Effects of Net Metering on the Use of Small-Scale Wind Systems in the United States* 12 (2002).

²⁸ *Id.*

²⁹ *Id.*

³⁰ Yih-huei Wan, *Supra* note 26, at 4.

³¹ *Id.*

³² *Id.*

³³ James W. Stoutenborough & Mathew Beverlin, *Encouraging Pollution-Free Energy: The Diffusion of State Net Metering Policies.*, 89 5 SOC. SCI. Q., 1230, 1233, (2008)

³⁴ Yih-huei Wan, *supra* note 26, at. 1.

³⁵ Posting of Mona Newton to CRES BLOGGERS, http://www.cres-energy.org/blogs/blogs_newton_07apr.html, ¶8, (April 2007).

³⁶ D. Herman, *Supra* note 3, at 3-8.

³⁷ *Id.* at 3-9.

³⁸ *Id.* at 3-10.

³⁹ Elizabeth Brown & Sarah Busche, Nat'l Renewable Energy Lab., *supra* note 2, at 88.

⁴⁰ *Id.*

⁴¹ *Id.* at 11-12.

⁴² Thomas J. Starrs, Renewable Energy Policy Project, *Net Metering: New Opportunities For Home Power* 8 (1996)

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ Thomas J. Starrs, *supra* note 42, at 8-9.

⁴⁷ *Id.*

⁴⁸ *Id.* at 9

⁴⁹ Elizabeth Brown & Sarah Busche, Nat'l Renewable Energy Lab., *supra* note 2, at 88.

⁵⁰ Valerie J. Faden, *supra* note 1 at 122.

⁵¹ James W. Stoutenborough and Mathew Beverlin, *supra* note 33, at 12301.

⁵² *Id.*

⁵³ D. Herman, *Supra* note 3, at 3-8.. 2-18

⁵⁴ Yih-huei, *supra* note 26, at 4.

⁵⁵ *Id.*

⁵⁶ Elizabeth Brown & Sarah Busche, Nat'l Renewable Energy Lab., *Supra* note 2.

⁵⁷ Shannon Graham, Ryan Katofsky, Lisa Frantzis, & Haley Sawyer Robert Margolis, Nat'l Renewable Energy Lab., Future of Grid-Tied PV Business Models: What Will Happen When PV Penetration on the Distribution Grid is Significant? 2 (2008).

⁵⁸ Elizabeth Brown & Sarah Busche, Nat'l Renewable Energy Lab., State of the States 2008: Renewable Energy Development and the Role of Policy 88 (2008).

⁵⁹ *Id.*

⁶⁰ Thomas J. Starrs, Renewable Energy Policy Project, Net Metering: New Opportunities For Home Power 14-15 (1996).

⁶¹ Posting of Mona Newton to CRES BLOGGERS, http://www.cres-energy.org/blogs/blogs_newton_07apr.html, ¶18, (April 2007).

⁶² Kenneth Gordon, PhD, Wayne P. Olson, & Amparo D. Nieto
Responding to EPAct 2005: Looking at Smart Meters for Electricity, Time-Based Rate Structures, and Net Metering, 7 (2006).

⁶³ *Id.* at 8.

⁶⁴ Posting of Mona Newton to CRES BLOGGERS, http://www.cres-energy.org/blogs/blogs_newton_07apr.html, ¶19, (April 2007).

⁶⁵ *Id.* at ¶20.

⁶⁶ For Maryland's largest utility the maximum amount of the cross subsidy was calculated to be forty-six cents per customer, which works out to less than four cents per customer per month. Christopher Cook & Jonathan Cross, Md. Energy Administration, A Case Study: The Economic Cost Of Net Metering In Maryland: Who Bears The Economic Burden? 2 (1999).

⁶⁷ *Id.*

⁶⁸ *Id.*

⁶⁹ *Id.* at 3.

⁷⁰ Christopher Cook & Jonathan *supra* note 66, at 5.

⁷¹ *Id.*

⁷² *Id.*

⁷³ Posting of Mona Newton to CRES BLOGGERS, http://www.cres-energy.org/blogs/blogs_newton_07apr.html, ¶20, (April 2007).

⁷⁴ *Id.*

⁷⁵ Thomas J. Starrs, Renewable Energy Policy Project, Net Metering: New Opportunities For Home Power 6 (1996)

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ *Id.* at pg. 7

⁸⁰ Thomas J. Starrs, *supra* note 75, at 7.

⁸¹ *Id.*

⁸² *Id.* at 8.

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ Christopher Cook & Jonathan *supra* note 70, at 3.

⁸⁷ Yih-huei Wan, Nat'l Renewable Energy Lab, *supra* note 26, at 4.

⁸⁸ *Id.*

⁸⁹ Yih-huei Wan & H. James Green, Current Experience with Net Metering Programs 2 (1998).

⁹⁰ B. Kalweit, EPRI, Viewing the Market for Distributed Resources from a Disruptive Technology Perspective A-12 (2000).

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.* at 4-3.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ Yih-huei Wan, Nat'l Renewable Energy Lab, *supra* note 89, at 1.

⁹⁷ Public Utility Regulatory Policies Act of 1978, 16 U.S.C. §2601 (2009).

- ⁹⁸ Kenneth Rose and Karl Meesuen, *supra* note 90, at 38.
- ⁹⁹ Public Utility Regulatory Policies Act of 1978, 16 U.S.C. § 796 (17) (2009).
- ¹⁰⁰ *Windway Technologies, Inc* 696 N.W.2d at 310 (IW 2005) (Larson, J., dissenting).
- ¹⁰¹ 18 CFR § 292.101(2009).
- ¹⁰² *Windway Technologies, Inc* 696 N.W.2d at 310 (IW 2005) (Larson, J., dissenting).
- ¹⁰³ *Orange & Rockland*, 43 F.E.R.C. ¶ 61,067, 61196 (1988).
- ¹⁰⁴ *Connecticut Light & Power Company*, 70 F.E.R.C. ¶ 61,012 (1995).
- ¹⁰⁵ Thomas J. Starrs, Thomas J. Starrs, *supra* note 77, at 9.
- ¹⁰⁶ *Id.*
- ¹⁰⁷ *Id.*
- ¹⁰⁸ *Id.*
- ¹⁰⁹ Yih-huei Wan & H. James Green, Current Experience with Net Metering Programs 6-7 (1998).
- ¹¹⁰ *In re: Gregory Swecker*, 111 F.E.R.C. P61, 365 (F.E.R.C. 2005).
- ¹¹¹ *Gregory Swecker v. Midland Power* 114 F.E.R.C. P61, 205, 61,694 (2006).
- ¹¹² *Swecker v. FERC*, 2006 U.S. App. LEXIS 24872 (D.C. Cir. Oct. 3, 2006) (citations omitted).
- ¹¹³ Steven Ferrey, *Net Zero: Distributed Generation and FERC's MidAmerican Decision*, The Electricity Journal October 2004 at 37.
- ¹¹⁴ *Id.*
- ¹¹⁵ *Id.*
- ¹¹⁶ *Id.* at 37-38.
- ¹¹⁷ *Id.* at 38.
- ¹¹⁸ *Id.* at 40.
- ¹¹⁹ Steven Ferrey, *supra* 112, at 39.
- ¹²⁰ *Id.* at 41-42.
- ¹²¹ Energy Policy Act of 2005 § 1251, 16 U.S.C. § 2621 (2009).
- ¹²² *Id.*
- ¹²³ *Id.*
- ¹²⁴ *Id.*
- ¹²⁵ Home Energy Generation Act, H. R. 729, 110th Cong. § 6(A) (2007).
- ¹²⁶ Home Energy Generation Act, H. R. 729, 110th Cong. § 6(B) (2007).
- ¹²⁷ Home Energy Generation Act, H. R. 729, 110th Cong. § 5(C) (i) (2007).
- ¹²⁸ Energy For Our Future Act, H. R. 1945, 110th Cong. § 206 (b) (7) (A) (2007).
- ¹²⁹ Energy For Our Future Act, H. R. 1945, 110th Cong. § 206 (b) (4) (B) (2007).
- ¹³⁰ *Net Metering, Interconnection Standards, and Distributed Generation: Before the Subcomm. on Energy of the S. Comm. On Energy and Natural Resources*, 1110th Cong., 6, (2009) (statement of the Honorable Garry A. Brown Chairman, New York State Public Service Commission on the behalf of the National Association of Regulatory Utility Commissioners).
- ¹³¹ To understand how net metering policies have diffused throughout the United States. See James W. Stoutenborough and Mathew Beverlin, Encouraging Pollution-Free Energy: James W. Stoutenborough and Mathew Beverlin, *Encouraging Pollution-Free Energy: The Diffusion of State Net Metering Policies.*, 89 5 SOC. SCI. Q., 1230, (2008).
- ¹³² Minnesota was the first state to adopt net metering in 1983. Net Metering Programs, Yih-huei Wan, Nat'l Renewable Energy Lab, *supra* note 26, at 4.
- ¹³³ Yih-huei Wan, Nat'l Renewable Energy Lab, *supra* note 26, at 4.
- ¹³⁴ *Net Metering, Interconnection Standards, and Distributed Generation: Before the Subcomm. on Energy of the S. Comm. On Energy and Natural Resources*, 1110th Cong., 6, (2009) (statement of the Honorable Garry A. Brown Chairman, New York State Public Service Commission on the behalf of the National Association of Regulatory Utility Commissioners).
- ¹³⁵ D. Herman, EPRI, Strategic Overview of Distributed Resources 2-3 (2000).
- ¹³⁶ Valerie J. Faden, Student Article, *Net Metering of Renewable Energy: How Traditional Electricity Suppliers Fight to Keep You in the Dark*, 10 Widener J. PUB. L. 109, (2000).
- ¹³⁷ Kenneth Rose & Karl Meesuen, Reference Manual and Procedures for the Implementation Of the "PRUPA Standards" of the Energy Policy Act of 2005., 42 (2006); Arkansas Code § 23-18-603 et seq. (2007).
- ¹³⁸ Cal Pub Util Code § 2827 (2009).

- ¹³⁹ 70 Ind. admin Code 4-4.2-1 (2004).
- ¹⁴⁰ Fla. Stat. § 366.91 (2008).
- ¹⁴¹ 220 ILCS 5/16-107.5 (2007).
- ¹⁴² *Net Metering, Interconnection Standards, and Distributed Generation: Before the Subcomm. on Energy of the S. Comm. On Energy and Natural Resources*, 1110th Cong., 8, (2009) (statement of the Honorable Garry A. Brown Chairman, New York State Public Service Commission on the behalf of the National Association of Regulatory Utility Commissioners)
- ¹⁴³ Yih-huei Wan & H. James Green, *Current Experience with Net Metering Programs* 6 (1998)
- ¹⁴⁴ Elizabeth Doris, Joyce McLaren, Victoria Healey, & Stephen Hockett, *Nat'l Renewable Energy Lab., State of the States 2009: Renewable Energy Development and the Role of Policy* 123 (2009).
- ¹⁴⁵ *Id.*
- ¹⁴⁶ Conn. Gen. Stats. § 16-243h (2007).
- ¹⁴⁷ Del. Code Ann. 26. 20, § 1014 (2009).
- ¹⁴⁸ Cal Pub Util Code § 2827 (2009).
- ¹⁴⁹ *Id.*
- ¹⁵⁰ Mich. Comp. law §460.1171 (2008).
- ¹⁵¹ Mich. Comp. Laws § 460.10g (2009)
- ¹⁵² *Net Metering Regulations Summary of Comments & Staff Recommendations*, Alaska Admin. Cod 3 §50.9000 (2009) (waiting to be signed by lieutenant governor) available at <http://rca.alaska.gov/RCAWeb/ViewFile.aspx?id=2dcf0210-ac95-4cd0-bab1-a599c2552cdd> (last visited March 14, 2010).
- ¹⁵³ *Net Metering, Interconnection Standards, and Distributed Generation: Before the Subcomm. on Energy of the S. Comm. On Energy and Natural Resources*, 1110th Cong., 6, (2009) (statement of the Honorable Garry A. Brown Chairman, New York State Public Service Commission on the behalf of the National Association of Regulatory Utility Commissioners)
- ¹⁵⁴ Kenneth Rose & Karl Meesuen, *Reference Manual and Procedures for the Implementation Of the "PRUPA Standards" of the Energy Policy Act of 2005* 42 (2006).
- ¹⁵⁵ Kan. Stat. Ann. § 66-1267 (2009).
- ¹⁵⁶ LA PSC Order, Docket No. R-27558 (2005) available at <http://www.dsireusa.org/documents/Incentives/LA02Rb.pdf> (last visited March 27, 10)
- ¹⁵⁷ N.M. Code R. 17.9.570 (Weil 2009).
- ¹⁵⁸ *Net Metering, Interconnection Standards, and Distributed Generation: Before the Subcomm. on Energy of the S. Comm. On Energy and Natural Resources*, 1110th Cong., 6, (2009) (statement of the Honorable Garry A. Brown Chairman, New York State Public Service Commission on the behalf of the National Association of Regulatory Utility Commissioners).
- ¹⁵⁹ Christopher Cook & Jonathan Cross *A Case Study: The Economic Cost Of Net Metering In Maryland: Who Bears The Economic Burden?* 5-6 (1999).
- ¹⁶⁰ *Id.* at 6.
- ¹⁶¹ Kenneth Rose & Karl Meesuen, *supra* note 134, at 42.
- ¹⁶² Colo. Rev. Stat. Ann. §40-2-124 (2009).
- ¹⁶³ *Id.*
- ¹⁶⁴ N.Y. Pub. Serv. Law §66-I (Mckinney 2009).
- ¹⁶⁵ Con. Gen. Stats. § 16-243h (2009).
- ¹⁶⁶ 70 Ind. admin Code 4-4.2-1 (Ind. 2004).
- ¹⁶⁷ Thomas J. Starrs, *Renewable Energy Policy Project, Net Metering: New Opportunities For Home Power* 7 (1996)
- ¹⁶⁸ *Id.*
- ¹⁶⁹ *Id.*
- ¹⁷⁰ Kenneth Rose & Karl Meesuen, *supra* note 134, at 42.
- ¹⁷¹ Cal Pub Util Code § 2827 (2009).
- ¹⁷² *Id.*
- ¹⁷³ Del. Code Ann. 26. 20, § 1014 (2009).
- ¹⁷⁴ 70 Ind. admin Code 4-4.2-1 (2004).
- ¹⁷⁵ Ky. Rev. Stat. Ann. § 278.466 (West 2009).
- ¹⁷⁶ 2008 Haw. PUC LEXIS 802, *11-13 (Haw. PUC 2008).

- ¹⁷⁷ Md. Code Ann., Pub. Util. Cos. § 7-306.
- ¹⁷⁸ http://www.legislature.state.oh.us/BillText127/127_SB_221_EN_N.pdf (citing 2008 Ohio Laws 21); Ohio Rev. Code Ann. § 4928.01.
- ¹⁷⁹ Thomas J. Starrs, Renewable Energy Policy Project, *supra* note 167, at 7.
- ¹⁸⁰ Edward A. Holt, Ryan Wiser & Mark Bolinger Who Owns Renewable Energy Certificates? An Exploration of Policy Options and Practice ix (2006).
- ¹⁸¹ Mich. Comp. Laws § 460.1011 (2009).
- ¹⁸² Chris Cook & Rusty Haynes, Analysis Of U.S. Interconnection And Net-Metering Policy 4 (2006).
- ¹⁸³ Edward A. Holt, Ryan Wiser & Mark Bolinger, *supra* note 180.
- ¹⁸⁴ *Id.*
- ¹⁸⁵ *Id.*
- ¹⁸⁶ *Id.*
- ¹⁸⁷ *Id.* at x.
- ¹⁸⁸ Edward A. Holt, Ryan Wiser & Mark Bolinger, *supra* note 180, at ix.
- ¹⁸⁹ For a more in-depth view on the ownership of REC's debate. *see* Edward A. Holt, Ryan Wiser & Mark Bolinger Who Owns Renewable Energy Certificates? An Exploration of Policy Options and Practice ix (2006).
- ¹⁹⁰ *Id.* at xiv.
- ¹⁹¹ *Id.*
- ¹⁹² *Id.*
- ¹⁹³ 2009 Kan. Sess. Laws 2369.
- ¹⁹⁴ 220 Mass. Code Regs. 18.09 (2009).
- ¹⁹⁵ Del. Code Ann. 26. 20, § 1014 (2009); N.D. Admin. Code 69-09-07-09 (2009).
- ¹⁹⁶ 2009 N.C. PUC LEXIS 460, *34-*38 (N.C. PUC 2009).
- ¹⁹⁷ Colo. Rev. Stat. Ann. §40-2-124 (2009).
- ¹⁹⁸ Cal. Pub. Util. Code § 2827 (West 2009).
- ¹⁹⁹ Yih-huei Wan & H. James Green, Current Experience with Net Metering Programs 6-7 (1998).
- ²⁰⁰ There has been some discussion on whether requiring a customer to relinquish RECs produced by their generator violates the U.S. Constitution's takings clause. North Carolina's Public Utility Commission held that requiring customer generators to relinquish their RECs to the utility did not violate the takings clause because it was not a taking, as it was more akin to a barter between the utility and customer generator. *See* NCUC Order, Docket No. E-100, Sub 83 (2009), available at <http://www.dsireusa.org/documents/Incentives/NC05Rd.pdf> (last visited March 14, 2010).
- ²⁰¹ 52 P.a. Code. §75.12 (2009)
- ²⁰² Net Metering, <http://www.dsireusa.org/solar/solarpolicyguide/?id=17> (last visited March 14, 2010).
- ²⁰³ 2009 R.I. Pub. Laws 485.
- ²⁰⁴ Vt. Stat. Ann. 30. §219a (2009).
- ²⁰⁵ Yih-huei Wan & H. James Green, *supra* note 199.
- ²⁰⁶ Christopher Cook & Jonathan Cross, Md. Energy Administration, A Case Study: The Economic Cost Of Net Metering In Maryland: Who Bears The Economic Burden? 4 (1999).
- ²⁰⁷ Nat'l Renewable Energy Lab., Making the Connection: Key Issues in Connecting a Photovoltaic System to the Utility Grid, National Renewable Energy Laboratory 5 (1998)
- ²⁰⁸ D. Herman, EPRI, Strategic Overview of Distributed Resources 3-8 (2000).
- ²⁰⁹ *Id.*
- ²¹⁰ Kenneth Rose & Karl Meesuen, Reference Manual and Procedures for the Implementation Of the "PRUPA Standards" of the Energy Policy Act of 2005 39 (2006).
- ²¹¹ *Id.*
- ²¹² *Id.*
- ²¹³ Kristin Bluvass, Comment, 70 Alb. L. Rev. 1589, 1607 Comment: Distributed Generation A step forward in United States Energy Policy (2007)
- ²¹⁴ *Id.*
- ²¹⁵ 70 Ind. admin Code 4-4.2-1 (Ind. 2004); Ky. Rev. Stat. Ann. § 278.466 (West 2009); 20 Va. Admin. Code 5-315-50. (2009).
- ²¹⁶ 65-407-313 Me. Code R. §3 (Weil 2009).
- ²¹⁷ 2009 Kan. Sess. Laws pg. 2369.

- ²¹⁸ Ariz. Admin Code §14-2-2306.
- ²¹⁹ Conn. Gen. Stat. § 16-243h (2008).
- ²²⁰ *Id.*
- ²²¹ Yih-huei Wan & H. James Green, *supra* note 199, at 1.
- ²²² Cal Pub Util Code § 2827 (2009).
- ²²³ *Id.*
- ²²⁴ Colo. Rev. Stat. Ann. §40-2-124 (2009).
- ²²⁵ *Id.*
- ²²⁶ Del. Code Ann. 26. 20, § 1014 (2009).
- ²²⁷ *Id.*
- ²²⁸ Ga. Code Ann. § 46-3-55 (2009)
- ²²⁹ Ohio Rev. Code Ann. § 4928.01.
- ²³⁰ *First Energy Corp. v. Public Utilities Comm'm*, 768 N.E.2d 648, 652 (OH 2002).
- ²³¹ *Id.* (Citing R.C. 4928.37(A)(1)(b)).
- ²³² *First Energy Corp.*, 768 N.E.2d at 652-53 (Citing R.C. 4928.37(A)(1)).
- ²³³ *First Energy Corp.*, 768 N.E.2d at 652-53 (Citing R.C. 4928.37(A)(1)).
- ²³⁴ *Id.* at 653.
- ²³⁵ *Id.*
- ²³⁶ *Id.*
- ²³⁷ *Id.*
- ²³⁸ *First Energy Corp.*, 768 N.E.2d at 653.
- ²³⁹ *Id.* (citations omitted)
- ²⁴⁰ *First Energy Corp.*, 768 N.E.2d at 653.
- ²⁴¹ *Id.*
- ²⁴² Thomas J. Starrs, Renewable Energy Policy Project, Net Metering: New Opportunities For Home Power 7 (1996)
- ²⁴³ New Orleans City Council Resolution R-07-132).
- ²⁴⁴ Available at <http://www.dsireusa.org/documents/Incentives/LA05R.htm> (last visited March 14, 2010)
- ²⁴⁴ *Windway Technologies, Inc* 696 N.W.2d at 310 (IW 2005).
- ²⁴⁵ Yih-huei Wan & H. James Green, *supra* note 199.
- ²⁴⁶ Rusty Haynes & Chuck Whitaker, Connecting to the to the Grid: A Guide to Distributed Generation Interconnection Issues 36 (2007)
- ²⁴⁷ *Id.*
- ²⁴⁸ *Id.*
- ²⁴⁹ *Id.*
- ²⁵⁰ CDR § 26-3000-3001, Or. Admin. R. 860-039
- ²⁵¹ Rusty Haynes & Chuck Whitaker *supra* note 245, at 36-37.
- ²⁵¹ *Id.*
- ²⁵² *Id.* at 28.
- ²⁵³ *Id.*
- ²⁵⁴ *Id.*
- ²⁵⁵ 170 IAC 4-4.2-8
- ²⁵⁶ *Id.*
- ²⁵⁷ *Id.*
- ²⁵⁸ Rusty Haynes & Chuck Whitaker *supra* note 246, at 28.
- ²⁵⁹ *Id.*
- ²⁶⁰ *Id.*
- ²⁶¹ *Id.*
- ²⁶² *Id.*
- ²⁶³ *Id.* at 31.
- ²⁶⁴ Rusty Haynes & Chuck Whitaker, Connecting to the to the Grid: A Guide to Distributed Generation Interconnection Issues 31 (2007)
- ²⁶⁵ Kenneth Rose & Karl Meesuen, Reference Manual and Procedures for the Implementation Of the "PRUPA Standards" of the Energy Policy Act of 2005." 45 (2006).
- ²⁶⁶ Yih-huei Wan & H. James Green, *supra* note 199, at 2.

-
- ²⁶⁷ LA PSC Order, Docket No. R-27558 (2005) *available at*
<http://www.dsireusa.org/documents/Incentives/LA02Rb.pdf> (last visited March 27, 2010).
- ²⁶⁸ New Orleans, LA City Council Resolution R-09-484 (2009) *available at*
<http://www.dsireusa.org/documents/Incentives/LA05Rb.pdf> (last visited March 14, 2010).
- ²⁶⁹ New Orleans City Council Resolution R-07221(2007) *available at*
<http://www.dsireusa.org/documents/Incentives/LA05Ra.htm> (last visited March 14, 2010).
- ²⁷⁰ New Orleans City Council Resolution R-09-484 (2009) *available at*
<http://www.dsireusa.org/documents/Incentives/LA05Rb.pdf> (last visited March 14, 2010).
- ²⁷¹ New Orleans City Council Resolution R-07-132 (2007) *available at*
<http://www.dsireusa.org/documents/Incentives/LA05R.htm> (last visited March 14, 2010).
- ²⁷² Generator Interconnection Information *available at*
<http://www.idahopower.com/aboutus/businessstobusiness/generationinterconnect/> (last visited March 14, 2010).
- ²⁷³ *Id.*
- ²⁷⁴ *Id.*
- ²⁷⁵ *Id.*
- ²⁷⁶ *Id.*
- ²⁷⁷ *Net Metering, Interconnection Standards, and Distributed Generation: Before the Subcomm. on Energy of the S. Comm. On Energy and Natural Resources*, 1110th Cong., 6, (2009) (statement of the Honorable Garry A. Brown Chairman, New York State Public Service Commission on the behalf of the National Association of Regulatory Utility Commissioners)
- ²⁷⁸ Jason Keyes, Kevin Fox, Joe Wiedman & Michael Sheehan, IREC, IREC's 2009 Updates & Trends Report 32 (2009).
- ²⁷⁹ IURC STAFF WHITE PAPER, *Energy Policy Act of 2005: Suggested Standards for State Consideration* 4 (2006).
- ²⁸⁰ Mike Taylor, *When Net Metering Goes Mainstream* Electric Light and Power, July and August 2009, at 41.