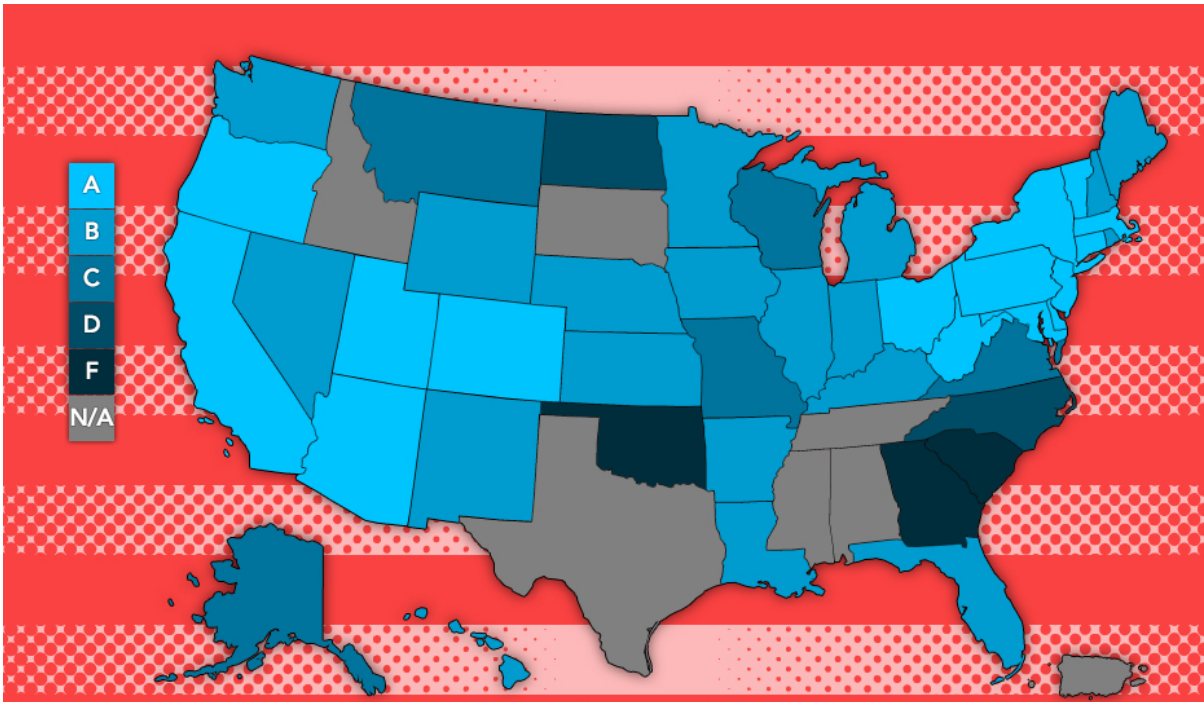




Best Practices in State Net Metering Policies and Interconnection Procedures



November 2014

Available as a free download & interactive online resource:
www.freeingthegrid.org



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Note: This report was prepared with the best information available at the time of writing. We welcome any new information and comments as we strive to make each edition of *Freeing the Grid* as accurate and up-to-date as possible. Any errors or omissions are the responsibility of the authors. Some of the state data and grades from past years were updated. Thus, the scores and grades in this edition may not always agree with what was published in previous editions of this report. In a reassessment of what constituted “statewide policies,” we determined that some state policies did not meet regulatory merit. As such, some states that were graded in past editions received an ‘N/A’ as a grade in this edition.

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Foreword

Welcome to the 2014 edition of *Freeing the Grid*, a guidebook and report for all 50 states on two foundational renewable energy policies: net metering and interconnection procedures.

In the eight years of *Freeing the Grid's* production, there has never been a time when these policies have been the subject of as much public attention and debate as today. We hope that this objective resource continues to help policymakers, regulators and stakeholders cut through the noise, implement sound regulation, and build upon the exciting clean energy progress that so many states have achieved to date.



Effective energy policy and a hefty dose of American entrepreneurship have accomplished something truly remarkable: renewable resources have achieved the scale and cost reductions necessary to allow them to be a real and growing part of our nation's energy landscape. Customer investment in solar and other clean energy sources is rising at a tremendous rate even as state incentives reach their lowest levels in a decade—and in some cases, having accomplished their intended purpose, have gone away entirely. Against this backdrop of newfound market maturity, net metering and interconnection serve to keep the way clear for customers to continue choosing clean energy.

At the same time, these foundational policies have faced increased scrutiny. As of November 2014, more than a dozen states are considering changes to net metering or related rate design. Yet, fortunately, *Freeing the Grid* 2014 grades show no significant decline in state grades over the past year. In addition, a couple states – Vermont and Massachusetts – continue to raise the bar by increasing their net metering caps to expand customer access to distributed renewable energy. On the interconnection side, Ohio notably improved its procedures to streamline the process through which clean energy customers can plug into the utility grid. Looking ahead, many additional states are looking to build upon current market momentum.

As we navigate a period of unprecedented change and innovation in the U.S. energy market, the 2014 *Freeing the Grid* provides an invaluable tool to inform sound clean energy policymaking. We invite you to use this report to learn, to educate and to engage in constructive policy and regulatory discussions that keep our country moving forward on clean energy.

A handwritten signature in black ink, appearing to read 'Adam Browning', written in a cursive style.

Adam Browning
Executive Director
Vote Solar

Introduction to the 2014 Edition

Now in its eighth year of production, *Freeing the Grid* is a guide for improving state net metering and interconnection rules. The 2014 grades and resources center are both available in a highly interactive online format designed to make it easy to access, understand and share best practices and state progress on these foundational energy policies. Visit: www.freeingthegrid.org

Most states that have created and/or revised their interconnection and net metering policies have done so in pursuit of one or more of the same goals:

- To encourage greater renewable energy generation;
- To promote customer-sited Distributed Generation (DG);
- To help meet the goals of renewable portfolio standards (RPS);
- To reduce demand on an increasingly strained electric grid;
- To reward investment in renewable technologies;
- To facilitate energy self-reliance;
- To improve air quality and public health;
- To reduce greenhouse gas emissions; and
- To promote in-state economic development and create jobs.

A dozen states are in the vanguard of best practices; they go beyond merely *enabling* customer-sited DG by actively *encouraging* these clean energy systems. Since the 1st Edition of *Freeing the Grid*, many more states have embraced standard best practices.

Across the board, the most successful states share certain policy components. Those seeking to achieve success have adopted substantially similar policies. The result is a clear, emerging consensus on best practices in many states, and a patchwork of ineffective and heterogeneous rules — or non-existent rules — in others.

One significant lesson that is apparent upon reviewing the wide variety of existing state standards is that inconsistency is the nemesis of clean energy development. It creates confusion among consumers, undermines the ability of businesses to operate efficiently across utility service territories or state lines, and increases costs to all program participants — utilities, consumers, businesses and commission staff — by forcing these stakeholders to master the idiosyncrasies of each individual state's programs.

Defining net metering & interconnection:

Net Metering: The billing arrangement by which customers realize savings from their systems, where 1 kWh generated by the customer has the same value as 1 kWh consumed by the customer.

Interconnection: The technical rules and procedures that allow customers to “plug in” to the grid.

To have a chance to attain the goals listed above, successful interconnection and net metering policies must facilitate the installations of thousands of clean energy systems. It is entirely possible to stymie the development of renewable generation in an entire state by allowing one or more counterproductive provisions to be inserted into these policies during the development process.

In general, commonly accepted technical standards serve an extremely important purpose in the U.S. economy. By meeting a uniform set of procedures and electrical specifications, a wide variety of products and technologies can be developed at low cost by unleashing innovation and customer choice in the marketplace. Additionally, the use of one consistent engineering standard ensures safe and practical daily application. Standards for net metering and interconnection produce similar results for the renewables industry.

Many states—as well as the Federal Energy Regulatory Commission (FERC)—are approaching a consensus on just this type of standard for interconnection. (The FERC standards and agreements for interconnection were adopted in 2005 and updated in 2013 by FERC Order 792, hereafter referred to as the “FERC Standards.”¹)

The vast majority of state and federal interconnection procedures are based on consensus safety and engineering standards from the IEEE and Underwriters Laboratories (UL). It is important to note that utility interests have had strong, expert representation throughout state and federal proceedings. The standards relevant to this report reflect technical provisions that have been negotiated and agreed upon with substantial utility input, thus obviating the need to renegotiate these provisions on a state-by-state basis. Indeed, the intended purpose of the robust standards development process is to benefit state decision-makers, regulators and utilities by saving them time and energy, while also preventing a patchwork of approaches and inconsistencies that impair market growth.

Designing economically sustainable renewable energy markets requires the coordination of complementary policy and regulatory mechanisms. While financial incentives are the engine of market development, interconnection and net metering policies are the road. It is much easier for a market to accelerate on the smooth, finished roads of Colorado, New Jersey and California, for example.

For three decades, states have served as the proving grounds for determining what works for connecting renewable energy to the grid. The best practices have emerged and are, once again, reflected in the latest edition of *Freeing the Grid*.

¹ <http://www.ferc.gov/industries/electric/indus-act/gi/small-gen.asp>

State Grades for 2014

STATE	Net Metering Grade	Interconnection Grade	STATE	Net Metering Grade	Interconnection Grade
Alabama	–	–	Montana	C	C
Alaska	C	–	Nebraska	B	–
Arizona	A	–	Nevada	A	B
Arkansas	B	–	New Hampshire	A	D
California	A	A	New Jersey	A	B
Colorado	A	B	New Mexico	B	A
Connecticut	A	B	New York	A	B
D.C.	A	B	North Carolina	C	B
Delaware	A	B	North Dakota	D	B
Florida	B	D	Ohio	A	A
Georgia	F	–	Oklahoma	F	–
Hawaii	B	B	Oregon	A	A
Idaho	–	–	Pennsylvania	A	B
Illinois	B	B	Rhode Island	B	B
Indiana	B	B	South Carolina	D	F
Iowa	B	B	South Dakota	–	C
Kansas	B	–	Tennessee	–	–
Kentucky	B	D	Texas	–	D
Louisiana	B	–	Utah	A	A
Maine	B	B	Vermont	A	B
Maryland	A	B	Virginia	D	A
Massachusetts	A	A	Washington	B	B
Michigan	B	C	West Virginia	A	B
Minnesota	B	C	Wisconsin	D	D
Mississippi	–	–	Wyoming	B	–
Missouri	B	–			

Grade Distribution for 2014

Net Metering Grade	Number of States
A	18
B	18
C	3
D	4
F	2
n/a	6

Interconnection Grade	Number of States
A	7
B	20
C	4
D	5
F	1
n/a	14

“Electric power is everywhere present in unlimited quantities and can drive the world’s machinery without the need of coal, gas, or any other common fuels.”

— Nikola Tesla



In Focus: The Long-Standing History of Self-Generation

As net metering garners more public discussion, its ability to encourage customer adoption of distributed solar generation is often discussed as a “new” or “emerging” challenge to the traditional utility business model. While the scale and scope of net metering may be reaching new heights, it is important to note that the right to self-generate has been somewhat quietly enshrined as a part of United States energy policy for over 30 years.

When Congress enacted the Public Utilities Regulatory Policy Act of 1978 (PURPA), it set the course of decades of national policy regarding the development of alternative forms of generation. While traditionally thought of in the context of the global oil crisis and the aim of reducing national reliance on fossil-based fuels, PURPA has also had a profound impact on the emerging movement toward a more distributed grid: i.e., a grid where generation is located closer to load than under the central station model that has dominated the past century.

Net metering rightfully gets credit for driving growth of customer adoption of solar, and for redefining the traditional roles of customer and utility in relation to the grid, but PURPA should get its due for laying the foundation for this paradigm shift. Indeed, PURPA can be seen as an early, federal “bill of rights” for those who wish to self-generate and still receive service from a utility’s grid. Perhaps just as significant is the fact that PURPA provides Qualifying Facilities (QFs)—a classification that includes solar photovoltaic (PV) facilities—protection against discriminatory treatment in their purchases from and sales to utilities.

While federal law does not provide for net metering, it does provide that, at a minimum, the interconnected utility must allow customers to self-generate and that the utility may be compelled to purchase any electrical output that is exported to the grid from the customer’s QF. The emergence of net metering into the mainstream of American policy, some two decades after PURPA’s enactment, can be viewed as a natural outgrowth of this foundational federal policy.

The distinction between a PURPA sales arrangement and state-level net metering is important. Under PURPA, utilities compensate QFs for exported electricity based on the incremental cost that the utility would have incurred to provide that some unit of electricity. This is known as “avoided cost.” Avoided cost rates have been historically insufficient to spur significant growth of distributed solar, though there are exceptions where other policy supports are in place at the state level (e.g., North Carolina has a solar tax credit and a renewable portfolio standard featuring a solar carve-out sufficient to drive solar growth under PURPA). Tremendous recent declines in the cost of DG solar are also starting to change this equation, with avoided cost rates more closely matching solar development costs in some states and some times of the year.

Net metering, on the other hand, does not necessarily involve the sale of exported electricity at all. Rather, net metering gives customers retail rate credit for system production against their consumption from the grid over an applicable billing period. A sale only occurs at the end of the state’s defined billing period (e.g., end of month, end of year or indefinite rollover), and then the

excess generation must be sold in compliance with PURPA. In this way, the only real “compensation” that customers receive is a lower electricity bill.

Despite these differences, net metering looks like a logical evolution from the federal PURPA policy of encouraging self-generation to meet the goal of reducing reliance on depletable, fossil-fuel resources. Indeed, FERC’s order adopting rules to implement PURPA (Order 69) addressed commenters’ suggestion that “net energy billing” might be an appropriate implementation of PURPA. FERC observed that it was possible that “netting” could constitute an appropriate proxy for avoided cost, particularly where retail rates were based on marginal costs and the customer was taking service under time-of-day rates (i.e., rates that charge customers a higher charge for consumption during defined on-peak periods when the cost of producing additional power is generally much higher). Ultimately, Order 69 recognized that this was primarily an issue of state jurisdiction and FERC deferred to the states on “whether to institute net energy billing.”

While PURPA and net metering both uphold to the principle of self-generation, they should be understood as distinct policies. Respectively, they are separate, state and federal iterations of a collective national policy of encouraging renewable energy development and reducing reliance on fossil-fired generation. PURPA represents the federally mandated bare minimum in terms of compensation that a QF must receive. Net metering, on the other hand, represents a state policy-driven program that is dependent on retail rate design—which is a solely the domain of the states—to derive just compensation.

From a best practices perspective, however, it is worth considering what PURPA has to say in regards to discriminatory charges on QFs. While a net metering system might not need to be a QF to participate in the state net metering program, all solar photovoltaic facilities under 1 MW would qualify as QFs, even without taking formal action to file for recognition with FERC. Just as *Freeing the Grid* recognizes states for a best practice for providing safe harbor—and ensuring that net metering systems do not face any additional charges—PURPA provides a minimum protection that rates for sales to QFs should be just and reasonable and should not discriminate against QFs, as compared to other customers that did not install QF generation. As the focus on customer’s ability to reduce purchases from utilities through net metering continues to build intensity, PURPA may have some lessons for us yet.

In Focus: Shared Renewables’ Ever-Upward Trajectory

Over the past several years a new policy trend has quickly grown from fringe outlier to mainstream movement. Shared renewables (aka community renewables) programs allow electric customers to participate in a common, shared system and, in return, receive credit on their energy bills for their share of the generation. This model carries a number of benefits – it can make the most of siting potential in an area, it provides renewable energy access to the majority of American who are renters or otherwise cannot host an onsite system, and it can facilitate participation in small increments, thereby becoming more attainable for low-income customers to participate. These exciting programs should be treated as additive to – rather than

a replacement for – traditional net metering, good interconnection and other regulations that support rooftop solar and other on-site clean energy investment.

States and forward-looking utilities across the country are increasingly exploring shared renewables as an additional pathway to connect even more consumers with the clean energy they want. Given all the progress made over the past year, shared renewables programs seem to be on an ever-upward trajectory. Here are a few of the highlights.



Over the past year, the nation focused much of its solar-related attention on Minnesota, as that State's Public Utilities Commission devised rules to implement an omnibus energy bill passed in May 2013. This law required Xcel Energy to permit community solar gardens of up to 1 megawatt (MW) in size, allocated to at least five subscribers. Subscribers may offset from 200 watts to 120% of their average annual consumption through a shared renewables subscription. With most of the details now worked out, this new offering should go a long way to helping far more Minnesota residents plug into the sun.

Enabling legislation was also abuzz in our nation's capital last year. On October 1, 2013, the D.C. Council voted to enact the Community Renewables Energy Act of 2013. As 60% of D.C. residents are renters, this law will bring renewable energy, and in particular solar, to the masses by allowing utility customers to participate in a community renewable energy facility and receive credits on their electricity bills. The Public Service Commission has not yet adopted rules for these arrangements but a rulemaking process is currently underway.

In addition to D.C. and Minnesota, utilities around the country have been setting up voluntary programs in response to customer demand. Projects have been announced, planned or launched in places like Lincoln, Nebraska; Clark County, Washington; Westby, Wisconsin; Grand Traverse County and Lansing, Michigan; and Orlando, Florida. This is a much broader geographic distribution than we saw even two years ago when shared renewables systems were located almost exclusively in the west (mostly in Colorado and Washington) and northeast (mostly in Vermont). Now we see shared renewables programs popping up in every region of the country. And as these programs multiply, they are also innovating and building off one another.

We are also now beginning to see the market-expanding effects from some of the more mature programs such as those resulting from Colorado's Community Solar Gardens law. According to the Clean Energy Collective, over 75% of electric customers now have access to a shared solar program in Colorado. Many local governments are also beginning to sign up for these shares to offset electric loads at schools and other government buildings. The private sector has also been

given a boost by its role in developing projects, billing software and administrative roles for these community facilities.

Shared renewables programs represent an exciting new frontier for renewable energy in the U.S. Voluntary utility programs have exhibited creativity and innovation in program design, larger statewide programs have been able to reach unprecedented numbers of new solar consumers, and we see an increasing number of states considering programs of their own. The momentum of shared renewables has gained such force across the country; we can confidently say it is a trend that is here to stay.

Emerging Issue:

Fixed Charge Proposals Warrant Reasoned and Reasonable Approach

Nationally, a lot of attention has recently focused on whether net metering is fair to residential customers that do not participate in the program. The crux of these concerns is whether residential net metering customers continue to pay a fair portion for the upkeep of the grid that they rely on to net meter. If utilities collect some portion of the grid costs through kilowatt-hour sales, and net metering allows customers to avoid those sales to some degree, then utilities tend to argue that they fail to collect sufficient revenue to cover their fixed costs of operating and owning the grid and must eventually pass those costs on to all ratepayers in a future rate case. Owing to the manner in which utilities collect distribution-related costs from residential customers—typically without use of demand charges—these issues of equitable use of the grid often boil down to a matter of rate design.

Accordingly, residential rate design—the manner in which utilities collect the costs that are attributable to the residential class—has taken center stage in this discussion. Most prominently, the California Public Utilities Commission commenced a comprehensive investigation into the future of rate design in the state, including a consideration of how the future rate structure might impact net metering customers. Currently, residential rate design tends to consist of just two structural components: a monthly, per customer fixed charge (if any) and a charge for each unit (kWh) of electricity purchased, i.e., the volumetric electricity rate. While a third component is used in some instances, a charge that applies to the maximum demand (kW) for each customer, demand-related costs are typically recovered from residential customers through some combination of fixed monthly charges and the volumetric rate. In many cases, imposing a demand rate component could require extensive rollout of metering infrastructure to measure residential customers' individual demands.

Though every utility will differ, the monthly fixed charge is typically designed to collect a small portion of the fixed costs of serving that customer, with the rest of the required revenue spread out among the total number of kWh sales the utility expects to make to the entire residential class. At a basic level, the more revenue that is collected through the fixed charge, the less revenue that has to be collected through volumetric rates (i.e., kWh charges). For net metering, this means that the greater the fixed charge, the lesser the value that will be realized by avoided kWh purchases from the utility. In this way, increasing reliance on fixed charges is also somewhat

of a worst practice for energy conservation, as it reduces the price signal to avoid the purchase of the next kWh and creates additional costs that cannot be avoided by customers.

Another aspect of this trend is that utilities have been seeking to expand the types of costs that are collected through fixed charges. Traditionally, customer charges have more or less been reserved to collecting the costs defined as “customer costs”, or those costs that are specific to the individual customer such as the meter, line drop, and billing costs. As utilities seek to recover a greater portion of their fixed costs of the grid through fixed customer charges, the types of costs proposed to be included will expand. For example, in testimony in an ongoing rate case of Appalachian Power Company (APCo) in Virginia, the utility has stated its intention to seek to eventually collect all fixed distribution costs through fixed, monthly recurring charges.

Whether or not this trend is in response to net metering or to correct undercollection of these costs from low-usage customers generally, utilities around the country have begun asking for greater assurances from regulators that they will be able to recover their customer and other demand-related costs of providing grid service. For example, in Utah, Rocky Mountain Power recently sought approval to increase its \$5 monthly customer charge to \$8, while asking to double its minimum bill—the minimum amount a customer must pay each month, even with zero kWh usage—from \$7 to \$15. In Virginia, APCo is proposing to double its residential customer charge from \$8.35 to \$16, with the caveat that it would eventually seek to recover 100% of its fixed distribution system costs (approximately \$25) through a fixed monthly charge. In California, as part of compromise legislation that firmly establishes a large net metering cap and calls for further net metering reforms, utilities will be able to seek up to \$10 in monthly fixed charges from residential customers.

As these charges impact net metering at a basic level, just as they affect all customers, it is significant that several utilities have begun to seek to augment these fixed monthly charges—which only recover a portion of fixed, distribution costs—with additional charges that only apply to net metering customers. For example, Arizona Public Service currently imposes a per kW monthly charge for all new net metered systems, though that charge was arrived at through a compromise process (i.e., without a fully litigated consideration of costs and benefits) and will be revisited on a more quantitative basis in a future rate case. In Utah, Rocky Mountain Power sought authority to impose an addition charge of \$4.65 (above and beyond the approved customer charge amount) to collect a greater portion of its fixed costs from net metering customers than it does for other residential customers. It was denied based upon insufficient evidence. Virginia’s APCo is seeking authority to impose a substantial per kW “standby” charge on residential net metering customers over 10 kW.

Charges like this tend to rest on the assumption that net metering customers are not purchasing sufficient kWh to cover fixed costs (less than class average) and that an additional measure is needed to prevent a cost shift from occurring. Underneath that assumption, however, is a deeper question of whether the benefits of net metering customers covers that purported under-recovered amount of revenue, which would leave other customers indifferent. In other words, the net metering customers would be contributing their costs to the grid by partially

paying for it through their utility bills and partially by improving the grid by virtue of operating their distributed net metering systems.

Best practices call for a thorough evaluation of the benefits that net metering customers create, not just whether they consume less kWhs than the average customer in their class. To be consistent with sound ratemaking practices, any costs directed specifically to net metering customers—and not charged to all customers—should be based on solid analysis of whether net metering customers differ significantly from other members of their respective class in how they cause the utility to incur costs to provide service. Absent robust information and analysis on the costs and benefits of customer-sited distributed generation, specific charges targeting net metering customers are unwarranted and constitute discriminatory ratemaking practices.

Our Scoring Methods

In this evaluation of statewide interconnection and net metering programs, the authors developed an index that awards points for elements that promote participation, expand renewable energy generation, or otherwise advance the goals sought by net metering. Conversely, the index issues demerits for program components that discourage participation or limit renewable energy generation.

Applying these numerical values to program components allows for separate plotting of the effectiveness of each state’s interconnection and net metering standard, and assignment of letter grades to each.

Policy Points: Net Metering

Net Metering Grades	
A	15 and above
B	9-14.5
C	6-8.5
D	3-5.5
F	Less than 3

Individual System Capacity

Points	Largest System Allowed to Net Meter
+5	2 MW or greater
+3	Greater than 500 kW, but not greater than 2 MW
+1	Greater than 100 kW, but not greater than 500 kW
0	Greater than 50 kW, but not greater than 100 kW
-1	50 kW or less

In certain cases, statutory or regulatory limits on the size of eligible technologies prevent electric customers from correctly sizing a DG system to meet their own demand, undermining one of the primary drivers of DG. There is no policy justification for limiting system size to an arbitrary level. Customer load and demand should determine the system's design parameters.

For a couple of examples, the Database of State Incentives for Renewables & Efficiency (DSIRE) notes: At the upper end of the spectrum, Pennsylvania allows net metering for certain systems up to 5 MW; New Mexico allows net metering for certain systems up to 80 MW; and there is no stated capacity limit in Arizona, Colorado, New Jersey, or Ohio. In many cases, states limit systems to a certain percentage (e.g., 125%) of the customer's load, so that customers do not intentionally oversize their systems. Furthermore, some states have established individual system capacity limits that vary by utility type, system type or customer type.

Total Program Capacity Limits

Points	Total Program Limit as Percentage of Peak Demand
+2.5-3	Equal to or greater than 5%; no limit
+2	Greater than 2%, but less than 5%
+1.5	Greater than 1%, but not greater than 2%
+1	Greater than 0.5%, but not greater than 1%
+0.5	Greater than 0.2%, but not greater than 0.5%
0	Less than 0.2%

In response to concerns that customer-sited DG represents lost revenues or may cause adverse system impacts, many states have limited the total aggregate capacity eligible for net metering, either statewide or for specific utilities. While these arguments have some intuitive appeal, they reflect a shortsighted view of the arrangement and warrant more robust analysis and discussion.

Arbitrary limitations on the total amount of clean energy that customers may generate and contribute to the electric grid runs counter to best practices. Utilities do not have an inherent

right to charge for electricity that customers could otherwise generate more efficiently and more cleanly on their own. What’s more, as previously noted, best practices call for a thorough evaluation of the benefits that net metering customers create, not just whether they consume less kWhs than the average customer in their class. Absent robust information and analysis on the costs and benefits of customer-sited distributed generation, capacity limits artificially restrict the expansion of on-site renewable generation and curtail the market for new renewable energy systems. They are also incompatible with aggressive targets for renewable energy deployment set by a growing number of states. Lastly, the adoption of interconnection standards can effectively address any potential system impacts of customer-sited DG before issues arise (see Interconnection Policy, *Technical Screens*).

Capacity limits, usually based on a percentage of peak demand, create uncertainty for customers considering net metering. Since customers have no way of knowing when capacity limits will be met, they cannot effectively plan for future DG installations. This regulatory uncertainty inhibits renewable energy investment.

Rollover Restrictions

Points Rollover Restrictions

+2.5	Indefinite rollover at retail rate
+1	Monthly rollover at retail rate for one year, annual payment at wholesale rate or avoided cost
0	Monthly rollover at retail rate for one year, excess energy donated to utility annually
-2	Monthly payment at wholesale rate or avoided cost
-4	No rollover permitted, excess energy donated to utility monthly

When customers generate more electricity than they consume during a monthly billing period, most states allow customers to “rollover” the excess generation. The utility carries forward any excess generation until it is used up. Some of the least effective net metering programs prohibit kWh credit rollover, perhaps only providing a wholesale rate payment for excess electricity generated by customers each month. In these states customers undersize their systems so the systems produce less energy than their monthly minimum load requirements.

Restricting rollover to a single month may be more costly than allowing rollover. In fact, the administrative costs that a utility may incur through the process of paying for small amounts of monthly excess generation, via cutting checks or some other form of payment, may be greater than any perceived loss of revenue associated with rollover credits.

To be successful, a net metering program must facilitate rollover so that customer-generators receive credit for excess energy generated during the seasons when renewable output is highest and apply it toward their consumption when output is lowest, allowing customers to achieve

zero net energy consumption from the grid. Indefinite rollover provides the best approach to account for variations among different system technologies and locations. Customer-generators realize the most financial benefit from net metering in this manner.

Metering Issues

Points Metering Provisions

- +2 No meter change required—customer-sited generator uses existing meter
- +2 New meter is provided by the utility at no cost to the customer-sited generator
- +1 Dual meters or dual registers—utility pays for the additional meter
- 0 Dual meters or dual registers—customer pays for the additional meter

Points Metering Provisions Under Time-of-Use (TOU) rates

- +2 TOU meters with time bin carryover
- +1 TOU meters with segregated time periods
- 1 Segregated TOU rate disadvantage small generators

Requiring the customer-generator to pay for additional meters singles them out for disparate treatment accorded no other customer of the utility. Special and/or duplicate meters are not necessary for the process of net metering and should not be an extra financial burden to customers with DG.

Some state policies require (or encourage) customers who choose to net meter to switch to a TOU rate, where the customer pays differing rates depending on the time of day. This can either reward generators who produce during peak demand periods, when electricity is most expensive and the grid is strained, or can disadvantage customers by requiring them to pay extra fees or undervalue weekend and off-peak production.

TOU meters track electric usage during specific periods of time. The time periods are tracked by the meter either through “real time” pricing (i.e., over 15 min, 30 min, or 1 hour intervals) or pre-set prices based on segregated time periods (i.e. day-peak/night-off-peak and/or seasonally adjusted). Ideally, if customer generation exceeds consumption in one time period (time bin), the excess generation produced in the peak time bin and not needed in that time bin can carry over to be utilized in other time bins. With segregated time periods and no time bin carryover, excess generation in one time period can only offset consumption in that same time period. This situation is less than ideal as it can leave net metering credits produced during peak time periods unable to be fully utilized – even in the case where offsetting consumption during off-peak times with credits produced during peak time periods. Accordingly, fewer points are awarded where TOU meters are utilized with segregated time periods and no time bin carryover. A negative point is awarded if TOU metering is required and the peak time period disfavors solar generation, such as having a peak period of 6pm-9pm. This would result in a high TOU peak rate with low PV output, thus providing the customer with less of an incentive to net meter.

Renewable Energy Credit Ownership

Points	Renewable Energy Credit (REC) Ownership
+1	Owned by customer
-1	REC ownership not addressed
-2	REC given to the utility for exported electricity
-5	REC transferred to utility without appropriate incentive

Renewable energy credits provide another potential stream of revenue for owners of systems that generate electricity with renewable resources. In many areas of the United States, RECs are bought and sold as a commodity in voluntary “green power” markets or are directly used to fulfill a utility’s RPS requirements. Utilities should not be permitted to seize RECs from system owners without paying the market price for them.

Eligible Technologies

Points	Eligible Technologies
+1	Solar, wind and other renewable and low emission technologies
+0.5	Solar and wind only
0	Excludes solar or wind

With appropriate interconnection procedures, there is no reason to exclude renewable, customer--sited generators, such as PV and small wind, from net metering. Most states include a longer list of eligible technologies, including biomass, landfill gas, small hydroelectric systems and other renewables that are often included in state RPS policies. Recently, there has been a growing trend of state legislation to include Combined Heat and Power (CHP) as an eligible technology in net metering; seven states have included CHP in the past two years alone. Making CHP a part of state net metering policy reflects various intentions depending on the particular state; either to encourage highly efficient and low--emission electricity generation, diversify electric resources, and/or address local grid infrastructure concerns.

CHP has several characteristics (flexibility in fuel sources, selective availability, and the ability to capture heat for different onsite applications), which make CHP a somewhat unique technology for net metering. These factors have occasionally warranted special caveats in state net metering policies to account for some of these differences. Some of these caveats include allowing only micro-CHP as an eligible technology (usually systems under 30 kW), different excess generation rollover provisions and fuel restrictions.

Eligible Customers

Points	Customer Class Eligibility
+2	No eligible class restrictions
+1	Non-residential class permitted to meter up to state capacity limits while residential class limited to no more than 10 kW
0	Residential class only

Some state net metering rules restrict the customer classes eligible to participate. Rules may also exclude commercial customers and/or other non-residential customers that could most greatly reduce demand on a strained grid and which often enjoy the lowest costs for installed systems. Allowing non-residential customers to net meter is essential to jump-starting new renewable energy markets.

Bonus for Aggregate Net Metering

Points	Bonus
+1	A customer may aggregate all meters on his or her contiguous property for the purposes of net metering.

A few states allow aggregation of meters for net metering, sometimes known as “group metering.” This primarily benefits farms and properties that may have multiple meters. Some states allow aggregate metering that combines accounts for net metering across one or multiple property boundaries.

Bonus for Community Shared Renewables

Points	Bonus
+1	A customer may receive net metering credits for investing in or subscribing to a renewable energy system that may not be physically located on their property.

For a variety of reasons, customers may be unable to host an on-site renewable energy system. For example, a customer may be a tenant in a multi-unit building where the landlord will not allow the installation of a solar system on the roof. Because renewable energy program rules often require a renewable energy system to be located on-site, these customers are prohibited from greening their energy supply despite their willingness to make that investment. Forward looking states are beginning to address this program gap and expand opportunities for customers to participate in renewable energy through shared renewables programs. Under a shared renewables program, customers are allowed to invest in an off-site renewable energy system and still participate in net metering and other state-level incentive programs. A well-

designed shared renewables program expands options for customer participation in renewables without weakening successful on-site renewable energy programs.

Safe Harbor Provisions, Standby Charges, or Other Fees

Points Fee Treatment	
+3	Safe harbor language protects customers from unspecified additional equipment, fees, requirements to change tariffs, etc.
0	Not addressed
-1	The utility imposes fees or decision on whether to add fees is left to the utility
-1	Minor additional fees for net metering are imposed
-5	Significant additional charges or fees are imposed

Many utilities claim that, in the event that net-metered systems fail, the utility is required to meet the resulting increase in customer demand. As a result, many states allow utilities to impose a “standby charge” on net-metered customers.

Standby charges constitute poor public policy in the context of net metering, especially for owners of small, renewable energy systems. Some researchers have noted that they are “analogous to assigning standby fees to residential customers who purchase high efficiency air conditioning units,” because, in theory, utilities would be required to meet increased demand should the air conditioners fail and need to be replaced by more conventional units. In some cases, standby charges are equal to—or even exceed—rates for full electrical service, in effect creating an economic disincentive for customers to install renewable energy systems.

Standby charges are particularly burdensome to small generators for whom utilities only need to provide a negligible amount of back-up power. These fees can be so costly that they diminish most, if not all, of the economic incentive net metering was intended to offer smaller generators.

Safe harbor provisions ensure that net-metered customers are treated like any other customer. These provisions explicitly state that the utility may not charge a customer-sited generator any fee or charge, or require additional equipment, insurance or any other requirement—unless the fee or charge also applies to other customers that are not customer-sited generators.

Policy Coverage

Points	Utilities Covered
+1	Rules apply to all utilities
0	Rules apply to investor-owned utilities only

Net metering policies generally arise from either a statute passed by a legislative body or from a commission decision. Depending on its origin, a policy may cover all utilities in the state (usually those embodied in a statute) or just investor-owned utilities (IOU) (usually those issued by a

commission decision). For example, Colorado’s Public Utilities Commission adopted net metering rules that only applied to the state’s IOU. This helped open solar markets in the more densely populated IOU territories, but did little for the windy rural areas that were operated by electric cooperatives (co-ops) or municipal utilities (munis). However, in early 2008, House Bill 08-1160 was enacted, offering net metering to customers of co-ops and munis. This was welcome news to rural customers who want to take advantage of small wind systems.

Third-Party Model

Points	Third-Party Power Purchase Agreement Treatment
+1	Presumed allowed to net meter
0	Not specified
-1	Presumed not allowed to net meter

Over the past few years, the third-party ownership model has emerged as a useful financing solution for solar installations. With this model, instead of buying a solar system, a customer signs a long-term contract with a third-party who installs and owns a solar system on the customer’s roof. This model has proven successful because the host does not have to put up initial capital, available tax credits and incentives are able to be more fully utilized (especially in the case where the property owner has limited tax liability), and the host has zero operations and maintenance costs. Given the success of this approach, it will be an important driver of a sustainable PV market. Faced with the possibility of these third-party owners being regulated as utilities, a few states have investigated the legality of this model. For example, in the summer of 2008, the Oregon Public Utility Commission (PUC) ruled that third parties are not utilities and therefore are not regulated by the commission. The PUC ruled that, with third-party ownership, the system is installed on the customer’s side of the meter and does not require the distribution system wires or ancillary services.

Creating a metric that weights the amenability of a state toward third-party ownership is sufficiently nuanced and state-specific; therefore relative scoring is impractical. The treatment of the third-party model may also be outside the net metering regulations themselves. For the purposes of this report, a point is awarded for net metering rules that do not preclude the third-party ownership model within the net metering rules. A negative point is warranted for those states that expressly exclude third-party-owned systems from net metering. For example, where a state’s net metering rule defines a net metering facility as a “customer-owned” facility, instead of using more neutral and flexible “customer-sited” terminology, the state’s rule would be counted as an express exclusion of third-party owned systems from net metering.

Policy Points: Interconnection

Interconnection Grades	
A	22 and above
B	15.5-21.5
C	10.5-15
D	8-10
F	0-7.5

The primary intent of revamping the interconnection grading criteria last year for *Freeing the Grid 2013* was to reflect continued evolution in best practices concerning interconnection procedures, including the aforementioned updates to FERC standards. While several states see an improvement in letter grades, due to the fact that the new approach recognizes several valuable policy components that were previously not measured, we have designed the scoring bands, to the maximum extent possible, to avoid lowering a state’s grade that has no policy changes. Lack of objective technical screens is the primary reason that any states received lower letter grades, since the new approach allocates more weight to that category.

Eligible Technologies

Points	Customers that Qualify (only one may apply)
+2	All customer-sited generators qualify, or
+1	Only renewable generators permitted

While public policy may emphasize the installation of renewable energy generation, the system and engineering impacts of a particular generation facility should be evaluated solely on their own merits. To do otherwise introduces complexity and may restrict innovation. If a generator complies fully with the relevant technical standards, there is no operational or safety justification to deny interconnection to the facility merely because it uses a non-renewable fuel source.

Individual System Capacity

Points	System Capacity (only one may apply)
+1	Generators up to at least 2 MW are eligible
+1.5	Generators larger than 2 MW and up to 10 MW are eligible
+2	Generators larger than 10 MW and up to 20 MW are eligible

Interconnection procedures should be less stringent for small, simple systems and more stringent as system size increases. However, standards should also permit systems that are sized to meet even large, on-site loads. Office parks, government buildings, military bases, hospitals or college campuses can potentially accommodate installations of 2 MW or more just to serve a portion of their load. Increasingly, forward-thinking states are facilitating this option.

“Breakpoints” for Interconnection Process

Points	Levels
+1	Simplified application for certified, inverter-based generators up to 25 kW
+1	Expedited interconnection process available for certified, inverter-based generators up to 2 MW
+0.5	Expedited interconnection process available for certified, inverter-based generators up to 5 MW
+0.5	Simplified/expedited process available for non-exporting generators up to at least 10 MW
+1	Study process is differentiated into two or more parts

Many technical considerations and studies are relevant only for relatively large generators. It is most efficient to break a single overall interconnection process into separate ‘tracks’ based on generator capacity, relieving complexity for the smallest systems while preserving conservative and thorough studies for larger installations. The emerging best practice is to position applicants at four breakpoints in system size: 25 kW, 2 MW, 10 MW (non-exporting systems), and a track for systems 20 MW and larger.

Timelines

Points	Timelines
+1	Application completeness reviewed in up to 10 business days
+1	Initial review screens, if any, applied in up to 15 business days
+1	Supplemental review, if any, applied in up to 20 business days
+1	Timeframe for utility completion of study process is less than 120 calendar days
+1	Timeframe specified for utility to provide an interconnection agreement

Time is money, and for a device like a rooftop PV systems, where physical installation may take just two working days, paperwork and permits represent the single largest obstacle to quick installation. The FERC standards establish a timeline for each step of the application process, for each type of generator and previous grading has focused on whether state standards provided timelines that were consistent with, better or worse than FERC’s timelines. Grade changes to this category made in 2013 allow partial points for states that match FERC’s timelines in some

respects, but exceed those timelines overall. It is important for interconnection customers to have certainty in the basic “process” timeframes.

Interconnection Charges

Points	Fees
+1	Application fees waived for net metered customers up to 25 kW
+1	Application fees are no more than \$300 for certified, inverter-based generators up to 25 kW
+1	Application fees are no more than \$1,100 for certified, inverter-based generators up to 1 MW
+1	Supplemental review cost, if any, is waived for net metered customers up to 25 kW
+1	Supplemental review cost, if any, is capped at no more than \$2,500

Interconnection application fees along with other fees can create challenges, especially if these fees are unknown at the onset of project development. Several states currently waive fees for smaller generators, or create an application fee structure that accounts for the lower cost of reviewing smaller generators, as compared to the maximum size allowed under an expedited process. Application fees should bear some reasonable relation to the complexity of the request, with an appreciation that generators 1 MW or less are unlikely to present any undue challenges to efficiently processing and reviewing the requests in an expedited manner.

Certification

Points	Standard
+1	IEEE 1547 specifies operating requirements generators must follow
+1	UL 1741 certification required for inverter-based systems

The electrical safety and operation of the grid must be a primary concern in the development of any interconnection procedure, and must remain an engineering standard, not a policy determination. Utilities, equipment manufacturers, national laboratories and testing facilities, and governmental representatives have developed the relevant technical standards jointly.

Technical Screens

Points	Screen
+3	Objective technical review screens applied to expedite interconnection up to at least 15% of peak load

+1	Supplemental review screens applied to generators that do not pass initial review screens to allow expedited interconnection up to at least 100% of minimum load
+1	Generators with limited upgrades on utility system still eligible for fast track
+0.5	Spot network interconnections allowed up to 5% of customer load or 50 kW
+0.5	Area network interconnections allowed under a defined process with clearly identified technical requirements

Every interconnection is different, but all interconnections share some fundamental characteristics. These relate to, among other things, the size of the generator relative to the section of the grid to which it connects and the ratings of the protective equipment installed. These factors determine how complex the interconnection process needs to be.

The FERC standards provide a thorough set of technical screens that has been widely adopted for use in many jurisdictions; as these screens are widely used and understood, adoption of these basic screens is considered a minimal measure for purposes of scoring. Key among these screens is the penetration screen, which effectively limits the amount of generation that can be installed, in the aggregate, on a line section. For generators that would cause a line section to exceed 15% of peak load, an emerging best practice is to allow that generator to proceed through a supplemental review process based on 100% of minimum load (and 100% of minimum daytime load for solar generation), minimizing the risk that a generator will cause adverse impacts.

Rule Coverage

Points	Utilities Covered
+1	Rules apply to all utilities, including municipal utilities and rural cooperative utilities

Interconnection procedures may cover all utilities in the state, but in many circumstances, the applicability of rules developed by state utility commissions is limited by jurisdictional constraints to investor-owned utilities. Statewide consistency in interconnection procedures and forms breeds familiarity and efficiency, reducing confusion for installers and utilities that may have to manage several different interconnection standards in the state.

Network and Distribution Upgrade Cost Exposure

Points	Screen
+1	Upgrade costs waived for net metered customers up to at least 25 kW
+1	Upgrade costs capped at amount estimated in interconnection agreement or studies (+/- 25%)
+1	Customer is able to construct its own interconnection facilities

For generators that require upgrades, cost certainty is a central concern affecting the viability of a particular project site and the ability to secure financing. In most instances, utility estimates of construction costs are non-binding. A best practice would be to set a maximum cap on the cost of system upgrades that is related to the utility’s good faith estimate of the costs to complete the upgrades.

Data Provision

Points	Screen
+3	Utilities post an interconnection queue
+1	Customers may request a pre-application report that provides specific information on an identified point of interconnection
+1	Utilities post maps of penetration levels or available system capacity
+0.5	Utilities report on interconnection activity at least quarterly

A growing number of states are recognizing the importance of early access to system information for project developers. A structured means to obtain the necessary data to evaluate the suitability of a specific location for interconnection of a generator is an efficient way of ensuring that high-quality, viable projects are proposed and put into the interconnection queue. Requirements for utilities to publicly post information regarding available capacity and “preferred” locations to interconnect also furthers transparency and assists project developers in their initial assessment of sites.

Bonus

Points	Screen
+0.5	Electronic signatures accepted on applications and agreements for generators up to 25 kW
+0.5	Applications and agreements accepted electronically
+1	Insurance requirements waived for inverter-based generators up to 25 kW
+1	External disconnect switch requirements waived for inverter-based generators up to at least 10 kW
+1	Dispute resolution process adopted to address disputes
+1	Indemnification requirements waived for government entities
+1	Standardized interconnection agreement adopted that applies to all utilities

The “Bonus” points for the 2014 FTG incorporate several previous categories from previous editions. These include: insurance, external disconnection switch, standard form agreement, and

dispute resolution. While these issues remain important, they are recognized here, generally, as they apply to very small, inverter-based generators, since additional requirements are typically unnecessary for this class of generators. For dispute resolution and standard form agreements, 2014 FTG sets a minimal bar in evaluating whether those features are present in a state’s standards, without making the more subjective determination about the internal content of those provisions.

Grading: From Alaska to Wyoming

Alaska

Net Metering

2007: N/A

2008: N/A

2009: N/A

2010: B

2011: C

2012: C

2013: C

2014: C

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Hydrokinetic, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Federal Government, Agricultural, Institutional
Limit on System Size:	25 kW
Limit on Overall Enrollment:	1.5% of average retail demand
Treatment of Net Excess:	Reconciled monthly
Applicable Utilities:	Utilities with annual retail sales of 5,000,000 kWh or more
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limits and allow systems to be sized to meet on-site load
- Carryover Net Excess Generation (NEG) indefinitely
- Grant REC ownership to customer-generators

In October 2009, the Regulatory Commission of Alaska (RCA) approved net metering regulations. These rules were finalized and approved by the lieutenant governor in January 2010 and became effective January 15, 2010. Alaska’s net-metering policy is relatively straightforward, but it is very limited in scope; net metering is only available to customers with generators up to 25 kW.

Any customer net excess generation is credited at the utility’s ‘non-firm’ rate - which equates roughly to the utility’s avoided-cost rate - and carried over indefinitely to subsequent billing periods. Alaska’s net-metering statute explicitly allows net metering for generators operated and either owned or leased by a consumer. Each year, utilities must report (1) the number of kilowatts equal to 1.5% of its average retail demand for the previous calendar year and (2) the aggregate capacity of generators participating in net metering.

Interconnection

- 2007: N/A
- 2008: N/A
- 2009: N/A
- 2010: N/A
- 2011: N/A
- 2012: N/A
- 2013: N/A
- 2014: N/A**

Recommendation:

- Adopt IREC’s model interconnection procedures

In May 2011, the RCA approved interconnection guidelines. All utilities subject to Alaska's net metering regulations are required to issue revised tariffs that address interconnection.

Arizona

Net Metering

- 2007: N/A
- 2008: B
- 2009: A
- 2010: A
- 2011: A
- 2012: A
- 2013: A
- 2014: A**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/Cogeneration, Hydrogen, Biogas, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Institutional
Applicable Utilities:	Investor-owned utilities, electric co-ops

System Capacity Limit:	No capacity limit specified, but system must be sized to meet part or all of customer's electric load and may not exceed 125% of customer's total connected load
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; excess reconciled annually at avoided-cost rate
REC Ownership:	Customer owns RECs (must be relinquished to utility in exchange for distributed generation payments)
Meter Aggregation:	Not addressed

Recommendation:

- Abide the state's safe harbor language to protect customer-generators from extra and/or unanticipated fees
- Eliminate the \$0.70 per kilowatt monthly charge for new residential solar customers

In November 2013 the Arizona Corporation Commission (ACC) authorized utilities to establish a \$0.70/kW surcharge on all residential DG customers that enter contracts for a system after December 31, 2013, and that do not enroll under a demand-based tariff rate. One thing that makes this decision all the more striking is that Arizona's net metering rules contain a safe harbor clause requires any additional charge be fully supported by a cost-of-service studies and cost/benefit analysis, and provides that the utility bears the burden of proof on any proposed charge. The Arizona decision, which was counter to ACC Staff's recommendation that the issue be addressed in a general rate case, raises questions over the efficacy and strength of safe harbor clauses, especially where they exist only in regulations rather than statutes. While Arizona's safe harbor language has not changed in years, the scoring has been updated to reflect the fact that, in practice, the protections it offers have proven to be less meaningful than they appear to be under the law.

The Arizona Corporation Commission (ACC) adopted net metering rules in October 2008, which became effective in May 2009. These rules, which apply to investor-owned and cooperative utilities in the state, allow net metering for systems that provide 125% or less of the customer's peak connected load. Net Excess Generation will be credited monthly at the retail rate and any remaining NEG at the end of the calendar year will be paid to the customer, via check or billing credit, at the utility's avoided cost payment. The ACC also requires that net metering charges be assessed on a non-discriminatory basis.

Interconnection

- 2007: C
- 2008: C
- 2009: C
- 2010: N/A
- 2011: N/A
- 2012: N/A
- 2013: N/A
- 2014: N/A**

Recommendation:

- Adopt IREC’s model interconnection procedures

For interconnection, the Arizona Corporation Commission (ACC) recommends that utilities use draft rules that apply for systems up to 10 MW.

Arkansas

Net Metering

2007: C

2008: C

2009: C

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Microturbines using Renewable Fuels, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, General Public/Consumer, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities (municipal utilities not subject to commission rules)
System Capacity Limit:	300 kW for non-residential; 25 kW for residential
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-generators from extra and/or unanticipated fees

Arkansas came very close to receiving an A in the 2014 edition of *Freeing the Grid*, topping out at the apex of the B category (14.5 points for a rank of 19th). The most significant source of lost points for Arkansas came in the system size limits category, where it scored a 1 out of a possible

5 points because it limits system size to 300 kW. If the state were to modify its policy to increase the maximum system size to larger than 500 kW, it would have received 2 additional points, placing it in the 16th spot with a solid A grade. Going further, if the maximum system size was increased to more than 2 MW, it would have received 4 additional points, placing it in a tie for 8th place and firmly within the A grading range.

The APSC revised net metering standards in April 2007 to address the rollover of NEG and the treatment of RECs. This resulted in monthly rollover of NEG until the end of the annual billing cycle, after which it is granted to the utility. Customers also retain all RECs associated with their generation. A standard agreement is used for the interconnection of customer-owned systems, which includes a mutual indemnification provision but does not address insurance requirements.

Interconnection

2007: F

2008: F

2009: F

2010: N/A

2011: N/A

2012: N/A

2013: N/A

2014: N/A

Recommendation:

- Adopt IREC's model interconnection procedures

The process for interconnection is only partially addressed through net metering provisions and is not sufficient for a grade in this edition. The standards require an external disconnect switch, though this may be waived for inverter-based systems meeting certain requirements. The law also authorizes the APSC to allow utilities to assess additional charges and/or fees for net metering customers.

California

Net Metering

2007: A

2008: B

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Fuel Cells, Biogas from manure methane production or as a byproduct of the anaerobic digestion of biosolids and animal waste
Applicable Sectors:	Commercial, Industrial, Residential, Agricultural
Applicable Utilities:	All utilities (except LADWP): solar and wind; Investor-owned utilities: solar, wind, biogas and fuel cells
System Capacity Limit:	1 MW (10 MW for up to 3 biogas digesters)
Aggregate Capacity Limit:	5% of utility's peak demand (statewide limit of 50 MW for biogas digesters; 112.5 MW for fuel cells);
Net Excess Generation:	Credited to customer's next monthly bill at retail rate. After 12 month period, customer may opt to have net excess generation roll over indefinitely, or to have the utility pay for any net excess at a rate to be determined by the rate making authority. If customer makes no affirmative decision, net excess generation will be granted to utility with no compensation.
REC Ownership:	Customer owns RECs. If customer receives payment for remaining net excess generation at the end of a 12 month cycle, utility owns the RECs associated with the net excess electricity purchased.
Meter Aggregation:	Virtual meter aggregation on multi-family affordable housing allowed

Recommendation:

- Remove system size limitations to allow customers to meet all on-site energy needs

To accommodate the rapid growth of customer-owned generation, California is in the process of transitioning to a new valuation method for net metering. In 2012 the California Public Utilities Commission (CPUC) clarified the state's 5% 'aggregate customer peak demand' for net metering as the sum of the non-coincident peak demands of all utility customers. This was an expansion of the previous interpretation and a departure from other state definitions concerning net metering participation. This definition was later enforced by state law AB 327 of 2013, which also required the CPUC to determine a successor tariff to net metering. The goal of this net metering transition is to ensure sustainable growth among distributed generation technologies while accurately reflecting the costs and benefits of these added resources on the grid. By way of transition, the CPUC issued an April 2014 decision to allow grandfathered systems (those in place by July 2017 or until a utility's program capacity is filled, whichever comes first) to remain on the current net metering tariff for 20 years.

California's original net metering law was enacted in 1996 and subsequent amendments have increased the eligible technologies and established fee structures, resulting in the current system. All utilities are subject to net metering rules except for publicly-owned utilities with 750,000 or more customers that also provide water (only the Los Angeles Department of Water and Power fits this description). Publicly-owned utilities can choose to incorporate a time-of-use rate schedule. Customers retain ownership of all RECs. Furthermore, no additional charges or fees are allowed. Beginning in 2009, California was also one of the first states to allow virtual net

metering for multi-family affordable housing units and municipalities. Legislation enacted in 2010 raised the aggregate net metering limit to 5.0% of the utility's aggregate customer peak demand.

Interconnection

- 2007: C
- 2008: B
- 2009: B
- 2010: B
- 2011: B
- 2012: A
- 2013: A
- 2014: A**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	No limit specified
Bonus:	Applications and agreements accepted electronically; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Remove requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance

California’s Rule 21 governs the interconnection process. Rule 21, adopted in 2000, is significantly different from the FERC standards in that Rule 21 does not include separate levels of interconnection. Rather, all applications enter the process at the same point and then “drop out” according to complexity. The California Solar Initiative has set a goal of installing 3,000 MW by 2017.

Colorado

Net Metering

2007: A

2008: A

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Recycled Energy, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	All utilities (exceptions for small municipal utilities)
System Capacity Limit:	IOU customers: 120% of the customer's average annual consumption. Muni and co-op customers: 25 kW for non-residential & 10 kW for residential
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate. IOUs pay customers at end of calendar year at average hourly incremental cost, or customer may opt for indefinite roll-over Munis and co-ops provide annual reconciliation at a rate they deem appropriate.
REC Ownership:	Customer owns RECs (must be relinquished to utility for 20 years in exchange for incentives)
Meter Aggregation:	Allowed for IOU customers; rules under development

Recommendation:

- Allow rules to cover muni and co-op customers

In terms of overall state net metering practices, Colorado represents the gold standard among actual state policies. That said, there are elements that could be improved upon. Most significantly, though not affecting the state score, the statutory basis for net metering (and interconnection) is heavily tied with the implementation of the state's RPS and REC-purchase programs providing incentives for customer-sited generation. This characteristic is less than ideal because net metering and interconnection are best seen as policies wholly separate from a state's RPS and incentive programs. A tie between these distinct policies can give rise to questions over the availability of net metering and guaranteed interconnection where an incentive program has been allowed to sunset, or a utility does not require additional renewable resources in order to comply with the RPS. The simple existence of such questions, whether or

not they have any merit, can create uncertainty in the market and ultimately have an adverse affect on the continued development of distributed generation.

In September 2009, the Colorado PUC released a decision that made several changes to Colorado’s net metering rules for IOUs. These changes include shifting the maximum system size for solar electric systems from 2 MW to 120% of the annual consumption of the site; redefining a site to include all contiguous property owned by the consumer; and allowing system owners to make a one-time election in writing to have their annual NEG carried forward as a credit from month to month indefinitely. In a pioneering move, Colorado passed legislation that allows for Community Solar Gardens (CSG). Those CSGs of up to 2 MW in size that have at least 10 subscribers will receive kWh credits on their utility bills in proportion to the size of their subscription. Colorado’s interconnection procedures are divided into three levels and follow the FERC standards. Legislation enacted in March 2008 required municipal utilities with more than 5,000 customers and all cooperative utilities to offer net metering for residential systems up to 10 kW and commercial and industrial systems up to 25 kW.

Interconnection

- 2007: C
- 2008: C
- 2009: C
- 2010: B
- 2011: B
- 2012: B
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, CHP/Cogeneration, Anaerobic Digestion, Fuel Cells using Renewable Fuels, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Utility, Agricultural, Institutional
Applicable Utilities:	All utilities (exceptions for small municipal utilities)
System Capacity Limit:	10 MW
Bonus:	Dispute resolution process adopted to address disputes

Recommendations:

- Increase covered system capacity to cover all system sizes
- Eliminate additional insurance requirements entirely

Connecticut

Net Metering

2007: B

2008: B

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Multi-Family Residential, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	2 MW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; excess reconciled annually at either avoided-cost rate or time-of-use/generation rate (for PV systems)
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees
- Expand net metering to all utilities (i.e., – munis and co-ops).

Connecticut scores high in net metering as a result of its customer-friendly policy provisions with high system size limits and friendly net excess roll-over provisions. The Department of Public Utility Control (DPUC) has endorsed NEM by establishing April-oriented annual banking and peak day-part production. In ruling upon these provisions, the DPUC noted that NEM customers are almost exclusively solar, thus the guidelines should be oriented towards this industry. While REC ownership is not addressed explicitly for net metering in the policy itself, REC purchase programs by utilities exist for behind the meter systems (known as Zero- and Low-emission RECs). This indicates that behind the meter customers clearly own RECs by default. Virtual net metering (effectively aggregate net metering) is also permitted for state, municipal, and agricultural customers. State law additionally requires all competitive electricity suppliers to offer net metering to customers, which awards Connecticut an additional bonus point.

Net metering is available to Class I renewable energy systems up to 2 MW. NEG rolls over to the next month at the retail rate and the utility compensates the customer for any NEG at the avoided cost at the end of the annual period. The DPUC ordered Connecticut Light and Power to calculate the reimbursement for PV systems for any NEG at the end of an annualized period on a time-of-use/generation basis. There is no stated limit on the aggregate capacity of net-metered systems in a utility's service territory. Also of note, Connecticut passed a new energy law (Public Act 11-80) in 2011.

Interconnection

- 2007: D
- 2008: D
- 2009: D
- 2010: B
- 2011: B
- 2012: B
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, (All Electric Customers)
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	20 MW
Bonus:	N/A

Recommendations:

- Remove requirement for redundant external disconnect switch
- Remove requirement for additional insurance
- Expand interconnection procedures to all utilities (i.e., munis and co-ops)

The Connecticut DPUC approved interconnection guidelines for systems up to 20 MW in 2007. These standards apply only to IOUs and include three levels of interconnection. An external disconnect switch is required, as well as liability insurance.

Delaware

Net Metering

2007: B

2008: B

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Small Hydroelectric, Fuel Cells
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities
System Capacity Limit:	DP&L: 2 MW for non-residential DP&L customers; 500 kW non-residential DEC and municipal utility customers; 25 kW for all residential customers; 100 kW for all farm customers on residential rates
Aggregate Capacity Limit:	5% of peak demand (utilities may increase limit)
Net Excess Generation:	Credited to customer's next bill at retail rate; indefinite rollover permitted but customer may request payment at the energy supply rate at the end of an annualized period.
REC Ownership:	Customer retains ownership of RECs associated with electricity produced and consumed by the customer
Meter Aggregation:	Not addressed

Recommendation:

- Allow net metering for third parties using the PPA model

Delaware has developed one of the best net metering policies in the country. Its policy explicitly allows meter aggregation, shared renewable-energy systems, and third-party system ownership. It could improve its current policy by lifting the aggregate cap on net metering, and by allowing the indefinite rollover of kWh credits generated by net-metered systems.

Net metering is allowed in Delaware for systems up to 25 kW for residential customers of DP&L, DEC and municipal electric utilities; two MW per meter for non-residential customers of DP&L; and 500 kW per meter for non-residential customers of DEC and municipal utilities. Legislation enacted in July 2009 allows for indefinite rollover of NEG, grants customer-generators ownership of all RECs and increases the aggregate participation limit to 5% of peak load.

Interconnection

2007: F

2008: F

2009: D

2010: F

2011: A

2012: A

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Fuel Cells, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities (only Delmarva Power is subject to commission rules)
System Capacity Limit:	10 MW
Bonus:	Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

District of Columbia

Net Metering

2007: F

2008: C

2009: B

2010: B

2011: B

2012: B

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Microturbines
Applicable Sectors:	Commercial, Residential
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	1 MW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at the full retail rate for

	systems 100 kW or less or at generation rate (i.e., avoided cost) for systems larger than 100 kW; credits may be carried forward indefinitely
REC Ownership:	Customer and utility own RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees
- Allow customers to retain RECs

The District of Columbia’s net metering policy operates somewhat differently for customers with systems larger than 100 kW. For customers with systems of up to 100 kW, credit excess generation during a billing period roll over at the retail rate indefinitely. However, for customers with larger systems, credits for excess generation during a billing period only include the energy component and not the transmission and distribution component. Owing to this detail, the District of Columbia receives a one-point deduction (-1) in the rollover category.

Net metering is currently available to D.C. residential and commercial customer-generators with systems powered by renewable-energy sources, CHP, fuel cells and microturbines. Legislation enacted in October 2008 expanded the limit on individual system size from 100 kW to 1 MW. A 2008 PSC order clarified that NEG for small DG systems is credited at the full retail rate during a billing cycle.

Interconnection

- 2007: F
- 2008: F
- 2009: B
- 2010: B
- 2011: B
- 2012: A
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Institutional
Applicable Utilities:	Investor-owned utilities

System Capacity Limit:	10 MW
Bonus:	Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Increase covered system capacity to 20 MW
- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance

In February 2009 the D.C. PSC issued an order establishing interconnection procedures for systems up to 10 MW, using a four-tiered approach to screening criteria. These tiers specify a process for non-exporting systems and those connecting to networks.

Florida

Net Metering

2007: N/A

2008: A

2009: A

2010: A

2011: A

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, CHP/Cogeneration, Hydrogen, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	2 MW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; excess reconciled annually at avoided-cost rate
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not allowed

Recommendations:

- Expand net metering to all utilities (i.e., munis and co-ops)

- Remove system size limitations to allow customers to meet all on-site energy needs

Florida resides in the middle of the pack in terms of the ranking of its net metering policy, tying for 25th on score with a B grade. Florida’s net metering policy is somewhat unique in several ways. First, the detailed provisions exist only in the regulations established by the Florida Public Service Commission (PSC), as opposed to within the statute. Second, it is the highest scoring state that receives a deduction (-1) for treatment of retail PPAs. Florida’s net metering regulations expressly permit leased systems to qualify for net metering, but past PSC decisions indicate that retail PPAs are not permitted generally or allowed to net meter. Finally, while the net metering statute and accompanying regulations do not contain any meaningful safe harbor clauses, another separate portion of Florida law related to the state’s energy conservation targets does suggest that customers who pursue energy efficiency or on-site generation should be protected from discriminatory rates and rate structures. Unfortunately, the meaning and strength of this clause is somewhat ambiguous, and as a consequence Florida does not receive full points in the safe harbor category.

Interconnection

2007: N/A

2008: D

2009: B

2010: B

2011: C

2012: D

2013: D

2014: D

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, CHP/Cogeneration, Hydrogen, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal
Applicable Sectors:	Commercial, Industrial, Residential, General Public/Consumer, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	2 MW
Bonus:	External disconnect switch

Recommendations:

- Increase covered capacity from 2 MW to 20 MW
- Remove requirements for redundant external disconnect switch on larger systems

The interconnection and net metering standards adopted by the Florida Public Service Commission in March 2008 apply only to investor-owned utilities. The standards include three breakpoints of interconnection, but limit the capacity of individual interconnected and net-

metered systems to 2 MW. Monthly NEG is credited to the customer's next bill at the utility's retail rate; at the end of the year, annual excess generation is credited at the avoided-cost rate. Customers retain all RECs.

Systems over 10 kW are subject to additional interconnection application fees, studies and insurance requirements, as well as a required external disconnect switch. The standards include a standard form agreement. Legislation enacted in July 2008 required municipal utilities and electric co-ops to "develop a standardized interconnection agreement and net metering program for customer-owned renewable generation" by July 1, 2009. The law did not provide clear standards or definitions for municipal utilities and electric co-ops and the PSC does not maintain authority over these utilities.

Georgia

Net Metering

2007: F

2008: F

2009: F

2010: F

2011: F

2012: F

2013: F

2014: F

Incentive Type:	Net Metering
Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Fuel Cells
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	All utilities
System Capacity Limit:	100 kW non-residential; 10 kW residential
Aggregate Capacity Limit:	0.2% of utility's peak demand during previous year
Net Excess Generation:	Credited to customer's next bill at a predetermined rate filed with the commission
REC Ownership:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase program capacity to at least 5% of a utilities peak demand
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees

Interconnection

2007: F
2008: F
2009: F
2010: N/A
2011: F
2012: N/A
2013: N/A
2014: N/A

Recommendation:

- The state should adopt IREC's model interconnection procedures

Legislation enacted in 2001 spurred the development of net metering and interconnection procedures for residential customers with systems less than 10 kW and commercial facilities with systems less than 100 kW. The aggregate system capacity is limited to 0.2% of the utility's peak load.

Hawaii

Net Metering

2007: C
2008: C
2009: C
2010: B
2011: B
2012: B
2013: B
2014: B

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Hydroelectric, Small Hydroelectric
Applicable Sectors:	Commercial, Residential, Local Government, State Government, Fed. Government
Applicable Utilities:	All utilities
System Capacity Limit:	100 kW for HECO, MECO, HELCO customers; 50 kW for KIUC customers
Aggregate Capacity Limit:	3% of utility's peak demand for HELCO and MECO; 1% of utility's peak demand for KIUC and HECO
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase capacity to at least 5% of a utility’s peak demand

Net metering is available in Hawaii for systems up to 50 kW for Kauai Island Utility Cooperative (KIUC) and up to 100 kW for the state’s three IOUs (HECO, MECO and HELCO). Each of these four utilities’ net metering programs are slightly different but each has a set-aside within their participation caps for systems 10 kW and smaller. All utilities are required to develop a pilot program for large systems. NEG is credited to the customer’s next bill until the end of a 12-month period, at which point any remaining NEG is granted to the utility. In October 2008, Hawaii’s governor signed an energy agreement with utilities and other key players in the state, as part of the Hawaii Clean Energy Initiative. This agreement provides that there should be no system-wide caps on net metering, and that net metering should transition toward a feed-in-tariff. A manual disconnect switch is required, but no additional fees are allowed for purposes of interconnection.

Interconnection

- 2007: F
- 2008: F
- 2009: F
- 2010: F
- 2011: F
- 2012: B
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, State Government, Fed. Government
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	No limit specified
Bonus:	Electronic signatures accepted on applications and agreements for generators up to 25 kW; Applications and agreements accepted electronically; Dispute resolution

Recommendations:

- Remove requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance

Hawaii has simplified interconnection rules for small renewables and separate rules for all other DG. For inverter-based systems up to 10 kilowatts (kW) in capacity (and inverter-based DG under

250 kW on islands other than Kauai), there is a simple application process for interconnection. Systems must use inverters compliant with IEEE 1547 and UL 1741. For other smaller systems, there are simplified interconnection procedures for net metered systems powered by solar, wind, biomass and hydroelectric up to 50 kW on Kauai and 100 kW in capacity on the other islands.

Illinois

Net Metering

2007: N/A

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels, Microturbines
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities, alternative retail electric suppliers
System Capacity Limit:	40 kW
Aggregate Capacity Limit:	1% of utility's peak demand in previous year
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase capacity to at least 5% of a utility's peak demand

The Illinois net metering law is among the more oddly constructed state policies in one primary way that has influenced how it has been graded for *Freeing the Grid*. Several pieces of legislation enacted during 2011 and 2012 resulted in the current statute, which in theory allows net metering for systems sized up to 2 MW, but in practice places considerably more restrictive limits on system size. As a result of the 2011 and 2012 legislation, net metering is only available to customers whose electric service had not been deemed competitive as of July 1, 2011. This includes all residential customers, but only includes non-residential customers with electric loads of up to 100 kW in the Commonwealth Edison service territory, and up to 150 kW in the Ameren

utilities service territory. Coupled with a requirement that systems be used primarily to offset on-site use, the maximum system size falls within the 100-150 kW range and results in Illinois receiving a score of +1 in the system size limit category, rather than the +3 used for states that limit system size to a range from 500 kW to 2 MW.

Interconnection

2007: N/A

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Tidal Energy, Wave Energy, Ocean Thermal, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	No limit specified
Standard Agreement:	Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendation:

- Expand interconnection procedures to all utilities (i.e., munis and co-ops)

Legislation enacted in Illinois in 2007 required the Illinois Corporation Commission to establish net metering and interconnection procedures by April 2008. Illinois’ interconnection rules use a four-tiered approach to review interconnection applications. The rules specify provisions for non-exporting systems and those connecting to spot and area networks. All systems are required to have an external disconnect switch directly accessible to the utility. Standardized interconnection agreements are available for all four tiers.

Indiana

Net Metering

2007: F

2008: F

2009: F

2010: D

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Fuel Cells, Hydrogen, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Multi-Family Residential, Low-Income Residential, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	1 MW
Aggregate Capacity Limit:	1% of utility's most recent peak summer load
Net Excess Generation:	Credited to customer's next bill at retail rate; carries over indefinitely
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase capacity to at least 5% of a utility's peak demand
- Include all customer classes
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees
- Expand net metering to all utilities (i.e., munis and co-ops)

Indiana's net-metering policy has generally been favorable since the Indiana Utility Regulatory Commission (IURC) adopted new regulations that expanded the program in 2011. However, Indiana's current policy does not address REC ownership, does not allow virtual net metering or community renewables, and only applies to customers who own and operate a generator, thereby not opening the door to third-party system ownership.

Interconnection

2007: D

2008: D

2009: D

2010: C

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Fuel Cells using Renewable Fuels, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities, regulated municipal utilities, regulated electric cooperatives
System Capacity Limit:	No limit specified
Bonus:	Dispute resolution process adopted to address disputes

Recommendation:

- Prohibit utility's discretion for redundant external disconnect switch

Indiana's interconnection procedures were amended in November 2005 by the IURC to provide three levels of interconnection. An external disconnect switch is required.

Iowa

Net Metering

2007: C

2008: C

2009: C

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Hydroelectric, Municipal Solid Waste, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities

System Capacity Limit:	500 kW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; carries over indefinitely
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Expand net metering to all utilities (i.e., munis and co-ops)

Iowa was one of the first U.S. states to establish a net-metering policy and its policy is now more than 30 years old. However, net metering is addressed only fleetingly in the state’s administrative code. The current policy is addressed in tariffs, filed by MidAmerican Energy and Interstate Power & Light, and approved by the Iowa Utilities Board, do not address REC ownership, and language addressing eligible generators does not favor third-party ownership. Net metering and third-party ownership in Iowa have attracted significant legal attention during the past decade; a case involving third-party ownership is currently pending before the Iowa Supreme Court.

Interconnection

- 2007: D
- 2008: F
- 2009: F
- 2010: B
- 2011: B
- 2012: B
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities; Linn County REC
System Capacity Limit:	10 MW
Bonus:	Applications and agreements accepted electronically; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Prohibit requirement for redundant external disconnect switch
- Prohibit requirements for additional insurance

The Iowa Utilities Board (IUB) adopted net metering standards in 1984. The guidelines allow customers of all IOUs to net meter renewable energy systems with no explicit limit on system size or total enrollment. More recent waivers have been able to limit system size to some customers at 500 kW. Changes to Iowa's interconnection procedures occurred in 2010 and now apply to DG facilities of up to 10 MW. The standards set four levels of review based on project size and complexity. The rules require the use of standardized interconnection applications and agreements and necessitate liability insurance.

Kansas

Net Metering

2007: N/A

2008: N/A

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	200 kW for non-residential; 25 kW for residential
Aggregate Capacity Limit:	1% of utility's peak demand during previous year
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Utility owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Expand net metering to all utilities (i.e., munis and co-ops)

In 2014, Kansas enacted legislation making several significant revisions to its net metering law, reducing its score when compared to 2013 grading. Most significantly, the state lost 1.5 points (going from 0 to -1.5) in the rollover category. The new law limits monthly rollover of NEG at the

retail rate to systems placed in service prior to July 1, 2014, and provides that all other customers are only permitted roll over NEG at an avoided cost rate. Customers that meet the July 1, 2014 deadline will transition to the avoided cost crediting system after January 1, 2030. The state also lost 0.5 points in the system size limit category (from +1 to +0.5) for reducing the largest system size eligible to net metering from 200 kW to 100 kW (except 150 kW for schools).

Interconnection

2007: N/A

2008: N/A

2009: F

2010: N/A

2011: N/A

2012: N/A

2013: N/A

2014: N/A

Recommendation:

- The state should adopt IREC’s model interconnection procedures

Kentucky

Net Metering

2007: D

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Incentive Type:	Net Metering
Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Hydroelectric, Biogas, Small Hydroelectric
Applicable Sectors:	Commercial, Residential, Nonprofit, Schools, Local Government, State Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities, electric co-ops (except TVA distribution utilities)
System Capacity Limit:	30 kW
Aggregate Capacity Limit:	1% of utility's single-hour peak load during previous year
Net Excess Generation:	Credited to customer's next bill at retail rate; carries over indefinitely
REC Ownership:	Customer owns RECs

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase program capacity to at least 5% of a utility’s peak demand

Kentucky has a relatively simple net-metering policy that includes favorable ‘safe harbor’ language and allows net metering for customers on time-of-use tariffs. However, the individual and aggregate system capacity limits (30 kW and 1% of a utility’s peak load, respectively) are low, and the policy only applies to customers who own and operate a generator, thereby not opening the door to third-party system ownership.

Interconnection

2007: N/A

2008: N/A

2009: F

2010: F

2011: F

2012: F

2013: D

2014: D

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities, electric co-ops (except TVA distribution utilities)
System Capacity Limit:	30 kW
Bonus:	Standardized interconnection agreement adopted that applies to all utilities

Recommendation:

- The state should adopt IREC’s model interconnection procedures

Kentucky’s interconnection rules use a two-tiered approach to specify review criteria and the requirement of an external disconnect switch has been left up to each utility’s discretion. Additional liability insurance is not required for systems that meet certain technical standards.

Louisiana

Net Metering

2007: B

2008: B

2009: B

2010: B

2011: C

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Small Hydroelectric, Fuel Cells using Renewable Fuels, Microturbines
Applicable Sectors:	Commercial, Residential, Agricultural
Applicable Utilities:	All utilities
System Capacity Limit:	300 kW for commercial; 25 kW for residential
Aggregate Capacity Limit:	0.5% of utility's retail peak load
Net Excess Generation:	Credited to customer's next bill at retail rate; carried over indefinitely
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Remove the aggregate participation limit
- Adopt safe harbor regulation to protect customer-sited generators from extra and/or unanticipated fees

Louisiana received a score of 10 and a grade on the low end of the B spectrum in the 2013 edition of *Freeing the Grid*. The most significant source of lost points for Louisiana came in the system size limits category, where it scored a 1 out of a possible 5 points because it limits system size to 300 kW. If the state were to modify its policy to increase the maximum system size to larger than 500 kW, it would have received 2 additional points, while increasing the size limit beyond 2 MW would have garnered 4 additional points. Further, the state lost 2 points by failing to specify that net metering customers retain ownership of the RECs produced by their system (receiving a -1 rather than a +1). If the maximum number of points in these categories had been achieved, the state would have received a score of 16, placing it firmly within the spectrum of A grades, on par with New York.

Interconnection

2007: F

2008: F

2009: F

2010: N/A
 2011: N/A
 2012: N/A
 2013: N/A
2014: N/A

Recommendation:

- The state should adopt IREC’s interconnection procedures

Maine

Net Metering

2007: C
 2008: C
 2009: B
 2010: B
 2011: B
 2012: B
 2013: B
2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, (CHP/Cogeneration since April 30, 2009), Small Hydroelectric, Tidal Energy
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	All utilities
System Capacity Limit:	660 kW for IOU customers; 100 kW for muni and co-op customers (although they may offer up to 660 kW voluntarily)
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Not addressed
Meter Aggregation:	Allowed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees

Maine is one of a handful of U.S. states that allows virtual net metering and net metering for shared renewable-energy systems. While Maine’s policy is generally good, it currently does not address REC ownership or include ‘safe harbor’ language to protect net-metering customers from potential fees and charges that would not apply to other customers. Indeed, Central Maine

Power (CMP), an investor-owned utility, has proposed a new standby charge for customers who generate their own electricity. CMP's proposal is part of a larger rate case under consideration by the Maine PUC.

Interconnection

- 2007: N/A
- 2008: N/A
- 2009: N/A
- 2010: A
- 2011: A
- 2012: A
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Tidal Energy, Wave Energy, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	All Transmission and Distribution Utilities
System Capacity Limit:	Not specified
Bonus:	Insurance Waived for Generators up to 25 kW

Recommendations:

- Provide more clarification on the dispute resolution process

The Maine PUC adopted interconnection procedures in January 2010, which were based on the 2006 IREC model. The rules have four tiers for interconnection with each having a fee and technical screens for evaluation.

Maryland

Net Metering

- 2007: A
- 2008: A
- 2009: A
- 2010: A
- 2011: A
- 2012: A
- 2013: A
- 2014: A**

Incentive Type:	Net Metering
Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities
System Capacity Limit:	2 MW generally, (30 kW for micro-CHP)
Aggregate Capacity Limit:	1,500 MW (~8% of peak demand)
Net Excess Generation:	Credited to customer's next bill at retail rate; reconciled annually at the wholesale energy rate
REC Ownership:	Customer owns RECs

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Allow for meter aggregation
- Credit Net Excess Generation at the retail rate and provide the option of indefinite rollover

Maryland is considered to have had a consistently stellar net metering policy, maintaining an A grade since 2007 and occupying the 5th spot in the 2013 rankings. Compared to the model rules, it loses only a small number of points, most significantly losing two (2) points for limiting system size to 2 MW, and losing 1.5 points for not allowing indefinite rollover of credits for net excess generation. While the state also receives a minor deduction (-0.5 points) for placing an aggregate statewide cap of 1,500 MW on net metered systems (roughly 9-10% of statewide peak demand), it should be noted that the formulation of the cap as a capacity-based measure is unique, transparent, and refreshingly easy to understand compared to those that exist in other states, while also being large enough to accommodate continued growth in distributed generation for years to come.

Interconnection

- 2007: D
- 2008: B
- 2009: B
- 2010: B
- 2011: B
- 2012: B
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Geothermal Electric, Fuel Cells, CHP/Cogeneration, All Distributed Generation, Anaerobic Digestion, Tidal Energy, Wave Energy, Ocean Thermal, Other Distributed Generation
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Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities
System Capacity Limit:	10 MW
Bonus:	Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; Dispute resolution process in place

Recommendations:

- Remove requirements for redundant external disconnect switch
- Increase limit on system size to 20 MW

Maryland enacted legislation in April 2007 requiring the state Public Service Commission to devise interconnection procedures, which were adopted in March 2008. There are four levels of interconnection available to customers of all utilities with systems up to 10 MW in capacity of all types of utilities. There is an equipment requirement equivalent to an external disconnect switch, but processing fees are limited to larger systems.

Massachusetts

Net Metering

2007: C

2008: B

2009: B

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	10 MW for net metering by a municipality or other governmental entity; 2 MW for all other "Class III" systems; 1 MW for all other "Class II" systems; 60 kW for all other "Class I" systems
Aggregate Capacity Limit:	3% of utility's peak load
Net Excess Generation:	Varies by system type and customer class

REC Ownership:	Customer owns RECs
Meter Aggregation:	Neighborhood net metering allowed

Recommendations:

- Increase overall enrollment to at least 5% of peak capacity
- Extend net metering to municipal electric utilities

Massachusetts has established a complex policy that includes three different ‘classes’ of systems, with certain policy provisions varying by system class. Significantly, Massachusetts’s policy explicitly allows ‘neighborhood net metering,’ a shared renewable-energy arrangement, and third-party ownership of systems. Interestingly, Massachusetts has established a ‘System of Assurance of Net Metering Eligibility,’ an online tool that enables customers to apply for and reserve space for a planned system under the established aggregate program cap. This site provides real-time updates and detailed information on cap allocations provided, including historical reports on available capacity under the established program cap.

Interconnection

2007: C

2008: B

2009: B

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	No limit specified
Bonus:	Applications and agreements accepted electronically; Dispute resolution process adopted to address disputes; Indemnification requirements waived for government entities; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Prohibit the use of a redundant external disconnect switch
- Prohibit requirements for additional insurance

Interconnection procedures have been available, in some form, to all customers of the IOUs in Massachusetts since February 2004. IOUs are prohibited from charging net-metered customers extra fees or requiring additional insurance. There are three levels of interconnection, including special guidelines for network systems. A manual external disconnect switch may be required.

Michigan

Net Metering

2007: F

2008: F

2009: B

2010: A

2011: A

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Municipal Solid Waste, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural
Applicable Utilities:	Investor-owned utilities, electric cooperatives, alternative electric suppliers
System Capacity Limit:	150 kW
Aggregate Capacity Limit:	0.75% of utility's peak load during previous year
Net Excess Generation:	Credited to customer's next bill at retail rate for systems 20 kW or less; credited to customer's next bill at power supply component of retail rate for larger systems. Carries over indefinitely.
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase aggregate capacity to 5% of peak load

Michigan’s policy is complex, allowing ‘true net metering’ for systems up to 20 kW and ‘modified net metering’ for larger systems. The billing and credit mechanisms are favorable under ‘true net metering’ but much less favorable for larger systems. Generators larger than 150 kW are subject to utility standby charges. Michigan’s net-metering statute authorizes an application fee of up to \$100 and indicates that the program ‘shall be designed for a period of not less than 10 years,’ implying that the program could be phased out within a few years.

Interconnection

- 2007: D
- 2008: D
- 2009: C
- 2010: C
- 2011: C
- 2012: B
- 2013: C
- 2014: C**

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Institutional
Applicable Utilities:	Investor-owned utilities, electric co-ops
System Capacity Limit:	No limit specified
Bonus:	Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes

Recommendations:

- Remove requirement for additional insurance

October 2008 legislation slightly modified the state’s interconnection procedures to provide for more customer protection. The standards, which apply to systems of all sizes, are separated into five levels of review. However, under a proposed joint utility application, additional conditions or further study and review of the systems may be required.

Minnesota

Net Metering

- 2007: C
- 2008: C
- 2009: C
- 2010: B
- 2011: B
- 2012: C
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	All utilities
System Capacity Limit:	1 MW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Reconciled monthly; customer may elect to take compensation as a payment or as a bill credit at the retail utility energy rate
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect all (currently set at 40 kW and below) customer-sited generators from extra and/or unanticipated fees

Minnesota dramatically improved its net metering law with 2013 legislation, resulting in a similarly dramatic increase in its *Freeing the Grid* score. Among the changes was a modification to the safe harbor clause, which now only permits standby charges to be assessed on customers with distribution generation facilities larger than 100 kW (increased from 40 kW under the prior law). In 2014 the Minnesota Public Utilities Commission further reduced the potential impact of standby charges by finding that customers with solar PV facilities should receive a capacity credit of \$5.15/kW against the standby charges, based on studies of the effective load carrying capability of solar PV facilities. Thus for 2014 Minnesota receives a small (+0.5) bonus which recognizes that while some customers may be subject to standby charges, the charge accounts for the unique beneficial capacity value provided by solar PV installations.

Interconnection

2007: F

2008: F

2009: F

2010: D

2011: D

2012: F

2013: D

2014: C

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	All utilities
System Capacity Limit:	10 MW
Bonus:	Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Remove requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance
- Further delineate tiers to accommodate different levels of complexity among system types and sizes

The Minnesota Public Utilities Commission developed generic interconnection guidelines in 2004 pursuant to Minnesota law. These standards are limited to the interconnection of systems 10 MW or less and require utilities to provide streamlined uniform interconnection applications and a process that addresses safety, economics and reliability issues. The standards also require an external disconnect switch and additional insurance.

Missouri

Net Metering

2007: C

2008: C

2009: C

2010: C

2011: C

2012: C

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities
System Capacity Limit:	100 kW
Aggregate Capacity Limit:	5% of utility's single-hour peak load during previous year
Net Excess Generation:	Credited to customer's next bill at avoided-cost rate; granted to utility at end of 12-month period
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Credit net excess generation at the retail rate and provide the option of indefinite rollover

Net metering in Missouri is limited by the low cap (100 kW) on individual system capacity, and because excess kWh generated by a customer during a billing period are credited at the utility's avoided-cost rate (as opposed to the utility's retail rate) on subsequent bills. However, Missouri's policy includes strong 'safe harbor' language and specifies that RECs are owned by the customer who generates them.

Interconnection

- 2007: F
- 2008: F
- 2009: F
- 2010: N/A
- 2011: N/A
- 2012: N/A
- 2013: N/A
- 2014: N/A**

Recommendations:

- The state should adopt IREC's model interconnection procedures

In June 2007, Missouri enacted legislation requiring all utilities to offer net metering to customers with systems up to 100 kW. Some interconnection procedures are found in the state's net metering law.

Montana

Net Metering

2007: C

2008: C

2009: C

2010: C

2011: C

2012: C

2013: C

2014: C

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Hydroelectric, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	50 kW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees
- Remove system size limitations to allow customers to meet all on-site energy needs

Net metering in Montana is limited to customers of investor-owned utilities with systems up to 50 kW. Montana's policy does not address many issues related to net metering, including 'safe harbor' provisions, REC ownership or meter aggregation. Montana could improve its current policy by raising the individual cap on net metering, and by allowing the indefinite rollover of kWh credits generated by net-metered systems.

Interconnection

2007: F

2008: F

2009: F

2010: C

2011: C

2012: C

2013: C

2014: C

Eligible Renewable/Other Technologies:	No restrictions on eligible technology
Applicable Sectors:	Commercial, Industrial, Residential, Schools, Local Government, State Government
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	10 MW
Bonus:	Dispute resolution process adopted to address disputes

Recommendations:

- Prohibit the requirement of a redundant external disconnect switch
- Set standard interconnection fees and charges lower than FERC

In 2010, the Montana Public Service Commission proposed and adopted interconnection procedures. The interconnection rules apply to all electric utilities within the jurisdiction of the Commission, which includes IOUs and co-ops. The Commission unanimously adopted the interconnection rules on July 19, 2010 and they went into effect on August 13, 2010.

Nebraska

Net Metering

2007: N/A

2008: N/A

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Anaerobic Digestion, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential, Agricultural
Applicable Utilities:	All utilities
System Capacity Limit:	25 kW
Aggregate Capacity Limit:	1% of utility's average monthly peak demand
Net Excess Generation:	Credited to customer's next bill at avoided-cost rate; excess reconciled at end of annual period
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Credit net excess generation at the customer's retail rate with indefinite rollover

- Remove the aggregate capacity limit

Net metering in Nebraska is limited by the extremely low cap (25 kW) on individual systems, and because excess kWh generated by a customer during a billing period are credited at the utility’s avoided-cost rate (as opposed to the utility’s retail rate) on subsequent bills. However, Nebraska’s policy includes strong ‘safe harbor’ language and requires utilities to publish annually on their web sites various data related to customers participating in net metering.

Interconnection

- 2007: N/A
- 2008: N/A
- 2009: F
- 2010: N/A
- 2011: N/A
- 2012: N/A
- 2013: N/A
- 2014: N/A**

Recommendation:

- The state should adopt IREC’s model interconnection procedures

Nevada

Net Metering

- 2007: B
- 2008: B
- 2009: B
- 2010: B
- 2011: B
- 2012: B
- 2013: A
- 2014: A**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	1 MW
Aggregate Capacity Limit:	3% of utility's peak capacity
Net Excess Generation:	Credited to customer's next bill at retail rate; carries over indefinitely
REC Ownership:	Customer owns RECs (must be relinquished to utility if utility subsidizes system)
Meter Aggregation:	Not addressed

Recommendations:

- Increase limit on overall enrollment to at least 5% of utility’s peak capacity
- Remove system size limitations to allow customers to meet all on-site energy needs
- Allow meter aggregation and net metering for shared or community systems

Nevada’s net metering policy scores highly overall, tying for 8th place among all states, and near the top possible score in many categories. What it lacks are the highest possible scores in a number of categories. Most significantly, it receives on 3 points for limiting system size to 1 MW, as opposed to 5 points for states that allow systems larger than 2 MW to net meter. It also loses a point for limiting aggregate net metering capacity to 3% total peak capacity in the state, receiving a score of 2 instead of the 3 reserved for uncapped net metering programs. Finally, it does not receive any points in the aggregated net metering or shared renewables categories (1 point apiece) because it only allows for aggregate net metering under very limited circumstances and contains no provisions for shared renewables. Ultimately, the state’s policy is very solid, but missing some of the most progressive ‘best practice’ elements.

Interconnection

2007: N/A

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Geothermal Electric
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	20 MW
Bonus:	Dispute resolution process adopted to address disputes

Recommendations:

- Establish a standard interconnection agreement
- Expressly prohibit requirements for an external disconnect switch

Interconnection procedures adopted by the Nevada PUC are largely consistent with California’s Rule 21.

New Hampshire

Net Metering

2007: C

2008: C

2009: C

2010: B

2011: B

2012: B

2013: A

2014: A

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Small Hydroelectric, Tidal Energy, Wave Energy, Biodiesel, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	All utilities
System Capacity Limit:	1 MW for most renewables, 100 kW for wind, 30 kW for CHP
Aggregate Capacity Limit:	50 MW, 2 MW for CHP
Net Excess Generation:	Credited to customer's next bill at retail rate; carries over indefinitely
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-generators from extra fees
- Increase limit on overall enrollment to at least 5% of utility's peak capacity

New Hampshire has a solid net-metering policy, although systems over 100 kW are treated slightly less favorably than smaller systems. Legislation enacted in 2013 extended net metering for shared systems, allowing a customer to become a group host for the purpose of reducing or otherwise controlling the energy costs of a group of customers who do not generate their own electricity. New Hampshire could improve its policy by raising the aggregate capacity limit and by specifying that systems owned by third parties are eligible to participate.

Interconnection

2007: D

2008: D

2009: C

2010: D

2011: D

2012: D

2013: D

2014: D

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Hydroelectric, Geothermal Electric, Small Hydroelectric, Tidal Energy, Wave Energy, Biodiesel, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	All utilities
System Capacity Limit:	1 MW for most renewables, 100 kW for wind
Bonus:	Insurance Waived for Generators up to 25 kW; External disconnect switch requirements waived for inverter-based generators up to at 10 kW; Dispute resolution process adopted to address disputes

Recommendations:

- Establish tiers to accommodate different levels of complexity among system types and sizes
- Establish timelines at or quicker than those outlined by the FERC

In June 2010, New Hampshire enacted a law that expanded the availability of net metering and interconnection in the state. For interconnection, an external disconnect switch is optional and any other additional charges or required insurance is not allowed.

New Jersey

Net Metering

2007: A

2008: A

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Geothermal Electric, Anaerobic Digestion, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities (electric distribution companies); electric suppliers
System Capacity Limit:	System must be sized not to exceed the customer's electricity consumption during the previous year
Aggregate Capacity Limit:	No limit specified (commission may limit to 2.5% of peak

	demand)
Net Excess Generation:	Generally credited to customer's next bill at retail rate; excess reconciled at end of annual period at avoided-cost rate
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Allow meter aggregation and net metering for shared or community systems

New Jersey’s net metering policy has consistently placed it near the top in the individual state rankings. The state could make a number of improvements to improve its score, but for the most part is a good example of the adoption of net metering best practices. One specific element of its score demands special mention: aggregated net metering. New Jersey received a 0 out of a possible score of 1 in this category despite the fact that its net metering law does contain a provision for net metering aggregation of public sector projects. The reason for this is that the regulations implementing aggregate net metering provide a retail offset only the ‘host’ meter while all other aggregated meters receive only a wholesale credit. Thus the beneficiary meters are not truly engaged in net metering as the term is commonly understood, and aggregated net metering is available in name only.

Interconnection

2007: B

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Geothermal Electric, Anaerobic Digestion, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities (electric distribution companies)
System Capacity Limit:	No limit specified
Bonus:	Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; External disconnect switch requirements waived for inverter-based generators up to at 10 kW

Recommendation:

- Adopt standard interconnection applications

Interconnection fees are divided into three levels, depending on system size and complexity. Utilities may not require Level 1 and Level 2 customers to install additional controls or external disconnect switches not included in the equipment package, to perform or pay for additional tests, or to purchase additional liability insurance.

New Mexico

Net Metering

2007: B

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric, Microturbines
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities, electric co-ops
System Capacity Limit:	80 MW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at avoided-cost rate or reconciled monthly at avoided-cost rate
REC Ownership:	Utility owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Allow customers to retain RECs
- Credit net excess generation at the retail rate and provide the option of indefinite rollover
- Allow meter aggregation and net metering for shared or community systems

While New Mexico's net metering policy scores fairly high in most categories, its overall score is significantly reduced because of a deduction it receives in one category: safe harbors for net metering customers. In this category, it received a 5-point deduction because it not only lacks a safe harbor clause, but has also permitted one utility (Southwestern Public Service) to impose a substantial standby charges on all distributed generation customers. The details of how the charge is determined are somewhat complicated, but the charge may ultimately range from 3-4 cents/kWh of energy produced by the system. In many months this may exceed the value of the customer's monthly excess generation, which carries over at a relatively low avoided cost rate.

Interconnection

2007: C

2008: B

2009: B

2010: B

2011: B

2012: B

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	Investor-owned utilities, electric co-ops
System Capacity Limit:	80 MW
Bonus:	Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes; Standardized interconnection

Recommendations:

- Prohibit requirements for a redundant external disconnect switch
- Prohibit requirements for additional insurance

Interconnection procedures, adopted in July 2008, have been established for “Qualifying Facilities,” under PURPA, up to 80 MW. The standards have four levels of review, may require an external disconnect switch for systems greater than 10 kW, and allow utilities to require proof of insurance for systems greater than 250 kW. New Mexico has also specified that third-party-owned systems will not be subject to Public Regulation Commission regulation as of Jan 2011.

New York

Net Metering

2007: D

2008: B

2009: D

2010: B

2011: B

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Microturbines
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	2 MW for non-residential solar or wind; 500 kW for agricultural wind or biogas; 25 kW for residential solar or wind; 10 kW for residential micro-CHP and fuel cells
Aggregate Capacity Limit:	3% of utility's 2005 demand for solar, agricultural biogas, residential micro-CHP and fuel cells; 0.3% of utility's 2005 demand for wind
Net Excess Generation:	Generally credited to customer's next bill at retail rate, except avoided cost for micro-CHP and fuel cells; excess generally reconciled annually at avoided-cost rate, except excess for non-residential wind and solar and residential micro-CHP and fuel cells carries over indefinitely
REC Ownership:	Not addressed
Meter Aggregation:	Allowed for non-residential and farm-based customers

Recommendations:

- Increase limit on overall enrollment to at least 5% of a utility's peak capacity
- Credit net excess generation at the retail rate and provide the option of indefinite rollover

New York has put itself in the forefront of both supportive net metering policy and consideration of the future evolution of distributed generation. In response to concerns over net metering availability, in 2013 the New York PSC increased the aggregate net metering cap for solar (and some other renewable energy systems) from 1% to 3% of a utility's 2005 peak demand. In recognition of that achieving the state's ambitious solar energy goals under the NY-SUN program, in 2014 it further directed any utility in danger of reaching the new aggregate cap to pro-actively file a request to increase its cap. The PSC considers this policy to be an interim measure to avoid undermining the market while it considers broad changes to the existing distribution network and demand-side resources regulatory regime under the ongoing Reforming our Energy Vision initiative. The results of this initiative will be central to determining how net metering and customer-sited generation are addressed long into the future.

Interconnection

- 2007: C
- 2008: C
- 2009: B
- 2010: B
- 2011: B
- 2012: B
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	2 MW
Bonus:	Electronic signatures accepted on applications and agreements for generators up to 25 kW; Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; External disconnect switch requirements waived for inverter-based generators up to at 10 kW; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Remove system size limits
- Establish a tier establishing rules for interconnecting non-exporting systems

In November 2009, the state’s Public Service Commission modified the Standard Interconnection Requirements (SIR), setting the maximum capacity at 2 MW for individual systems. The SIR includes simplified requirements for small net-metered systems and certified, inverter-based systems up to 25 kW are not required to have an external disconnect switch.

North Carolina

Net Metering

2007: F

2008: F

2009: D

2010: D

2011: D

2012: D

2013: C

2014: C

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, CHP/Cogeneration, Hydrogen, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed.

	Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	1 MW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at beginning of summer billing season
REC Ownership:	Utility owns RECs (unless customer chooses to net meter under a time-of-use tariff)
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees
- Extend net metering requirements to all utilities (i.e., munis and co-ops)
- Remove limitations on REC ownership

North Carolina occupies a somewhat odd place in the U.S. solar market, having become a top tier state for mid-size grid supply solar projects, while very much lagging behind in the development of customer sited generation. To some degree, this is attributable to North Carolina’s net metering rules, which can be fairly favorable under the right circumstances; but have elements that dramatically decrease the attractiveness of net metering for many customers. First, customers with systems larger than 100 kW are subject to standby charges. Second, all customers must enroll in a relatively unfavorable time-of-use rate with a demand component in order to retain ownership of their renewable energy credits. Third, while excess generation is carried forward at the retail rate, the customer is required to forfeit any remaining excess generation at the beginning of the summer billing season. In practice, this means that a typical residential customer that wishes to sell RECs is subject to both demand charges and tariff conditions that diminish the value of net excess generation, and in some cases may forfeit significant amounts of excess generation from the spring months each year.

Interconnection

- 2007: F
- 2008: B
- 2009: B
- 2010: B
- 2011: B
- 2012: B
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies
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Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor Owned Utilities
System Capacity Limit:	No limit specified
Bonus:	Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance
- Extend interconnection procedures to all utilities (i.e., munis and co-ops)

The North Carolina Utilities Commission adopted interconnection procedures in June 2008 that apply to the state’s investor-owned utilities. These standards generally follow the FERC standards. North Carolina’s standards include three levels of interconnection review, with no limit on individual systems, but fast-track application available to generators smaller than 2 MW. Extra charges and additional insurance are only required for certain systems. IOUs may require an external disconnect switch, but must reimburse the customer for the cost.

North Dakota

Net Metering

2007: D

2008: D

2009: D

2010: D

2011: D

2012: D

2013: D

2014: D

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	100 kW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Reconciled monthly at avoided-cost rate
REC Ownership:	Customer and utility share RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Credit NEG at the retail rate, with indefinite roll-over
- Extend net metering requirements to all utilities (i.e., munis and co-ops)

North Dakota’s policy is extremely minimal; it was established within the state’s regulations to address the federal PURPA. Other than setting the limit on individual system capacity at 100 kW, few other policy details exist.

Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

2013: N/A

2014: N/A

Recommendation:

- The state should adopt IREC’s model interconnection procedures

Ohio

Net Metering

2007: B

2008: B

2009: B

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Small Hydroelectric, Microturbines
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities, competitive retail electric service providers
System Capacity Limit:	No limit specified (limit based on customer's load)
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at unbundled generation rate; customer may request refund of excess at end of 12-month

	billing period
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Credit Net Excess Generation at the retail rate and provide the option of indefinite rollover
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees
- Specify that RECs belong to the customer

In 2014, the Public Utilities Commission of Ohio (PUCO) adopted revised net metering regulations. While the 2014 adoption did not contemplate any major changes to the state’s net metering program, it make several clarifying improvements to the state policy, including a revision of the definition of ‘customer-generator’ that solidifies the eligibility of third-party owned systems for net metering. In addition, the rule adoption provides that systems designed to produce no more than 120% of historic on-site load are eligible for net metering; that utilities are obligated to credit all customers, including those receiving service from a competitive retailer, for excess generation at their standard service offer (SSO) generation rate; and that the PUCO intends to open a future docket to consider virtual and aggregated net metering. Upon rehearing, the PUCO further clarified that the credit rate includes both the energy and capacity components of SSO rate.

Interconnection

- 2007: C
- 2008: C
- 2009: C
- 2010: C
- 2011: C
- 2012: C
- 2013: B
- 2014: A**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	20 MW
Bonus:	Insurance Waived for Generators up to 25 kW; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Expand interconnection procedures to all utilities (i.e., munis and co-ops)

Oklahoma

Net Metering

2007: D

2008: D

2009: D

2010: F

2011: F

2012: F

2013: F

2014: F

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential, General Public/Consumer
Applicable Utilities:	Investor-owned utilities, regulated electric co-ops
System Capacity Limit:	100 kW or 25,000 kWh/year (whichever is less)
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill or granted to utility monthly (varies by utility)
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Require all utilities to rollover NEG month-to-month at the retail rate
- Specify that RECs belong to the customer

Oklahoma's net metering policy could be improved in many ways, most significantly by raising the system capacity cap (limited to facilities with total generation of 25,000 kWh or less annually) and requiring utilities to compensate customers net excess generation, which is currently forfeited to the utility without compensation on a monthly basis. Unfortunately, rather than making efforts to improve its policy, in 2014 the state enacted legislation raising the possibility that additional fees and charges could be imposed on its already beleaguered net metering customers. While the 2014 legislation does not require additional charges and it remains to be seen whether any new charges will be imposed, the state receives a further point deduction (-3) in the 2014 grading as a result of this new provision, reducing its score to 0.

Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

2013: N/A

2014: N/A

Recommendation:

- The state should adopt IREC's model interconnection procedures

Oregon

Net Metering

2007: B

2008: A

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Anaerobic Digestion, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities (except Idaho Power)
System Capacity Limit:	2 MW for non-residential & 25 kW for residential PGE and PacifiCorp customers; 25 kW for non-residential & 10 kW for residential muni, co-op and PUD customers
Aggregate Capacity Limit:	No limit specified for PGE and PacifiCorp; 0.5% of utility's historic single-hour peak load for munis, co-ops, PUDs
Net Excess Generation:	Credited to customer's next bill at utility's retail rate for IOU customers; varies for muni, co-op and PUD customers
REC Ownership:	Customer owns RECs (must be relinquished in exchange for Energy Trust incentives)
Meter Aggregation:	Allowed

Recommendations:

- Increase aggregate capacity for municipal utilities, electric co-ops and people’s utility districts to at least 5% of utility’s peak capacity
- Remove system size limitations to allow customers to meet all on-site energy needs

Oregon’s policy is favorable, but complex. There are different limits on eligible system capacity for residential and non-residential customers, as well as for customers of investor-owned utilities (excluding Idaho Power) and other types of utilities. Interestingly, for customers of investor-owned utilities, Oregon’s policy specifies that the value of any net excess generation remaining in a participating customer’s account will be donated to customers enrolled in the utility's low-income assistance programs. Oregon’s current policy does not support net metering for shared renewable-energy systems.

Interconnection

- 2007: C
- 2008: B
- 2009: B
- 2010: B
- 2011: B
- 2012: B
- 2013: A
- 2014: A**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, Anaerobic Digestion
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities (Idaho Power is exempt from interconnection procedures for net-metered systems)
System Capacity Limit:	Greater than 20 MW for large generators; Up to 10 MW for small generators; 25 kW for residential net-metered; 2 MW for non-residential net-metered
Bonus:	Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Remove requirements for redundant external disconnect switch for customers of investor-owned utilities and for all system sizes
- Expand interconnection procedures to all utilities (i.e., munis and co-ops)

Oregon has two sets of net metering and interconnection rules. In June 2009, the Oregon PUC adopted rules for the interconnection of small generator facilities (i.e. non-net-metered) systems up to 10 MW. The PUC also maintains separate rules for net-metered systems, which have three

levels of interconnection review, a standard agreement and which require the use of a standard application.

Pennsylvania

Net Metering

2007: A

2008: A

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Waste Coal, Coal-Mine Methane, Anaerobic Digestion, Small Hydroelectric, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	5 MW for microgrid and emergency systems; 3 MW for non-residential; 50 kW for residential
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; reconciled at end of year at "price-to-compare"
REC Ownership:	Customer owns RECs
Meter Aggregation:	Virtual meter aggregation allowed

Recommendation:

- Expand net metering to include all utilities (i.e., munis and co-ops)

Pennsylvania's policy is one of the best in the country. It has high individual system capacity limits with no aggregate limit; explicitly allows meter aggregation, virtual meter aggregation and third-party ownership of systems; affirms that RECs belong to system owners; and contains strong 'safe harbor' provisions. It does not, however, allow NEG credits to roll over indefinitely, and it does not explicitly allow shared renewables. In February 2014, the Pennsylvania PUC initiated a proposed rulemaking that would revise its Alternative Energy Portfolio Standard (AEPS) regulations, which include net-metering regulations. Among other things, the PUC's proposed revisions tighten the available of virtual net metering, establish an approval process for

proposed systems exceeding 500 kW, and specify that net-metered systems must serve an independent load.

Interconnection

2007: D

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Waste Coal, Coal-Mine Methane, Anaerobic Digestion, Small Hydroelectric, Other Distributed Generation
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	5 MW (seek utility guidance for systems above 2MW)
Bonus:	Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes

Recommendations:

- Remove requirements for redundant external disconnect switch for IOU customers.
- Expand interconnection procedures to all utilities (i.e., munis and co-ops)

The PUC adopted interconnection procedures that include four levels of interconnection. An external disconnect switch is required at the cost of the customer.

Rhode Island

Net Metering

2007: C

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Anaerobic Digestion, Small Hydroelectric, Ocean Thermal, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Multi-Family Residential, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	5 MW (systems must be "reasonably designed" to generate only up to 100% of annual electricity consumption)
Aggregate Capacity Limit:	3% of peak load (2 MW reserved for systems under 50 kW)
Net Excess Generation:	Credited at avoided cost; rolled over to next bill or purchased by utility
REC Ownership:	Not addressed
Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Anaerobic Digestion, Small Hydroelectric, Ocean Thermal, Fuel Cells using Renewable Fuels

Recommendations:

- Increase limit on overall enrollment to at least 5% of utility’s peak capacity
- Expand net metering to all utilities (i.e., munis and co-ops)

Rhode Island has not made any significant changes to its net metering policy since 2011. The law provides for a system that resembles net metering, but which could be argued is not net metering as practiced in other states. The law provides that a net metering customer receives ‘net metering credits’ that offset up to 100% of the customer’s usage during a month, and is ‘paid’ for generation of up to 25% in excess of consumption at the utility’s standard service offer (SSO) rate. Thus the customer may offset on-site consumption with self-generation at the retail rate during a billing period (i.e., net metering) and carry over excess of up to 25% at the SSO rate, but the transaction itself could be seen as blurring the line between net metering and a buy-all, sell-all rate. In 2014, Rhode Island enacted legislation modestly increasing its score by removing the former 3% of statewide peak load aggregate net metering cap for National Grid (the utility provider for 98.5% of the state’s electric customers), and clarifying that net metering customers own the renewable energy credits produced by their systems (formerly unspecified).

Interconnection

- 2007: N/A
- 2008: N/A
- 2009: N/A
- 2010: N/A
- 2011: N/A
- 2012: D
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Anaerobic Digestion, Small Hydroelectric, Ocean Thermal, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Multi-Family Residential, Agricultural, Institutional
Applicable Utilities:	Investor-owned Utilities
System Capacity Limit:	Not specified
Bonus:	Applications and agreements accepted electronically; Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes

Recommendation:

- The state should adopt IREC's model interconnection procedures

In the summer of 2011 a bill was passed for certain interconnection provisions. The PUC's implementation created greater standardization.

South Carolina

Net Metering

2007: N/A

2008: N/A

2009: N/A

2010: F

2011: F

2012: F

2013: D

2014: D

Eligible Renewable/Other Technologies:	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric
Applicable Sectors:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, CHP/Cogeneration, Hydrogen, Small Hydroelectric, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
Applicable Utilities:	Duke Energy, Progress Energy, SCE&G
System Capacity Limit:	100 kW for non-residential; 20 kW for residential
Aggregate Capacity Limit:	0.2% of utility's SC jurisdictional retail peak demand for previous calendar year
Net Excess Generation:	Credited to customer's next bill at applicable time-of-use rate or less; granted to utility (annually) each summer
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendation:

- The state should adopt IREC’s model net metering rules

Previously, in August 2009, the PSC issued a directive approving a net metering settlement, in which involved parties signed an agreement to improve the terms of net metering in the state. This agreement however, provided few requirements or directives for utilities, which is why South Carolina has scored low on the net metering scale until now. Its grade may soon be on the rise though, as Senate Bill 1189 of 2014 requires the South Carolina PSC to create a net-metering program (for utilities with PSC-approved distributed generation plans) for residential systems up to 20 kW-AC and non-residential systems up to 1 MW-AC. It also creates a leasing program (in which utilities may participate) but prohibits 3rd-party electricity sales and leasing arrangements that occur outside of the state-approved leasing program. The PSC will implement the law and establish interconnection standards for distributed generation systems up to 2 MW.

Interconnection

2007: N/A

2008: F

2009: F

2010: F

2011: F

2012: F

2013: F

2014: F

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	100 kW for non-residential; 20 kW for residential
Bonus:	N/A

Recommendation:

- The state should adopt IREC’s model interconnection procedures

The South Carolina PSC adopted interconnection procedures for investor-owned utilities for residential systems up to 20 kW and non-residential systems up to 100 kW. The system capacity is limited to 2% of rated circuit capacity, although additional interconnection applications may be considered.

South Dakota

Net Metering

2007: N/A

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

2013: N/A

2014: N/A

Recommendation:

- The state should adopt IREC’s model net metering rules

Interconnection

2007: N/A

2008: N/A

2009: B

2010: B

2011: B

2012: B

2013: C

2014: C

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	10 MW
Bonus:	Dispute resolution process adopted to address disputes

Recommendations:

- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance and naming the utility as an “additional insured”

On May 29, 2009, the South Dakota PUC issued an order approving their proposed South Dakota Small Generation Interconnection Rules. The rules specify interconnection procedures, in four

tiers, for systems up to 10 MW. These rules were modeled from Illinois' Small Generator Interconnection Rules. System owners are generally responsible for all interconnection expenses and utilities are authorized to require the use of an external disconnect switch. Limited interconnection to area networks is permitted. General liability insurance is required and for all systems other than residential generators up to 10 kW in capacity and the customer must include the utility as an 'additional insured.'

Texas

Net Metering

2007: D

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

2013: N/A

2014: N/A

Recommendation:

- The state should adopt IREC's model net metering rules

For most electric customers throughout the state, net metering as the term is traditionally defined, remains unavailable. However, in accordance with a state law adopted in 2010 and rule revisions adopted in 2014, net metering is available within the service territory of El Paso Electric (EPE) for renewable energy generation facilities of 50 kW or less, and for master metered apartment homes occupied by low-income residents. For apartment homes, the facility must produce at least 50% of annual electricity needs of the site, and all systems must be sized so as not to generate electricity in excess of on-site needs. For eligible customers, net metering is implemented using a single meter that can roll forwards and backwards. Net excess generation during a billing period is purchased at the utility's avoided cost rate, but is carried forward as a credit when it does not exceed \$50. For reference, EPE serves roughly 300,000 customers, or 2.5% of electric customers in the state.

Interconnection

2007: D

2008: D

2009: D

2010: C

2011: C

2012: C

2013: D

2014: D

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, CHP/Cogeneration, Reciprocating Engines, Turbines, Storage , Tidal Energy, Wave Energy, Ocean Thermal, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	10 MW
Bonus:	N/A

Recommendations:

- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance

Interconnection procedures have been in place in Texas since 1999 for systems up to 10 MW, with four levels of review, at 10 kW, 500 kW, 2 MW and 10 MW. An external disconnect device is required for all systems but utilities are prohibited from requiring any pre-interconnection fees for systems less than 500 kW. Standardized interconnection applications and interconnection agreements are available.

Utah

Net Metering

2007: F

2008: D

2009: A

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Hydrogen, Waste Gas and Waste Heat Capture or Recovery, Anaerobic Digestion, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities, electric co-ops
System Capacity Limit:	2 MW for non-residential; 25 kW for residential
Aggregate Capacity Limit:	20% of 2007 peak demand for Rocky Mountain Power; 0.1% of utility's 2007 peak demand for co-ops
Net Excess Generation:	Credited to customer's next bill as retail rate for Rocky

	Mountain Power customers and at avoided-cost rate for co-ops; granted to utility at end of 12-month billing period
REC Ownership:	Customer owns RECs
Meter Aggregation:	Allowed at same or adjacent location

Recommendations:

- Increase limit on overall enrollment to at least 5% of co-op utility’s peak capacity
- Allow net metering for shared or community systems

Utah enacted legislation modifying the net metering law during 2014. Though the changes did not merit a revision to its score, they are nevertheless interesting. The changes removed the existing safe harbor clause, which prohibited additional charges on customer generators without prior Commission approval. In its place, the new law inserted language requiring the Commission to determine the costs and benefits of net metering to the utility and other customers, and to determine any new rate structure, charge, or credit on the basis of those costs and benefits. Thus the new law retains the previous protections, but provides greater detail on how the Commission should determine whether a new charge, or indeed, an additional credit, is warranted.

Interconnection

2007: F

2008: F

2009: F

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, Hydrogen, Waste Gas and Waste Heat Capture and Recovery, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities, electric co-ops
System Capacity Limit:	20 MW
Bonus:	Applications and agreements accepted electronically; Insurance waived for generators up to 25kW; External disconnect switch requirements waived for inverter-based generators up to 10 kW; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

In 2010, Utah improved its interconnection procedures by basing them on the FERC’s interconnection procedures for small generators. These rules include provisions for three levels of interconnection for systems up to 20 MW, based on system complexity.

Vermont

Net Metering

2007: C

2008: B

2009: B

2010: B

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels
Applicable Sectors:	Commercial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	All utilities
System Capacity Limit:	2.2 MW for military systems; 20 kW for micro-CHP; 500 kW for all other systems
Aggregate Capacity Limit:	15% of utility's 1996 peak demand or peak demand during most recent calendar year (whichever is greater).
Net Excess Generation:	Credited to customer's next bill at retail rate; excess credits not used within 12 months of generation granted to utility
REC Ownership:	Customer retains RECs, has the option of voluntarily granting to utility
Meter Aggregation:	Group net metering allowed

Recommendations:

- Adopt safe harbor language to protect customer-generators from extra and/or unanticipated fees
- Increase limit on overall enrollment to at least 5% of utility’s peak capacity

Vermont overhauled its net metering policy in 2014 by enacting H. 702, which includes several significant changes. H. 702 raised the state’s aggregate capacity limit for NEM (for the fifth time) from 4% to 15% of a utility’s peak demand, established a new methodology for calculating the value of NEG generated by customers participating in utility rate schedules with inclining block

rates, and clarified that NEM customers own the RECs associated with the electricity they generate. However, Vermont’s policy still limits individual system capacity to 500 kW (with a larger limit for systems serving military facilities), and it does not allow NEG credits to roll over indefinitely. Vermont’s new NEM policy will be replaced on January 1, 2017 by new rules that the Vermont Public Service Board will develop, taking into consideration a long list of issues specified by statute. The new rules must be adopted by July 1, 2016.

Interconnection

- 2007: C
- 2008: C
- 2009: C
- 2010: C
- 2011: C
- 2012: C
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Microturbines, Other Distributed Gen.
Applicable Sectors:	Commercial, Residential, Agricultural
Applicable Utilities:	All utilities
System Capacity Limit:	No limit specified
Bonus:	Applications and agreements accepted electronically; Standardized interconnection

Recommendations:

- Update interconnection procedures to incorporate the 2008 revisions to net metering
- Remove requirements for redundant external disconnect switch

Vermont has adopted separate interconnection procedures for net-metered systems that are 150 kW or less, and for DG systems that are net-metered but greater than 150 kW (up to 250 kW) as well as systems that are not net-metered.

Virginia

Net Metering

- 2007: C
- 2008: C
- 2009: B
- 2010: B
- 2011: B
- 2012: C
- 2013: D
- 2014: D**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Small Hydroelectric, Tidal Energy, Wave Energy
Applicable Sectors:	Commercial, Residential, Nonprofit, Schools, Local Government, State Government, Institutional
Applicable Utilities:	Investor-owned utilities, electric co-ops
System Capacity Limit:	500 kW for non-residential (may be higher if a utility chooses); and 10 kW (20 kW with standby charges) for residential
Aggregate Capacity Limit:	1% of utility's adjusted Virginia peak-load forecast for the previous year
Net Excess Generation:	Credited to customer's next bill at retail rate. After 12-month cycle, customer may opt to roll over credit indefinitely or to receive payment at avoided-cost rate
REC Ownership:	Customer owns RECs
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase limit on overall enrollment to at least 5% of utility's peak capacity

Virginia does not score as well as many of its neighboring states because of its relatively low system size caps and aggregate participation limits. In particular, Virginia gets a significant penalty from the customer charges the state has implemented. In 2011 the Virginia State Corporation Commission increased the system size cap to 20 kW for residential facilities; however, those with a capacity of greater than 10 kW are now required to pay a monthly standby charge. Virginia gets added point though, as third-party-owned systems are eligible for net metering and RECs are explicitly awarded to the customer-generator.

Interconnection

- 2007: F
- 2008: F
- 2009: A
- 2010: A
- 2011: A
- 2012: A
- 2013: A
- 2014: A**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Tidal Energy, Wave Energy
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	All utilities
System Capacity Limit:	20 MW
Bonus:	Dispute Resolution & Standardized Interconnection Agreement

Recommendations:

- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance

The Virginia State Corporation Commission (SCC) adopted interconnection procedures that took effect in July 2009. The procedures cover all utilities, all eligible technologies and systems up to 20 MW. The procedures adopt spot and area network interconnection screens that reflect those in the IREC Model Interconnection Procedures. Systems under 10 kW must carry \$100,000 in liability insurance. Systems up to 500 kW must carry at least \$300,000. Systems between 500 kW and 2 MW must carry \$2 million. Insurance requirements for systems larger than 2 MW will be determined on a case-by-case basis. The new interconnection procedures do not apply to net-metered systems.

Washington

Net Metering

2007: D

2008: D

2009: C

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Hydroelectric, Fuel Cells, CHP/Cogeneration, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	All utilities
System Capacity Limit:	100 kW
Aggregate Capacity Limit:	0.25% of utility's 1996 peak demand (increases to 0.5% on 1/1/2014)
Net Excess Generation:	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
REC Ownership:	Customer owns RECs
Meter Aggregation:	Allowed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Increase limit on overall enrollment to at least 5% of utility's peak capacity

Washington's net-metering policy is straightforward. Although Washington's policy sets relatively low limits on individual system capacity (100 kW) and aggregate capacity (0.5% of a utility's peak demand), it includes favorable 'safe harbor' provisions, explicitly allows meter

aggregation and allows for the participation of third-party owned systems. . REC ownership is not directly addressed for net-metered systems (although it is addressed for certain other renewable-energy systems).

Interconnection

- 2007: F
- 2008: D
- 2009: D
- 2010: D
- 2011: D
- 2012: D
- 2013: B
- 2014: B**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
Applicable Utilities:	Investor-owned utilities
System Capacity Limit:	20 MW
Bonus:	Applications and agreements accepted electronically; Insurance waived for generators up to 25 kW; External disconnect switch requirement waived

Recommendations:

- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance

Interconnection procedures, adopted in September 2007, apply to DG systems up to 20 MW. Washington’s interconnection procedures provide for two levels of review. An external disconnect switch and additional insurance may be required.

West Virginia

Net Metering

2007: F

2008: F

2009: D

2010: A

2011: A

2012: A

2013: A

2014: A

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Small Hydroelectric, Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Agricultural
Applicable Utilities:	All utilities
System Capacity Limit:	IOUs with more than 30,000 customers: 2 MW for industrial; 500 kW for commercial; 25 kW for residential. IOUs with fewer than 30,000 customers, municipal utilities and co-ops: 50 kW for commercial and industrial; 25 kW for residential.
Aggregate Capacity Limit:	3% of peak demand during the previous year
Net Excess Generation:	Credited to customer's next bill at retail rate with no annual true-up (perpetual rollover)
REC Ownership:	Not addressed
Meter Aggregation:	Allowed

Recommendations:

- Specify that customers retain RECS associated with net metering generation
- Increase limit on overall enrollment to at least 5% of utility's peak capacity

West Virginia has rightly earned an A for its stellar net metering policy, which is user-friendly and accessible to distributed generation customers. It includes a relatively high limit for residential systems (25 kW) and allows systems up to 500 kW for commercial and 2 MW for industrial customers. Though its aggregate capacity limit is higher than its neighbors to the south, at 3%, the state could lift this arbitrary limit to pave the way for future deployment of NEM systems. Despite this strong net metering policy, however, net metering adoption is lower than many other states with A grades, likely due to the low electricity rates in West Virginia.

Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Small Hydroelectric, Renewable Fuels
Applicable Sectors:	Commercial, Industrial, Residential, Agricultural
Applicable Utilities:	All utilities
System Capacity Limit:	2 MW
Bonus:	External disconnect switch requirement waived for inverter-based generators up to 10 kW; Dispute resolution process adopted to address disputes; Standardized interconnection agreement adopted that applies to all utilities

Recommendation:

- Remove system capacity limit

The West Virginia PSC adopted rules for both net metering and interconnection in 2010. The interconnection rules were similar to the previous set of rules; however, several important improvements were incorporated, such as tiered insurance requirements and a prohibition of external disconnect switch requirements in the case of smaller, inverter-based systems.

Wisconsin

Net Metering

2007: F

2008: D

2009: D

2010: C

2011: D

2012: C

2013: D

2014: D

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric, Other Distributed
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	Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities, municipal utilities
System Capacity Limit:	20 kW (100 kW for wind for We Energies customers)
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Generally credited at retail rate for renewables and avoided-cost for non-renewables
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Adopt safe harbor language to protect customer-generators from extra and/or unanticipated fees

Wisconsin should get credit for having one of the oldest net metering policies in the country, dating back to 1982. However, the state has not kept pace with the evolution of net metering as a state policy and as a consequence now ranks within the bottom quarter of state policies. Most significantly, the state receives a -1 out of a total possible score of 5 for generally limiting system capacity to 20 kW or less (though some utilities allow net metering for systems of up to 100 kW). It further loses points (scoring 0 out of a possible 3) for not providing any safe harbors against additional fees and charges, and for net excess generation crediting practices that do not allow for indefinite retail rollover, and allow one utility (Xcel Energy) to only credit customers for net excess generation at the avoided cost rate (scoring 1.5 out of a possible 3 points). If the state achieved the maximum number of points in these three categories, it could increase its score from 5.5 (C) to 16 (A), placing it on par with New York’s net metering policy score and moving it into the top 15.

Interconnection

- 2007: D
- 2008: D
- 2009: D
- 2010: D
- 2011: D
- 2012: C
- 2013: D
- 2014: D**

Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
Applicable Sectors:	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
Applicable Utilities:	Investor-owned utilities, municipal utilities

System Capacity Limit:	15 MW
Bonus:	Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

- Prohibit requirements for redundant external disconnect switch
- Prohibit requirements for additional insurance

Interconnection review is divided into four categories. Wisconsin’s interconnection procedures require an external disconnect switch and additional insurance.

Wyoming

Net Metering

2007: B

2008: B

2009: B

2010: B

2011: B

2012: B

2013: B

2014: B

Eligible Renewable/Other Technologies:	Photovoltaics, Wind, Biomass, Hydroelectric, Small Hydroelectric
Applicable Sectors:	Commercial, Industrial, Residential
Applicable Utilities:	Investor-owned utilities, electric co-ops, irrigation districts
System Capacity Limit:	25 kW
Aggregate Capacity Limit:	No limit specified
Net Excess Generation:	Credited to customer's next bill at retail rate; excess reconciled annually at seasonal avoided-cost rate
REC Ownership:	Not addressed
Meter Aggregation:	Not addressed

Recommendations:

- Remove system size limitations to allow customers to meet all on-site energy needs
- Allow customers to own RECs

Net metering in Wyoming is limited by the extremely low cap (25 kW) on individual system capacity. However, Wyoming’s policy includes favorable ‘safe harbor’ language, allows all types of customers to net meter, and does not specify an aggregate capacity limit.

Interconnection

2007: F

2008: F

2009: F

2010: N/A

2011: N/A

2012: N/A

2013: N/A

2014: N/A

Recommendation:

- The state should adopt IREC's model interconnection procedures

Wyoming requires investor-owned utilities and electric co-ops to offer net metering for certain systems up to 25 kW. Systems must comply with IEEE and UL standards, and an external disconnect switch is required. NEG is credited to the following month at the retail rate and utilities must pay customers at the avoided-cost rate for any remaining NEG credit at the end of a 12-month period. A few interconnection guidelines are incorporated in the state's net metering law.

STATES THAT DID NOT MAKE THE GRADE

States without statewide net metering

Alabama

Idaho*

Mississippi

South Carolina*

South Dakota

Tennessee

Texas*

** Limited net metering programs exist in some utility territories.*

States without statewide interconnection procedures

Alabama

Alaska

Arizona

Arkansas

Georgia

Idaho

Kansas

Louisiana

Mississippi

Missouri

Nebraska

North Dakota

Oklahoma

Rhode Island

Tennessee

Wyoming

Appendix A: Net Metering Scores

STATE	Total 2013	System Capacity	Program Capacity	Rollover	Metering Issues	RECs	Eligible Tech	Eligible Customers	Aggregate Meters	Shared Renewables	Retail Choice	Safe Harbor	Rule Coverage	PPA Treatment
IREC 2014	26.5	5	3	2.5	4	1	1	2	1	0	0	3	1	3
Colorado	25	5	3	2.5	2	1	1	1.5	1	1	0	3	1	3
Delaware	23.5	3	2.5	2.5	2	1	1	1.5	1	1	1	3	1	3
Pennsylvania	23	5	3	1	3	1	1	2	1	0	0	3	0	3
California	22.5	3	2.5	0.5	4	1	1	2	1	1	0.5	3	0	3
Maryland	22.5	3	2.5	1	3	1	1	2	1	0	1	3	1	3
New Jersey	22	5	3	1	2	1	1	2	0	0	1	3	0	3
Vermont	20.5	3	3.5	0	3	1	1	2	1	1	0	3	1	1
Arizona	20	5	3	1	3	1	1	2	0.5	0.5	0	2	0	1
Connecticut	20	4	3	1	3	1	1	2	1	0	1	0	1	2
New Hampshire	19.5	3	2	2.5	1	1	1	2	0	1	1	3	1	1
Nevada	18.5	3	1.5	2.5	3	-0.5	1	2	0	0	0	3	0	3
Oregon	18.5	3	2.5	0	2	1	1	2	1	0	0	3	0	3
West Virginia	18	3	2	2.5	3	-1	1	1.5	1	0	0	3	1	1
DC	17.5	3	3	2.5	2	-1	1	2	0	1	1	0	0	3
Massachusetts	17.5	3	3.5	1.5	0.5	1	1	2	1	1	0	0	0	3
New York	16	3	2	1.5	2	-1	1	1.5	1	0	1	3	0	1
Utah	15.5	3	2.5	-1	2	1	1	2	1	0	0	3	0	1
Ohio	15	5	3	-2	1	1	1	2	0	0	0	3	0	1
Arkansas	14.5	1	3	1	2	1	1	1.5	1	0	0	3	0	0
Illinois	14.5	1	2.5	0	4	1	1	0	0	0	1	3	0	1
Minnesota	14.5	3	3	2.5	0	-1	1	2	1	1	0	0	1	1
Hawaii	14	0	3	0	2	-1	1	2	0	0	0	3	1	3
Rhode Island	14	5	3	-2	1	1	1	2	1	0	0	3	0	-1
Washington	12.5	0	0.5	0	2	1	1	2	1	0	0	3	1	1
Florida	12	3	3	1	2	1	1	2	0	0	0	0	0	-1
Maine	12	2	1	0	2	-1	1	2	1	1	1	0	1	1
Indiana	11.5	3	1	2.5	1	-1	1	2	0	0	0	3	0	-1
Kentucky	11.5	-1	1	2.5	3	1	1	2	0	0	0	3	0	-1
Iowa	10.5	1	3	2.5	2	-1	1	2	0	0	0	0	0	0
Missouri	10.5	1	2.5	-2	0	1	1	2	0	0	0	3	1	1
Wyoming	10.5	-1	3	0.5	2	-1	1	2	0	0	0	3	0	1
Louisiana	10	1	0.5	2.5	1.5	-1	1	1.5	0	0	0	3	1	-1
Michigan	10	1	1	0.5	1.5	1	1	2	0	0	1	0	0	1
New Mexico	9.5	5	3	0.5	2	0	1	2	0	0	0	-5	0	1
Kansas	9	1	2	-1.5	2	-1	1	1.5	0	0	0	3	0	1
Nebraska	9	-1	1	-2	2	1	1	2	0	0	0	3	1	1
Alaska	7	-1	1.5	-1.5	2	-1	1	2	0	0	0	3	0	1
North Carolina	7	3	3	0	2	-2	1	2	0	0	0	-1	0	-1

Net Metering Scores, Cont'd.

STATE	Total 2013	System Capacity	Program Capacity	Rollover	Metering Issues	RECs	Eligible Tech	Eligible Customers	Aggregate Meters	Shared Renewables	Retail Choice	Safe Harbor	Rule Coverage	PPA Treatment
Montana	7	-1	3	0	2	-1	1	2	0	0	0	0	0	1
Wisconsin	5.5	-1	3	1	1.5	-1	1	2	0	0	0	0	0	-1
Virginia	5	1	1	0.5	3	1	1	1.5	0	0	0	-5	0	1
South Carolina	4.5	0	0	0	3	-1.5	1	1.5	0	0	0	0	0	0.5
North Dakota	4	0	3	-2	0	0	1	2	0	0	0	0	0	0
Oklahoma	3	0	3	-2	0	-1	1	2	0	0	0	0	0	0
Georgia	0.5	0	0	-2	1	0.5	1	1	0	0	0	-1	1	-1

Interconnection Scores:

STATE	2013 Score	Eligible Technologies	System Capacity	Breakpoints	Timelines	Interconnection Charges	Certification	Technical Screens	Rule Coverage	Network & Upgrade Cost	Data Provision	Bonus
IREC 2014	30	2	2	4	4	2	2	6	1	1	1	5
California	27.5	2	2	2	4	4	2	2.5	-	1	5.5	2.5
Utah	25	2	2	3	4	3	2	4.5	-	-	-	4.5
Oregon	24	2	1.5	3.5	2	3	2	5	-	1	1	3
Massachusetts	22.5	2	2	2.5	3	1	2	4.5	-	1	1	3.5
New Mexico	22.5	2	2	2	4	2	2	4.5	-	-	1	3
Ohio	22.5	2	2	3.5	2	2	2	6	-	-	1	2
Virginia	22	2	2	2	4	2	2	5	1	-	-	2
Vermont	21.5	2	2	2.5	3	2	2	4.5	1	-	1	1.5
Illinois	21	2	2	2.5	3	2	2	4	-	-	-	3.5
Maryland	20.5	2	1.5	2.5	2	2	2	5	1	-	-	2.5
New Jersey	20.5	1	2	2	3	2	2	5	-	-	-	3.5
North Carolina	20.5	2	2	2	4	2	2	3.5	-	-	1	2
Connecticut	20	2	2	2	4	1	2	4	-	-	-	3
Hawaii	20	2	2	1.5	3	3	2	3	-	1	1	1.5
Delaware	19.5	2	1.5	2.5	2	1	2	4	-	1	-	3.5
Maine	19.5	2	2	2.5	3	2	2	5	-	-	-	1
Nevada	19.5	2	2	1.5	3	3	2	4	-	1	-	1
Washington	19.5	2	2	2	2	2	2	4	-	-	-	3.5
Colorado	18.5	2	1.5	2	4	-	2	5	1	-	-	1
DC	18.5	2	1.5	2.5	2	1	2	4	-	-	-	3.5
Rhode Island	18.5	2	2	3.5	3	2	2	1.5	-	-	-	2.5
Indiana	18	2	2	2	3	1	2	5	-	-	-	1
Iowa	17.5	1	2	2.5	2	2	2	3.5	1	-	-	1.5
Pennsylvania	17.5	2	1	2	2	1	2	5	-	-	-	2.5
West Virginia	17.5	2	1	2	1	2	2	3.5	1	-	-	3
New York	16.5	2	1	1	3	2	2	-	-	-	0.5	5
South Dakota	15	2	1.5	2	1	2	1	4.5	-	-	-	1
Michigan	14	2	2	-	2	2	2	1	-	-	1	2
Montana	12.5	1	1.5	2.5	1	-	2	3.5	-	-	-	1
Minnesota	10.5	2	1.5	-	1	2	1	-	1	-	-	2
Florida	10	1	1	1	4	-	2	-	-	-	-	1
Wisconsin	9.5	2	1.5	-	1	2	2	-	-	-	-	1
Kentucky	9	1	-	1	-	1	2	3	-	-	-	1
New Hampshire	9	1	-	-	1	-	2	-	1	-	1	3
Texas	8.5	2	1.5	-	1	-	1	-	-	-	-	3
South Carolina	5	2	-	-	-	1	2	-	-	-	-	-

Some states' numeric scores (for either net metering or interconnection) may exceed the numeric score of IREC's model rules. These instances demonstrate the evolution of policies that are setting the 'Best Practices' bar higher. Future IREC model rules may incorporate elements from those state policies. Conversely, states with lower numeric scores than the previous year's score may have not actively made the policies worse. As the FTG methodology evolves state scores may decrease based on the increase in the points for what constitutes 'Best Practices'.

Appendix B

IREC Model Rules and Resources:

Model Net Metering Rules

IREC's model net metering rules have been referenced in numerous regulatory proceedings and adopted in numerous states. IREC's model rules apply to systems rated up to a customer's service entrance capacity. These rules are available at: <http://www.irecusa.org/NMmodel09>

Model Interconnection procedures and Procedures for Small Generator Facilities

IREC's model interconnection procedures incorporate the best practices of small-generator interconnection procedures developed by various state governments, the Federal Energy Regulatory Commission (FERC) standards, the National Association of Regulatory Utility Commissioners (NARUC), and the Mid-Atlantic Distributed Resources Initiative (MADRI). IREC's model standards include four levels of interconnection.

These standards are available at: <http://www.irecusa.org/wp-content/uploads/2013-IREC-Interconnection-Model-Procedures.pdf>

Guidebook: Connecting to the Grid

IREC's Connecting to the Grid Guide provides a comprehensive introduction to net metering and interconnection policies and technical issues. The 6th edition of this guide includes explanations of IREC's updated model interconnection procedures, alternative billing arrangements for net metering, energy storage issues and several other emerging issues in the field.

<http://www.irecusa.org/wp-content/uploads/2009/11/Connecting-to-the-Grid-Guide-6th-edition.pdf>

A Regulators Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation

There is an acute need for a standardized approach to determining the benefits and costs associated with distributed solar generation (DSG). This report offers lessons learned from 16 regional and utility-specific DSG studies summarized in a recent review by the Rocky Mountain Institute (RMI), and then proposes a standardized valuation methodology for public utility commissions to consider implementing in future studies.

http://www.irecusa.org/wp-content/uploads/2013/10/IREC_Rabago_Regulators-Guidebook-to-Assessing-Benefits-and-Costs-of-DSG.pdf

Appendix C

Abbreviations and Acronyms:

BPU	Board of Public Utilities
CHP	Combined Heat and Power
DG	Distributed Generation
DSIRE	Database of State Incentives for Renewables & Efficiency
EPAct	Energy Policy Act of 2005
FERC	Federal Energy Regulatory Commission
IC	Interconnection
IEEE	Institute of Electrical and Electronics Engineers
IOU	Investor-Owned Utility
IREC	Interstate Renewable Energy Council
kW	Kilowatt (1000 Watts)
kWh	Kilowatt-Hour
MW	Megawatt (1,000,000 Watts)
NARUC	National Association of Regulatory Utility Commissioners
NEG	Net Excess Generation
NEM	Net Energy Metering
NNEC	Network for New Energy Choices
PPA	Power Purchase Agreement
PUC	Public Utilities Commission
PSC	Public Service Commission
PURPA	Public Utility Regulatory Policies Act of 1978
PV	Photovoltaic
QF	Qualifying Facility
REC	Renewable Energy Credit
RPS	Renewable Portfolio Standard
TOU	Time-of-Use
UL	Underwriters Laboratories

About Us



The Interstate Renewable Energy Council (IREC) believes clean energy is critical to achieving a sustainable and economically strong future. Its programs and policies have benefitted energy consumers, policymakers, utilities and the clean energy industry since 1982. IREC works to expand consumer access to clean energy; generates information and objective analysis grounded in best practices and standards; and leads programs to build a quality clean energy workforce. IREC is a 501(c)3 non-profit organization.

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