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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 that were graded in the past 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 to Freeing the Grid 2013

State policy is the foundation of clean-energy development in the United States, and net metering and interconnection procedures still remain critical facilitators in supporting the continued growth of renewable energy. These policies allow individuals, businesses, schools, and others to connect renewable energy systems to the grid under transparent terms and receive a fair credit for excess energy they produce while following practices of safety and reliability. With this in mind, we are pleased to present the 2013 edition of *Freeing the Grid*. This publication continues to build an objective record of state policy development so that we have an accurate picture of where we are heading as individual states and a country.



As in years past, *Freeing the Grid 2013* includes an explanation of the metrics used to grade state policies, a comprehensive breakdown of all state policies, and a spotlight on the best and less-than-best examples of policy developments during the past year. The report is designed to help policymakers, regulators, advocates, businesses, media representatives, researchers, and the general public make better sense of these policies.

Over the past seven years, *Freeing the Grid* has established itself as an essential resource for state policy development. Policymakers and renewables stakeholders rely on the grades provided by this report to effect positive change in their states. *Freeing the Grid* has been referenced in regulatory proceedings around the country. It has spurred interest and healthy competition among states to improve their annual grades. Its metrics are used by the U.S. Department of Energy's Rooftop Solar Challenge program to measure progress achieved by Rooftop Challenge teams nationally.

State policies and best practices have evolved as the U.S. market for distributed renewables has boomed, and the metrics used in *Freeing the Grid* have been updated accordingly. As states have raised the bar, so have we. This year, we overhauled the grading metrics for state interconnection procedures, which now take into account data accessibility, high-penetration integration, and network and distribution upgrade cost exposure. We also updated our grading metrics for net metering by reassessing the significance of certain policy components, and by providing bonuses for policies that require "electricity suppliers" to offer net metering and that allow virtual net metering.

We want to help create a race to the top when it comes to clean energy policy development. We invite you to join us by using this report to learn or educate, to assist with outreach efforts, and to engage in meaningful policy conversations in your state.

A handwritten signature in dark ink, appearing to read 'Jane Weissman', with a stylized, flowing script.

Jane Weissman

## Introduction to the 2013 Edition

Now in its seventh year of production, *Freeing the Grid* is a guide for improving state net metering and interconnection rules. The 2013 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](http://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 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 Distributed Generation (DG) by actively *encouraging* these clean energy systems. Since the 1<sup>st</sup> 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 enemy 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 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 by FERC Order 2006, hereafter referred to as the “FERC Standards”.)

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 have already been negotiated with more than adequate utility representation; there is no need to renegotiate these provisions in dozens of regulatory arenas.

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

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; there is no need for a state to reinvent the wheel.

### **New in 2013: Changes to the Grading Process**

Significant changes were made to the grading of interconnection procedures in the 2013 edition. These changes were necessary to bring the criteria up to date with current experience and to increase grading transparency. In previous editions of *Freeing the Grid*, grading criteria were based primarily on the FERC’s Small Generator Interconnection Procedures (SGIP), which required many subjective determinations to compare that benchmark to the various format of state procedures. The primary intent behind these changes is to create clear, easy to apply criteria—that still capture the fundamental building blocks of interconnection reflected in the previous

focus on the SGIP—while recognizing emerging best practices from the states that go beyond the SGIP.

To facilitate this new approach, interconnection scores are now based on an additive method and do not feature penalties – in other words: a state will get credit for positive features of their interconnection procedures by earning points but will not receive negative points for practices that differ from the SGIP. With the exception of the first two categories (Eligible Technologies and Individual System Capacity), it is possible for a state to earn multiple adders under each category. This approach allows the grading scale to deliver more information regarding what features are of value consistent with best practices.

In some categories, best practices have evolved since previous editions of *FTG*. For example, several states have begun to consider expanding expedited interconnection review by increasing system size thresholds for Simplified and Fast Track interconnections, and by creating a well-defined supplemental review process (including new technical supplemental review screens) for generators that may not pass all Fast Track requirements. The technical substance of the grading criteria for these emerging best practices is drawn from several recent reports from the National Renewable Energy Laboratories (NREL), *Updating Small Generator Interconnection Procedures for New Market Conditions (Updating SGIP)* and *Updating Interconnection Screens for PV System Integration (Updating Screens for PV)*, and from IREC’s *Model Interconnection Procedures*, 2013 edition. The emerging best practices, discussed below, are also offered in light of the FERC’s ongoing process to consider modifications to the SGIP that include many of the new standards proposed in IREC’s *Model Interconnection Procedures* and the NREL papers.

In addition to shifting the approach to scoring and the continued incorporation of these emerging best practices, the new grading criteria have reallocated the weighting of certain categories to reflect their importance to the interconnection process. Time and cost certainty remain central principles of good interconnection policy, and the new grading criteria award points for states that have explicit, objective benchmarks. For this reason, categories like “technical screens” have been weighted to enable more total points, as the application of widely-used and well-understood technical screens in an expedited review process is one of the most important features of a state’s interconnection policy.

## **Emerging Best Practices in Interconnection**

### **Expanding Access to Expedited Review**

As states have gained more experience using the Fast Track process to accommodate generators of 2 MW or less, several states have begun to expand the size limits for expedited review. Instead of the static 2 MW or less limit, evolving standards will allow generators of up to 5 MW or less, depending on the rating of a line and the distance from the generator to the substation. For very small interconnections, many states feature a Simplified Interconnection process for inverter-based systems of 25 kW or less, an expansion on the FERC’s 10 kW or less inverter-based process. Expansion of the simplified interconnection application process, and the eligible size threshold for Fast Track review under the SGIP are both currently under review in a rulemaking at the FERC.

Further detail on these emerging best practices can be found in Chapter 3 of the NREL publication *Updating Small Generator Interconnection Procedures for New Market Conditions*. These emerging best practices expand the number and types of generators that will qualify for Simplified or Fast Track interconnection and are recognized as “adders” in the updated 2013 “Breakpoints” grading criteria.

### Growing Significance of Supplemental Review

Expedited review procedures, based on the application of objective technical review screens to a particular interconnection request, have been widely used throughout the United States. As states see higher penetrations of renewable, distributed generation on the grid, however, the occurrences of screen failures have increased. In states with high penetration of solar, like Hawaii and California, supplemental review has developed into an important tool to ensure that a generator that can be interconnected without compromising the safety or reliability, on the basis of specified technical criteria, will not be forced into a study process solely because it failed one or more initial technical review screens.

One of the most frequently failed Fast Track screens, particularly in high penetration scenarios, is the SGIP screen that allows aggregate generation to reach up to 15% of peak load on a line section. For generators that would cause aggregate generation on a line section to exceed 15% of peak load, several states have adopted or have begun to consider an emerging best practice 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, such as causing power to backfeed beyond the substation. NREL’s publications, *Updating SGIP* and *Updating Screens for PV*, provide a much more in depth discussion of the significance of the minimum load screen to accommodating higher penetrations of solar generation.

The growing importance of supplemental review is reflected by its inclusion in several grading categories: Breakpoints for Interconnection Process; Application Charges; Timelines; and Technical Screens. As with most categories, points are awarded where the supplemental review process gives customers certainty about the technical review criteria, the time involved, and the potential cost of further review.

### Transparency and Data Access to Support Interconnection

A growing number of jurisdictions are taking an active role to require that utilities make some amount information about the grid available to developers or to the public. Information about available line capacity and existing or pending generation interconnection requests can be critical to evaluating the viability of a particular project. Provision of this level of data in a pre-application report is emerging as a best practice and is reflected in IREC’s Model Interconnection Procedures and NREL’s *Updating SGIP* paper. Publication of certain information, including interconnection queues with all current and proposed generators, available capacity on specific areas on the utility’s grid, and “preferred” locations to interconnect also furthers the aims of transparency and efficiency. The more granular the information, the more useful it can be to help identify suitable project sites.



### 2013 Bonus Criteria

The “Bonus” category for the 2013 *Freeing the Grid* incorporates several former stand-alone categories from previous editions. These include: insurance, external disconnect switch, standard form agreement, and dispute resolution. While these issues remain important, the way they are evaluated has been modified to remove subjective elements. For example, points are awarded to states that have a consistent standard form agreement without making the more subjective determination of whether the standard terms are more or less favorable than those approved by FERC. Points are awarded for “dispute resolution” so long as a structured process is discussed in the state interconnection procedures that goes beyond simply stating that parties can file formal complaint with a state utility commission. For indemnification provisions within those standard agreements, it is a best practice to waive such requirements for government entities, since many government customers are prohibited by statute or constitution from agreeing to indemnify a party in a contract.

For external disconnect switch and additional insurance requirements, points are awarded where states waive these requirements for very small, inverter-based systems that pose very little risk of liability or injury to line workers. This is consistent with a focus throughout the 2013 categories for recognizing waiver of fees or upgrade costs for small, inverter-based systems.

## State Grades for 2013

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	D	B
Delaware	A	B	North Dakota	C	—
Florida	B	D	Ohio	A	B
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	C	—	Utah	A	A
Maine	B	B	Vermont	A	B
Maryland	A	B	Virginia	C	A
Massachusetts	A	A	Washington	B	B
Michigan	B	C	West Virginia	A	B
Minnesota	B	D	Wisconsin	C	D
Mississippi	—	—	Wyoming	B	—
Missouri	B	—			

## Grade Distribution for 2013

Net Metering Grade	Number of States
A	18
B	17
C	6
D	2
F	2
n/a	6

Interconnection Grade	Number of States
A	6
B	20
C	3
D	6
F	1
n/a	15

*“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: Best Practices: Expanding access to net metering**

Net metering gives renewable energy customers credit on their utility bills for the excess clean power they deliver to the grid to be used by their neighbors. This simple billing arrangement has long been one of the most important state policies for empowering customer investment in distributed renewables. And with state subsidies winding down in many parts of the country as solar approaches grid parity, net metering has become an increasingly critical policy for continued solar adoption.

In many states, participation in net metering is capped in relation to the aggregate load on the grid, typically as a percentage of a utility's peak load. Once these program caps are reached, utilities are no longer required to provide net metering to additional renewable energy customers. These caps, which are typically based on utility operational and financial "concerns" with virtually no supporting data, place an unnecessary barrier to private investment in distributed renewables and limit the many economic, environmental and grid benefits associated with net-metered systems. Moreover, these aggregate program caps ignore the fact that many large systems do not export energy yet count towards meeting a cap, which limits the number of small systems that are eligible for the program.

As a result, we have long recognized that best practices in program design would not limit cumulative generating capacity of net-metered systems. While not going so far as to uncap their programs, two states took commendable action this year to raise their aggregate net metering caps and ensure that more energy customers get full credit for their clean energy investment.

### **New York:**

The Empire State's primary market-building policy is the NY-Sun Initiative, an incentive program designed to achieve solar scale and affordability for New Yorkers. Originally conceived of as a four-year program (2012-2015), Governor Cuomo and his administration have committed to extending the program through 2023 to provide the long-term market certainty necessary for robust investment and sustainable growth in the state's solar industry.

It's an exciting growth trajectory; however, the state's 1% net metering cap would be hit long before NY-Sun's ambitious goals would be met. In fact parts of the state were on track to hit the existing cap before the end of 2013. To address this near-term barrier to growth, the New York Public Service Commission approved a decision in June 2013 to triple the state's net metering cap to 3% for five of the state's major electric service providers. The action will keep NY-Sun shining by clearing the way for New Yorkers to invest in an additional 462 megawatts (MW) of net-metered generation.

### **California:**

California is the nation's largest solar market, with more than 1.5 gigawatts (GW) of net metered solar installed at homes, businesses, schools and other buildings. In October 2013, Governor Brown signed into law AB 327, a rate reform bill that provides a framework for continued rooftop solar success by expanding customer access to net metering.

California's net metering program is currently capped at 5% of the sum of each utility's customers' maximum demand. Prior to AB 327, state regulators at the California Public Utilities Commission (CPUC) were considering suspending the program even earlier: as soon as the end of 2014. The new law ensures that California's net metering program will now stay in place until customers of the three large utilities do indeed hit the 5% cap, likely around 2016 or 2017. Furthermore, it gives the CPUC authority to remove caps on net metering participation altogether. The law specifically directs the CPUC to ensure that after the existing 5% program cap has been met, rooftop solar customers will continue to receive some form of fair credit on their utility bills. The details will be determined during the implementation process, but we hope that the CPUC will continue to take an approach—consistent with Freeing the Grid best practices—that retains the essential driving force that has made net metering so successful: to compensate solar customers fairly for the valuable power they are delivering to the grid.

### **Worst Practices: Undervaluing net-metered generation**

With distributed solar generation (DSG) growing at a record pace, states nationwide are undertaking comprehensive studies to assess the benefits and costs of this dynamic resource. The origins of these studies are diverse, either undertaken at the behest of regulators, commissioned by advocates in the solar industry, or put forward by utilities. The implications of these studies are critical as they are being conducted in a growing number of states, often with the explicit intent of altering the very structure of net metering programs or practices.

The importance of a transparent and informed DSG study methodology cannot be overstated. A flawed analysis that exaggerates general ratepayer costs associated with net-metered customers and understates the benefits provided by DSG systems can provide an inaccurate and inadequate basis to establish or change public policy. Recently, several utilities have put forward methodologies that significantly undervalue or ignore the long-term grid benefits and capacity value of net-metered systems. Most studies also tend to exclude the quantifiable societal benefits of net metering, including job creation, environmental benefits and health benefits from reduced pollution. It is logical to consider these benefits in valuation studies, or at a minimum considered as qualitative factors, as these public benefits are often the foundation for legislative support for net metering programs in the first place.

The foundation for best practices in the valuation of solar should involve the formulation of defensible and reasonable assumptions about the true spectrum of value that DSG brings to the table. There is a growing body of literature devoted to this subject, and IREC's recent publication, *A REGULATOR'S GUIDEBOOK: Calculating the Benefits and Costs of Distributed Solar Generation*, provides comprehensive guidance on how to develop a robust framework for developing a valuation methodology for DSG. Regulators should be involved in determining the reasonableness of assumptions at the outset, and should not be relegated to the clerical role of merely checking the math of studies put forward by parties. There is a fair amount of recent regulatory activity on this issue, but there has not been much definitive treatment by state

authorities of the proper method of calculating the benefits of DSG or in determining the cost-effectiveness of policies like net metering.

Unfortunately, 2013 brought a number of utility-sponsored studies that severely undervalued customer-sited DSG because they significantly departed from best practices on the topic. In this sense, these studies are an emerging worst practice in today's regulatory landscape. While state regulators have not yet accepted these methodologies, we consider significant deviations from the type of comprehensive analysis necessary to accurately value the benefits and costs of DSG to be a worst practice as it not only causes significant friction between all stakeholders, but also deviates from long-standing practice in regulatory decisionmaking. Ongoing proceedings in the following states provide salient examples of how not to undertake such a review and these proceedings highlight the importance of regulators establishing a standard methodology at the onset to fairly evaluate questions of cost-shift and equity among ratepayers.

#### Arizona:

With over 250 megawatts producing enough power for about 31,000 homes, Arizona has installed more rooftop solar than almost any other state, behind only California and New Jersey.<sup>1</sup> However, in July, Arizona's largest utility APS filed a proposal at the Arizona Corporation Commission (ACC) to assess substantial new charges on customers who go solar – a move that would stymie the current pace of solar adoption. APS put forward a cost-benefit analysis in support of its proposal that many stakeholders believe overlooks the significant capacity value of solar and makes other assumptions that represent a worst practice in valuing DSG.

The APS analysis found that the bottom line value of the expected DSG installed on homes and businesses would be 8.2¢ per kilowatt-hour in 2025. Discounted to today, that alleged value to the utility is only 3.5¢. This amount is far less than the findings of similar studies performed outside of Arizona, which ranged from 12.8¢ (Austin Energy, Texas)<sup>2</sup> to 19.3¢ (California) and higher to 25-32¢ (New Jersey and Pennsylvania).<sup>3</sup> This amount is even less than APS's own 2009 APS analysis of the benefits of distributed energy, which found that DSG value to range from 7.91¢ to 14.11¢ per kWh, well within range of the retail rates at which these customers are being credited.<sup>4</sup> These divergent results are due to many factors, including differences in the scope of the analysis (i.e., the time span over which benefits are evaluated) and the varying assumptions about the value of solar capacity that already exists and provides current benefit. These differences underscore the importance of developing fair and transparently developed assumptions to measure the value of DSG. Against this backdrop, the ACC staff issued a recommendation to the Commission in October 2013 to reject the utility's proposals, counseling

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<sup>1</sup> Larry Sherwood, *U.S. Solar Market Trends 2012* (IREC), available at [www.irecusa.org/wp-content/uploads/IREC-Trends-Report-2012\\_091312.pdf](http://www.irecusa.org/wp-content/uploads/IREC-Trends-Report-2012_091312.pdf).

<sup>2</sup> DSIRE website, Austin Energy-Value of Solar Residential Rate web page, available at [http://www.dsireusa.org/incentives/incentive.cfm?Incentive\\_Code=TX139F](http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=TX139F).

<sup>3</sup> Beach, Thomas and McGuire, Patric, *Re-evaluating the Cost-Effectiveness of Net Energy Metering in California* (2012), available at <http://votesolar.org/wp-content/uploads/2012/01/Re-evaluating-the-Cost-effectiveness-of-Net-Energy-Metering-in-California-1-9-2012.pdf>; Perez, R. et al., *The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania* (2012), available at <http://communitypowernetwork.com/sites/default/files/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf>.

<sup>4</sup> R.W. Beck, Inc., *Distributed renewable energy operating impacts and valuation study* (2009), available at [www.aps.com/files/solarRenewable/DistRenEnOpImpactsStudy.pdf](http://www.aps.com/files/solarRenewable/DistRenEnOpImpactsStudy.pdf).

that any changes to this foundational policy should be addressed in future rate cases. Considering the importance of net metering to Arizona’s growing rooftop solar market, such careful consideration is warranted. The proposals now go to the commissioners to make a final decision about the future of net metering in Arizona.

#### Colorado:

In a similar proceeding in Colorado, Xcel Energy requested that the Colorado Public Utilities Commission (CPUC) treat net metering as a subsidy based on its analysis that those customers are imposing more costs than benefits on the system and on non-participating customers. Similar to APS, Xcel’s analysis includes a number of assumptions that stakeholders claim will either significantly discount or overlook many of the cost savings that distributed renewables deliver to the utility system, including such benefits as avoided generation capacity costs, avoided ancillary costs, and avoided line losses. An alternate analysis—that accounts for these benefits—paints a much different picture, indicating that existing DSG currently in the Xcel service area delivers as much as \$11 million in annual net positive benefits to Xcel’s ratepayers.<sup>5</sup> While this proceeding is pending, as of publication, and the CPUC has not yet sanctioned or endorsed Xcel’s particular methodology, the critique here is that Xcel did not fully account for the benefits of net metered systems.

#### Idaho:

In early 2013, Idaho Power Company proposed weakening the utility’s net metering program and otherwise penalizing DSG customers through its rate case proceeding. The utility argued that non-participants must assume all the costs that net metering customers are avoiding by investing in solar and other renewable resources, but the utility did not support its claim with any analysis to substantiate those allegations. Fortunately in this case, the Idaho verdict came – appropriately the day before Independence Day – with the Idaho Commission standing strong for net metering and rejecting the utility’s proposals to dismantle net metering.

#### Need for standardization:

While values associated with net metering do indeed differ from one utility to the next, the approach used to calculate that value should be uniform. Any conversation about changes to net metering must begin with a fair, quantitative assessment of the value that DSG provides to the utility and to other ratepayers. The examples cited indicate how much methodological assumptions impact the end results. As this question arises in more jurisdictions, it is important for regulators, non-utility stakeholders and utilities to be working from the same playbook. Regulators, utilities and other stakeholders should adopt a standardized set of ‘best practice’ methodologies to help ensure accountability and verifiability of benefit and cost estimates. For more information about the issue and proposed standardized approaches, read IREC’s [REGULATOR’S GUIDEBOOK: Calculating the Benefits and Costs of Distributed Solar Generation](#).

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<sup>5</sup> Crossborder Energy. “Net Benefits of Solar Distributed Generation for the Public Service Company of Colorado.” (Sept 2013) Available at: [http://protectnetmetering.org/files/2813/8003/9574/Critique\\_of\\_Xcel\\_Study\\_of\\_the\\_Benefits\\_of\\_Distributed\\_Solar\\_Generation.pdf](http://protectnetmetering.org/files/2813/8003/9574/Critique_of_Xcel_Study_of_the_Benefits_of_Distributed_Solar_Generation.pdf)

## 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 a nod to utility concerns that customer-sited DG represents lost revenues, many states have limited the total aggregate capacity eligible for net metering, either statewide or for specific utilities. While this argument has some intuitive appeal, it is a shortsighted view of the arrangement.

It makes little sense to limit the total amount of clean energy that customers may generate and contribute to the electric grid. Utilities do not have an inherent right to charge for electricity that customers could otherwise generate more efficiently and more cleanly on their own. 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.

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.

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 (REC) 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 Renewable Portfolio Standard 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 multiunit 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,”<sup>6</sup> 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 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 for *Freeing the Grid 2013* is to reflect continued evolution in best practices concerning interconnection procedures. 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 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
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+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 2013 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, 2013 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.

## Alaska

### Net Metering

2007: N/A

2008: N/A

2009: N/A

2010: B

2011: C

2012: C

**2013: C**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Federal Government, Agricultural, Institutional
<b>Limit on System Size:</b>	25 kW
<b>Limit on Overall Enrollment:</b>	1.5% of average retail demand
<b>Treatment of Net Excess:</b>	Reconciled monthly
<b>Applicable Utilities:</b>	Utilities with annual retail sales of 5,000,000 kWh or more
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	Not addressed

Recommendations:

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

### Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

**2013: N/A**

Recommendation:

- Adopt IREC's model interconnection procedures

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. 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**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops
<b>System Capacity Limit:</b>	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
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; excess reconciled annually at avoided-cost rate
<b>REC Ownership:</b>	Customer owns RECs (must be relinquished to utility in exchange for distributed generation payments)
<b>Meter Aggregation:</b>	Not addressed

Recommendation:

- Adopt 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

### Interconnection

2007: C

2008: C

2009: C

2010: N/A

2011: N/A

2012: N/A

**2013: N/A**

Recommendation:

- Adopt IREC's model interconnection procedures

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. 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**

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

### Interconnection

2007: F

2008: F

2009: F

2010: N/A

2011: N/A

2012: N/A

**2013: 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. 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.

## California

### Net Metering

2007: A

2008: B

2009: A

2010: A

2011: A

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Fuel Cells, Biogas from manure methane production or as a byproduct of the anaerobic digestion of biosolids and animal waste
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Agricultural
<b>Applicable Utilities:</b>	All utilities (except LADWP): solar and wind; Investor-owned utilities: solar, wind, biogas and fuel cells



<b>System Capacity Limit:</b>	1 MW (10 MW for up to 3 biogas digesters)
<b>Aggregate Capacity Limit:</b>	5% of utility's peak demand (statewide limit of 50 MW for biogas digesters; 112.5 MW for fuel cells);
<b>Net Excess Generation:</b>	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.
<b>REC Ownership:</b>	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.
<b>Meter Aggregation:</b>	Virtual meter aggregation on multi-family affordable housing allowed

Recommendation:

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

### Interconnection

2007: C

2008: B

2009: B

2010: B

2011: B

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	No limit specified
<b>Bonus:</b>	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 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. 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**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Recycled Energy, Small Hydroelectric, Fuel Cells using Renewable Fuels
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	All utilities (exceptions for small municipal utilities)
<b>System Capacity Limit:</b>	IOU customers: 120% of the customer's average annual consumption. Muni and co-op customers: 25 kW for non-residential & 10 kW for residential
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	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.
<b>REC Ownership:</b>	Customer owns RECs (must be relinquished to utility for 20 years in exchange for incentives)
<b>Meter Aggregation:</b>	Allowed for IOU customers; rules under development

Recommendation:

- Allow rules to cover muni and co-op customers

## Interconnection

2007: C

2008: C

2009: C

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Utility, Agricultural, Institutional
<b>Applicable Utilities:</b>	All utilities (exceptions for small municipal utilities)
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	Dispute resolution process adopted to address disputes

Recommendations:

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

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.

## Connecticut

### Net Metering

2007: B

2008: B

2009: A  
 2010: A  
 2011: A  
 2012: A  
**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Multi-Family Residential, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	2 MW
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	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)
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	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).

#### Interconnection

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

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

## Delaware

### Net Metering

2007: B

2008: B

2009: A

2010: A

2011: A

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Small Hydroelectric, Fuel Cells
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	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
<b>Aggregate Capacity Limit:</b>	5% of peak demand (utilities may increase limit)
<b>Net Excess Generation:</b>	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.
<b>REC Ownership:</b>	Customer retains ownership of RECs associated with electricity produced and consumed by the customer

<b>Meter Aggregation:</b>	Not addressed
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Recommendation:

- Allow net metering for third parties using the PPA model

### Interconnection

2007: F

2008: F

2009: D

2010: F

2011: A

2012: A

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Fuel Cells, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	All utilities (only Delmarva Power is subject to commission rules)
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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: None

Net metering is allowed in Delaware for systems up to 25 kilowatts (kW) for residential customers of DP&L, DEC and municipal electric utilities; two megawatts (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.

## District of Columbia

### Net Metering

2007: F

2008: C

2009: B

2010: B

2011: B  
 2012: B  
 2013: A

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Microturbines
<b>Applicable Sectors:</b>	Commercial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	1 MW
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	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
<b>REC Ownership:</b>	Customer and utility own RECs
<b>Meter Aggregation:</b>	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

### Interconnection

2007: F  
 2008: F  
 2009: B  
 2010: B  
 2011: B  
 2012: A  
 2013: B

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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
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#### Recommendations:

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

Net metering is currently available to D.C. residential and commercial customer-generators with systems powered by renewable-energy sources, combined heat and power (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. 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**

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



Recommendation:

- 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

**Interconnection**

2007: N/A

2008: D

2009: B

2010: B

2011: C

2012: D

**2013: D**

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

<b>Incentive Type:</b>	Net Metering
<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Fuel Cells
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	100 kW non-residential; 10 kW residential
<b>Aggregate Capacity Limit:</b>	0.2% of utility's peak demand during previous year
<b>Net Excess Generation:</b>	Credited to customer's next bill at a predetermined rate filed with the commission
<b>REC Ownership:</b>	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**

#### 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

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

### Interconnection

2007: F

2008: F

2009: F

2010: F

2011: F

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, State Government, Fed. Government

<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	No limit specified
<b>Bonus:</b>	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

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.

## Illinois

### Net Metering

2007: N/A

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels, Microturbines
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities, alternative retail electric suppliers
<b>System Capacity Limit:</b>	40 kW
<b>Aggregate Capacity Limit:</b>	1% of utility's peak demand in previous year
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle

<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	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

### Interconnection

2007: N/A

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	No limit specified
<b>Standard Agreement:</b>	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. Net metering was adopted in May 2008 and interconnection procedures for systems up to 10 MW were adopted in August 2008. These standards make net metering available to systems up to 40 kW with an aggregate limit of 1% of each utility's peak demand (larger systems are allowed, but on terms that are equivalent to what is required under PURPA). Electric co-ops and municipalities are exempt. NEG rolls-over to the next billing period at the retail rate but expires at the end of the year. Customers retain all RECs. 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**

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)

### Interconnection

2007: D

2008: D

2009: D

2010: C

2011: B

2012: B

**2013: 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 Indiana Utility Regulatory Commission (IURC) to provide three levels of interconnection. An external disconnect switch is required. The net metering rules adopted by IURC in 2004 apply to investor-owned utilities and limit the aggregate system to 0.1% of the utility's most recent summer peak load. These rules allow net metering for residential customers and K-12 schools; this is the only state net metering program that excludes the commercial class. Net-metered customers may not be subject to additional fees, but insurance may be required. NEG is credited to the customer's next bill; expiration of NEG for multi-year participants is not addressed.

## Iowa

### Net Metering

2007: C

2008: C

2009: C

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Biomass, Hydroelectric, Municipal Solid Waste, Small Hydroelectric
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	500 kW
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; carries over indefinitely
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	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)

### Interconnection

2007: D

2008: F

2009: F

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities; Linn County REC
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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 distributed generation 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**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	200 kW for non-residential; 25 kW for residential
<b>Aggregate Capacity Limit:</b>	1% of utility's peak demand during previous year
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
<b>REC Ownership:</b>	Utility owns RECs
<b>Meter Aggregation:</b>	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)

**Interconnection**

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

Recommendation:

- The state should adopt IREC's model interconnection procedures

The Kansas legislature enacted a state-wide net metering and interconnection law in May 2009 that applies to residential systems up to 25 kW and non-residential systems up to 200 kW. This bill carries an aggregate participation limit of 1% of the utility's peak demand for the previous year, though this cap can be increased through a hearing process at the Kansas Corporation Commission (KCC). Net excess generation (NEG) may be carried forward from month to month though NEG remaining at the end of the calendar year is forfeited to the utility. Utilities may require an external disconnect switch though they may not require customers to purchase additional insurance. Utilities are also forbidden from charging customers additional standby,

capacity, interconnection or other fees that would not otherwise be charged if the customer were not a customer-generator. The law also directs the KCC to require simple contracts for interconnection and net metering agreements. The capacity of all net metering systems interconnected with utilities under this law will count toward compliance for the state's renewable energy standard.

## Kentucky

### Net Metering

2007: D

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: B**

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

### Interconnection

2007: N/A

2008: N/A

2009: F

2010: F

2011: F

2012: F

**2013: D**

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

#### Recommendation:

- The state should adopt IREC's model interconnection procedures

Kentucky's net metering law was expanded in April 2008 to systems up to 30 kW and to a variety of renewable technologies (previously, only PV was allowed). The PSC issued net metering and interconnection rules in January 2009 as a result of this law. NEG is rolled-over to the next month's bill with no apparent expiration. Electricity generated under a time-of-use tariff is credited at the rate that applies at the time that the electricity was generated. The PSC may limit the aggregate capacity of net metering to 1% of a utility's single-hour peak load. 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**

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

**Interconnection**

2007: F

2008: F

2009: F

2010: N/A

2011: N/A

2012: N/A

**2013: N/A**

Recommendation:

- The state should adopt IREC's interconnection procedures

Rules set by the Louisiana Public Service Commission in November 2005 require investor-owned utilities and rural electric co-ops to offer net metering to residential customers with systems of 25 kW or less and to commercial customers with systems of 100 kW or less. In June 2008, Louisiana enacted legislation increasing the eligible size of non-residential systems to 300 kW. NEG is credited to the customer's next monthly bill and then rolled-over for an indefinite period. In July 2011, the PSC issued an order that allows utilities to file for a suspension of the rule when the aggregate participation reaches 0.5% of the utility's retail peak load, which had not been specified in the legislation.

**Maine**

**Net Metering**

2007: C

2008: C

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	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
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<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	660 kW for IOU customers; 100 kW for muni and co-op customers (although they may offer up to 660 kW voluntarily)
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; granted to utility at end of 12-month billing cycle
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	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

### Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: A

2011: A

2012: A

**2013: B**

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

Recommendations:

- Provide more clarification on the dispute resolution process

In April 2009, the Maine legislature passed emergency legislation to allow the PUC to adopt rules modifying the states net metering policy. Net metering was subsequently allowed for systems up to 660 kW and included high-efficiency CHP as an eligible technology. Interestingly, this rule was also one of the first in the country to allow for the shared ownership of net-metered systems. Up to 10 meters may be aggregated against a single renewable facility. NEG is credited to the following month for 12 months, at which point it is granted to the utility. There is no aggregate limit on net metering. The Maine Public Utility Commission (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. Since interconnection was based on IREC's model rules (IREC updated the model in 2009), Maine's interconnection procedures are the strongest in the country.

## Maryland

### Net Metering

2007: A

2008: A

2009: A

2010: A

2011: A

2012: A

**2013: A**

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

### Interconnection

2007: D

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind,
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<b>Technologies:</b>	Biomass, Geothermal Electric, Fuel Cells, CHP/Cogeneration, All Distributed Generation , Anaerobic Digestion, Tidal Energy, Wave Energy, Ocean Thermal, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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. The 2007 legislation also increased the capacity limit for net-metered systems to 2 MW and the aggregate system capacity to 1,500 MW. NEG rolls-over to the next month's bill until the end of year, at which point it is granted to the utility. In May 2009 the Maryland legislature enacted bills that allowed third-party ownership and included CHP as an eligible net metering technology. Legislation enacted in May of 2010, however, would have adversely affected how NEG would be valued—(essentially at wholesale instead of retail rates)—however the law was revised again through legislation in May 2011, which provides monthly rollover of net excess generation at the retail rate, and annual reconciliation at the wholesale energy rate. Customers retain RECs and are protected from any additional fees.

## Massachusetts

### Net Metering

2007: C

2008: B

2009: B

2010: A

2011: A

2012: A

**2013: A**

<b>Eligible Renewable/Other</b>	Solar Thermal Electric, Photovoltaics, Wind, Biomass,
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<b>Technologies:</b>	Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	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
<b>Aggregate Capacity Limit:</b>	3% of utility's peak load
<b>Net Excess Generation:</b>	Varies by system type and customer class
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	Neighborhood net metering allowed

Recommendations:

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

### Interconnection

2007: C

2008: B

2009: B

2010: A

2011: A

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	No limit specified
<b>Bonus:</b>	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



In June 2009 the Department of Public Utilities adopted net metering rules in accordance with a 2008 law. Net metering is generally available for “Class I, II, and III” systems up to 2 MW, with an aggregate capacity of 1% of a distribution company’s peak load. An October 2010 bill subsequently allowed government agencies to net meter systems up to 10 MW, and included a separate aggregate capacity of 2% for those facilities. NEG is rolled-over month-to-month at a slightly less-than-retail rate and credits from net metering facilities may be transferred to another customer of the same utility as long as certain conditions are met. Utilities may also choose to pay for the net metering credits for Class III facilities rather than allocating credits. Massachusetts’ rules additionally provide for “Neighborhood Net Metering” which allows a group of 10 or more residential customers to offset their electric load through one shared system. 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

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Municipal Solid Waste, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural
<b>Applicable Utilities:</b>	Investor-owned utilities, electric cooperatives, alternative electric suppliers
<b>System Capacity Limit:</b>	150 kW
<b>Aggregate Capacity Limit:</b>	0.75% of utility's peak load during previous year

<b>Net Excess Generation:</b>	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.
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	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

### Interconnection

2007: D

2008: D

2009: C

2010: C

2011: C

2012: B

**2013: C**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops
<b>System Capacity Limit:</b>	No limit specified
<b>Bonus:</b>	Insurance Waived for Generators up to 25 kW; Dispute resolution process adopted to address disputes

Recommendations:

- Remove requirement for additional insurance

In May 2009 the Michigan PSC adopted rules for net metering as a result of legislation passed in October 2008. The rules, which currently apply to IOUs, co-ops and alternative electric suppliers, specify that systems up to 20 kW are eligible for "true" net metering, and most systems between 20 kW and 150 kW are eligible for "modified" net metering. Methane digesters up to 550 kW are also eligible for net metering. True net metering is available until aggregate capacity reaches 0.5% of a utility's peak load; modified net metering is available until participation reaches an additional 0.25% of a utility's peak load for systems of 150 kW or less and 0.25% for systems larger than 150 kW. For true net metering, NEG during a billing period may be carried forward to the next billing period at the retail rate. Modified net metering allows NEG to carry over only for

the power supply component of the retail rate. NEG may be carried forward indefinitely and system owners retain RECs associated with on-site production. The October 2008 legislation also 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**

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

### Interconnection

2007: F

2008: F

2009: F

2010: D

2011: D

2012: F

## 2013: D

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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

Minnesota's net metering legislation was adopted in the early 1980s. Net metering is offered for systems up to 40 kW with no limit on aggregate program capacity. The rules are unlike most other state net metering policies in that they allow utilities to pay customers at the end of the month in order to purchase NEG at the retail rate. Compensation may take the form of an actual payment (i.e., check for purchase) for NEG or as a credit on the customer's bill. 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

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

### Interconnection

2007: F

2008: F

2009: F

2010: N/A

2011: N/A

2012: N/A

**2013: 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. Utilities are required to offer net metering up to a maximum of 5% of their peak demand for the previous year although there is also a smaller cap on the capacity of systems interconnected in a single year. NEG is credited at the avoided cost rate on a monthly basis and is granted to the utility annually. 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

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

## Interconnection

2007: F

2008: F

2009: F

2010: C

2011: C

2012: C

## 2013: C

<b>Eligible Renewable/Other Technologies:</b>	No restrictions on eligible technology
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Schools, Local Government, State Government
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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

All IOUs are required to offer net metering for systems of less than 50 kW. NEG is rolled over to the next monthly bill until the end of the year, at which point it is granted to the utility. Some of Montana's utility companies, each with their own agreements and requirements, offer interconnection procedures. The Montana Electric Cooperatives Association (MECA) has adopted a scaled-down model interconnection and net metering policy. While net metering is voluntary for non-investor-owned utilities, most have adopted voluntary programs similar to the MECA

models. 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**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Anaerobic Digestion, Small Hydroelectric
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Agricultural
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	25 kW
<b>Aggregate Capacity Limit:</b>	1% of utility's average monthly peak demand
<b>Net Excess Generation:</b>	Credited to customer's next bill at avoided-cost rate; excess reconciled at end of annual period
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	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

### Interconnection

2007: N/A

2008: N/A

2009: F

2010: N/A

2011: N/A

2012: N/A

**2013: N/A**

Recommendation:

- The state should adopt IREC's model interconnection procedures

Legislation signed in May 2009 established statewide net metering rules for all electric utilities in Nebraska. The rules apply to facilities that are rated at or below 25 kW in capacity. Monthly NEG is credited at the utility's avoided cost rate for that month and carried forward to the next billing period. Any remaining credit at the end of an annualized period will be paid out to the customer, also at the avoided cost rate. Customers retain all RECs for electricity generated. The allowed net metering enrollment cap is reached when the aggregate generating capacity of all customer-generators equals one percent of the utility's average monthly peak demand for that year.

## Nevada

### Net Metering

2007: B

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Small Hydroelectric
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	1 MW
<b>Aggregate Capacity Limit:</b>	3% of utility's peak capacity
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; carries over indefinitely
<b>REC Ownership:</b>	Customer owns RECs (must be relinquished to utility if utility subsidizes system)
<b>Meter Aggregation:</b>	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

### Interconnection

2007: N/A

2008: B

2009: B

2010: B

2011: B

2012: B



## 2013: B

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

### Recommendations:

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

Nevada originally enacted net metering in 1997 and has since amended its law several times. In 2007, legislation increased the net metering capacity to 1 MW; however, the aggregate limit on enrollment in net metering is limited to 3% of a utility's peak capacity. NEG rolls over to the next month's bill indefinitely. There are specific guidelines for customers billed under a TOU schedule. Additional liability insurance requirements are prohibited by Nevada law. Third-party systems are allowed to net meter and are not considered utilities. 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

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Small Hydroelectric, Tidal Energy, Wave Energy, Biodiesel, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	1 MW for most renewables, 100 kW for wind, 30 kW for CHP
<b>Aggregate Capacity Limit:</b>	50 MW, 2 MW for CHP
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; carries over indefinitely
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	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
- Increase limit on overall enrollment to at least 5% of utility's peak capacity

### Interconnection

2007: D

2008: D

2009: C

2010: D

2011: D

2012: D

**2013: D**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Hydroelectric, Geothermal Electric, Small Hydroelectric, Tidal Energy, Wave Energy, Biodiesel, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	1 MW for most renewables, 100 kW for wind
<b>Bonus:</b>	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. As of publication, the New Hampshire PUC has not yet established rules to in accordance with the new law. All utilities are required to offer net metering to customers with renewable systems with a maximum capacity of 1 MW, with the exception of wind energy systems, which remain at the previous system cap of 100 kW. The aggregate system capacity is 50 MW for the entire state, calculated by multiplying the state cap (50 MW) by the individual utility's share of the "total 2010 annual coincident peak energy demand." NEG carries over indefinitely. The interconnection procedures come out of the net metering rules the New Hampshire Public Utilities Commission set according to the law. 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**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Geothermal Electric, Anaerobic Digestion, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities (electric distribution companies); electric suppliers
<b>System Capacity Limit:</b>	System must be sized not to exceed the customer's electricity consumption during the previous year
<b>Aggregate Capacity Limit:</b>	No limit specified (commission may limit to 2.5% of peak demand)
<b>Net Excess Generation:</b>	Generally credited to customer's next bill at retail rate; excess reconciled at end of annual period at avoided-cost rate
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	Not addressed

Recommendations:

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

### Interconnection

2007: B

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Geothermal Electric, Anaerobic Digestion, Tidal Energy, Wave Energy, Fuel Cells using Renewable Fuels
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities (electric distribution companies)
<b>System Capacity Limit:</b>	No limit specified

<b>Bonus:</b>	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
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Recommendation:

- Adopt standard interconnection applications

New Jersey enacted legislation in 1999 requiring utilities to offer net metering to residential and small commercial customers which have been significantly improved upon since, making New Jersey a model state for net metering rules. In January 2010 New Jersey enacted legislation removing the 2 MW cap for net-metered systems and the BPU adopted this change in June 2010. Although there is no hard limit stated in the rules, the BPU is authorized to limit aggregate system capacity to 2.5% of utilities' peak demand. Net metering customers are also allowed to choose their annual period to take advantage of seasonal fluctuations in energy use and generation. 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**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric, Microturbines
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops
<b>System Capacity Limit:</b>	80 MW
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at avoided-cost rate or reconciled monthly at avoided-cost rate
<b>REC Ownership:</b>	Utility owns RECs
<b>Meter Aggregation:</b>	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

### Interconnection

2007: C

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops
<b>System Capacity Limit:</b>	80 MW
<b>Bonus:</b>	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

The New Mexico Public Regulation Commission (PRC) required utilities to offer net metering beginning in 1999, but current standards are a result of 2007 revisions. Systems of up to 80 MW are eligible to interconnect and net meter, but are subject to additional charges and safety standards. There is no aggregate cap on the capacity of net-metered systems statewide. Net excess generation rolls over monthly at the utility's avoided-cost rate and is credited to the customer's next bill if it is under \$50. The utility will pay the customer for monthly NEG exceeding \$50. 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 PRC regulation as of January 1, 2011.

## New York

### Net Metering

2007: D

2008: B

2009: D

2010: B

2011: B

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Microturbines
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	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
<b>Aggregate Capacity Limit:</b>	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
<b>Net Excess Generation:</b>	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
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	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

### Interconnection

2007: C

2008: C

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells,
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	Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	2 MW
<b>Bonus:</b>	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

New York allows net metering for residential solar and wind systems of up to 25 kW, non-residential solar and wind systems of up to 2 MW, agricultural wind or biogas systems up to 500 kW and 10 kW for residential micro-CHP and fuel cells. In June 2011 New York enacted legislation allowing eligible farm-based and non-residential customer-generators to engage in "remote" net metering. 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: D**

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

	Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	1 MW
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; granted to utility at beginning of summer billing season
<b>REC Ownership:</b>	Utility owns RECs (unless customer chooses to net meter under a time-of-use tariff)
<b>Meter Aggregation:</b>	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

#### Interconnection

2007: F

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor Owned Utilities
<b>System Capacity Limit:</b>	No limit specified
<b>Bonus:</b>	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 (NCUC) adopted a net metering standard in October 2005, and revised it in 2006 and 2009. There are no limits on aggregate customer participation. Time-of-use (TOU) customers retain RECs, while non-TOU customers must turn over all RECs to the utility. Standby charges are prohibited for residential systems up to 20 kW and for non-residential systems up to 100 kW. The NCUC 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: C**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	100 kW
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Reconciled monthly at avoided-cost rate
<b>REC Ownership:</b>	Customer and utility share RECs
<b>Meter Aggregation:</b>	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)

### Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

**2013: N/A**

Recommendation:

- The state should adopt IREC's model interconnection procedures

The North Dakota Public Utilities Commission issued net metering rules in 1991. These rules make net metering available to renewable energy systems of up to 100 kW, and allow customers to retain the RECs associated with production of non-NEG. Utilities retain any RECs associated with NEG, but must compensate the customer. Net excess generation is purchased at the end of the month at the utility's avoided-cost rate. North Dakota has not yet adopted statewide interconnection procedures.

## Ohio

### Net Metering

2007: B

2008: B

2009: B

2010: A

2011: A

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Small Hydroelectric, Microturbines
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities, competitive retail electric service providers
<b>System Capacity Limit:</b>	No limit specified (limit based on customer's load)
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at unbundled generation rate; customer may request refund of excess at end of 12-month billing period
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	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

## Interconnection

2007: C

2008: C

2009: C

2010: C

2011: C

2012: C

**2013: B**

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

Recommendations:

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

The Public Utilities Commission of Ohio (PUCO) adopted revised interconnection procedures in March 2007 to provide for three levels of review for systems up to 20 MW in capacity. Technical screens, fees and timelines are contained in the standards for each level. PUCO revised the state's net metering standards, as prompted by EAct 2005. These revisions expanded net metering; however, a 2002 Ohio Supreme Court decision requires that NEG be credited to the customer at the utility's unbundled generation rate. In November 2008, PUCO created rules for the amended net metering law. The new rules removed the aggregate capacity limit and the limitations on eligible technologies.

## Oklahoma

### Net Metering

2007: D

2008: D

2009: D

2010: F

2011: F

2012: F

**2013: F**

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

#### Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

**2012: N/A**

#### Recommendation:

- The state should adopt IREC's model interconnection procedures

Oklahoma's investor-owned utilities and electric co-ops are required to offer net metering to customers with systems up to 100 kW, as a result of an order issued by the Oklahoma Corporation Commission in 1988. There is no stated aggregate limit on net-metered capacity. Utilities are not allowed to impose extra charges or require additional insurance of customers with net-metered systems. Utilities are not required to purchase NEG. An external disconnect switch is required. Oklahoma has not yet adopted statewide interconnection procedures.

## Oregon

#### Net Metering

2007: B

2008: A

2009: A

2010: A

2011: A  
 2012: A  
 2013: A

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

#### Interconnection

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

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Fuel Cells, Municipal Solid Waste, Anaerobic Digestion
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities (Idaho Power is exempt from interconnection procedures for net-metered systems)
<b>System Capacity Limit:</b>	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
<b>Bonus:</b>	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. Oregon has also established separate net metering programs for the state's primary investor-owned utilities (PGE and PacifiCorp), and for its municipal utilities and electric co-ops. The PUC adopted rules for net metering for PGE and PacifiCorp customers in July 2007, raising the individual system capacity limit from 25 kW to two MW for non-residential applications. Net excess generation is carried over to the customer's next bill as a kilowatt-hour credit for a 12-month period. Munis, co-ops and public utility districts are required to offer net metering up to 25 kW for non-residential systems and 10 kW for residential systems. Net excess is either purchased at the utility's avoided-cost rate or credited to the customer's next monthly bill as a kilowatt-hour credit. In July 2008, the Oregon PUC further incentivized renewable installations by allowing third-party ownership of net-metered systems.

## Pennsylvania

### Net Metering

2007: A

2008: A

2009: A

2010: A

2011: A

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional

<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	5 MW for microgrid and emergency systems; 3 MW for non-residential; 50 kW for residential
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; reconciled at end of year at "price-to-compare"
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	Virtual meter aggregation allowed

Recommendation:

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

### Interconnection

2007: D

2008: B

2009: B

2010: B

2011: B

2012: B

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	5 MW (seek utility guidance for systems above 2MW)
<b>Bonus:</b>	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 customers of investor owned utilities.
- Expand interconnection procedures to all utilities (i.e., munis and co-ops)

The Pennsylvania Public Utilities Commission (PUC) issued rules in 2008 that require investor-owned utilities to offer net metering to residential customers with systems up to 50 kW and non-residential customers with systems up to 3 MW. Systems up to 5 MW are also allowed for customers who make their systems available to the grid during emergencies, or where a micro-grid is established in order to maintain critical infrastructure. RECs are retained by the customer. Pennsylvania allows meter aggregation on multiple properties owned or operated by one

customer within 2 miles of each other. 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**

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

### Interconnection

2007: N/A

2008: N/A

2009: N/A

2010: N/A

2011: N/A



2012: D

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	
<b>Applicable Sectors:</b>	
<b>Applicable Utilities:</b>	
<b>System Capacity Limit:</b>	
<b>Bonus:</b>	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 1998, Rhode Island's Public Utilities Commission (PUC) issued an order requiring the largest investor-owned utility in the state to offer net metering. In July 2008, legislation was enacted to expand net metering and by June 2011 a new net metering program was in place. The new program that took effect in July 2011 allows systems up to 5MW to net meter, so long as it provides approximately 100% of onsite needs. The rules allow municipalities and multi-municipal collaborative to net meter and provides for meter aggregation. In the summer of 2011 a bill was passed for certain interconnection provisions. The PUC's implementation could lead to an effort to create greater standardization.

## South Carolina

### Net Metering

2007: N/A

2008: N/A

2009: N/A

2010: F

2011: F

2012: F

**2013: D**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Duke Energy, Progress Energy, SCE&G
<b>System Capacity Limit:</b>	100 kW for non-residential; 20 kW for residential
<b>Aggregate Capacity Limit:</b>	0.2% of utility's SC jurisdictional retail peak demand for previous calendar year

<b>Net Excess Generation:</b>	Credited to customer's next bill at applicable time-of-use rate or less; granted to utility (annually) at beginning of each summer
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	Not addressed

Recommendation:

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

### Interconnection

2007: N/A

2008: F

2009: F

2010: F

2011: F

**2012: F**

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

Recommendation:

- The state should adopt IREC's model interconnection procedures

The South Carolina Public Service Commission (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. 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.

## 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**

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**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Tribal Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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.” Net metering is not available in South Dakota.

## Texas

### Net Metering

2007: D

2008: N/A

2009: N/A

2010: N/A

2011: N/A

2012: N/A

**2013: N/A**

Recommendation:

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

### Interconnection

2007: D

2008: D

2009: D

2010: C

2011: C

2012: C

**2013: D**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	10 MW
<b>Bonus:</b>	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**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops
<b>System Capacity Limit:</b>	2 MW for non-residential; 25 kW for residential
<b>Aggregate Capacity Limit:</b>	20% of 2007 peak demand for Rocky Mountain Power; 0.1% of utility's 2007 peak demand for co-ops
<b>Net Excess Generation:</b>	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
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	Allowed at same or adjacent location

### Recommendations:

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

## Interconnection

2007: F

2008: F

2009: F

2010: A

2011: A

2012: A

**2013: A**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local

	Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops
<b>System Capacity Limit:</b>	20 MW
<b>Bonus:</b>	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

Utah began requiring all investor-owned utilities and co-ops to allow interconnection and net metering for systems up to 25 kW in 2002. In March 2008, non-residential net metering was expanded to 2 MW, but co-ops serving fewer than 1,000 customers were allowed to discontinue offering net metering. The Public Service Commission increased Rocky Mountain Power's aggregate capacity limit to 20% of 2007 peak demand in 2009 (for co-ops it is still 0.1%). NEG rolls over to the next month's bill at the avoided-cost rate until the end of a 12-month period, at which point it is granted to the utility. 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**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels
<b>Applicable Sectors:</b>	Commercial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	2.2 MW for military systems; 20 kW for micro-CHP; 500 kW for all other systems
<b>Aggregate Capacity Limit:</b>	4% of utility's 1996 peak demand or peak demand during most recent calendar year (whichever is greater).

<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; excess credits not used within 12 months of generation granted to utility
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	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
- Specify that customer-generators own their RECs

### Interconnection

2007: C

2008: C

2009: C

2010: C

2011: C

2012: C

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Residential, Agricultural
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	No limit specified
<b>Bonus:</b>	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

Legislation adopted in May 2011 increased the system and aggregate capacity limits for Net Metering. "Group net metering" is allowed for all types of customers (previously it was only allowed for farm-based systems). The utility is required to issue a single aggregate monthly bill to the contact person of the group net metering system and therefore allocation of NEG credits among group members is the responsibility of the group. 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: C**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Small Hydroelectric, Tidal Energy, Wave Energy
<b>Applicable Sectors:</b>	Commercial, Residential, Nonprofit, Schools, Local Government, State Government, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops
<b>System Capacity Limit:</b>	500 kW for non-residential (may be higher if a utility chooses); and 10 kW (20 kW with standby charges) for residential
<b>Aggregate Capacity Limit:</b>	1% of utility's adjusted Virginia peak-load forecast for the previous year
<b>Net Excess Generation:</b>	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
<b>REC Ownership:</b>	Customer owns RECs
<b>Meter Aggregation:</b>	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

## Interconnection

2007: F

2008: F

2009: A

2010: A

2011: A

2012: A

**2013: A**

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



<b>Bonus:</b>	Dispute Resolution and Standardized Interconnection Agreement
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#### Recommendations:

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

The Virginia State Corporation Commission (SCC) approved net metering regulations in April 2010, pursuant to a 2009 law. Primarily, these actions increased the system size limit for non-residential customers to 500 kW from 250 kW, clarified that the customer retains ownership of RECs and allows the customer a one-time option of selling RECs back to the utility. The SCC also 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**

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

### Interconnection

2007: F

2008: D

2009: D

2010: D

2011: D

2012: D

**2013: B**

<b>Eligible Renewable/Other Technologies:</b>	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
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government, Agricultural, Institutional
<b>Applicable Utilities:</b>	Investor-owned utilities
<b>System Capacity Limit:</b>	20 MW
<b>Bonus:</b>	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

Net metering is available to all customers of all utilities in Washington. The aggregate capacity of net-metered systems is limited to 0.25% of each utility's 1996 peak demand, but this limit will increase to 0.5% in 2014. Individual systems are limited to 100 kW. NEG is credited to the customer's next bill at the utility's retail rate for a 12-month period; any remaining NEG at the end of this period is granted to the utility. 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**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Small Hydroelectric, Renewable Fuels
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Agricultural
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	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.
<b>Aggregate Capacity Limit:</b>	3% of peak demand during the previous year
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate with no annual true-up (perpetual rollover)
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	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

**Interconnection**

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

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Small Hydroelectric, Renewable Fuels
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Agricultural
<b>Applicable Utilities:</b>	All utilities
<b>System Capacity Limit:</b>	2 MW
<b>Bonus:</b>	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. The PSC also dramatically improved their net metering rules by raising the system cap to 2 MW for industrial customers of investor-owned utilities and to 500 kW for commercial customers. The new net metering rules also provide for indefinite rollover of NEG credits and allow customers to combine meters for the purpose of offsetting energy consumption at multiple sites on their property.

## Wisconsin

### Net Metering

2007: F

2008: D

2009: D

2010: C

2011: D

2012: C

**2013: C**

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

### Interconnection

2007: D

2008: D

2009: D

2010: D  
 2011: D  
 2012: C  
**2013: D**

<b>Eligible Renewable/Other Technologies:</b>	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Fed. Government
<b>Applicable Utilities:</b>	Investor-owned utilities, municipal utilities
<b>System Capacity Limit:</b>	15 MW
<b>Bonus:</b>	Standardized interconnection agreement adopted that applies to all utilities

Recommendations:

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

The Wisconsin Public Service Commission adopted net metering standards for investor-owned and municipal utilities in 1982, which were subsequently amended in 1992. Wisconsin allows net metering for systems up to 20 kW (100 kW for We Energies customers) and interconnection procedures for systems up to 15 MW. NEG provisions are specific to each utility, but utilities generally pay customers for NEG at the retail rate for renewable energy systems and at the avoided-cost rate for non-renewable energy systems. 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**

<b>Eligible Renewable/Other Technologies:</b>	Photovoltaics, Wind, Biomass, Hydroelectric, Small Hydroelectric
<b>Applicable Sectors:</b>	Commercial, Industrial, Residential
<b>Applicable Utilities:</b>	Investor-owned utilities, electric co-ops, irrigation districts

<b>System Capacity Limit:</b>	25 kW
<b>Aggregate Capacity Limit:</b>	No limit specified
<b>Net Excess Generation:</b>	Credited to customer's next bill at retail rate; excess reconciled annually at seasonal avoided-cost rate
<b>REC Ownership:</b>	Not addressed
<b>Meter Aggregation:</b>	Not addressed

Recommendations:

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

### Interconnection

2007: F

2008: F

2009: F

2010: N/A

2011: N/A

2012: N/A

**2013: 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\*

### **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 2013	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
Connecticut	20	4	3	1	3	1	1	2	1	0	1	0	1	2
Massachusetts	18.5	3	3.5	1.5	0.5	1	1	2	1	1	1	0	0	3
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
New Hampshire	18	3	1.5	2.5	1	1	1	2	0	0	1	3	1	1
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
Arizona	17	5	3	1	3	1	1	2	0.5	0.5	0	-1	0	1
Vermont	17	3	2	0	3	-1	1	2	1	1	0	3	1	1
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
Missouri	13.5	1	3.5	0	0	1	1	2	0	0	0	3	1	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
Kansas	11.5	1	2	0	2	0	1	1.5	0	0	0	3	0	1
Kentucky	11.5	-1	1	2.5	3	1	1	2	0	0	0	3	0	-1
Rhode Island	11	5	2	-2	1	-1	1	2	1	0	0	3	0	-1
Iowa	10.5	1	3	2.5	2	-1	1	2	0	0	0	0	0	0
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
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	6	-1	3	0	2	-1	1	2	0	0	0	0	0	0
Wisconsin	5.5	-1	3	1	1.5	-1	1	2	0	0	0	0	0	-1
North Dakota	5	0	3	-2	0	1	1	2	0	0	0	0	0	0
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
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 2013	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
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
Ohio	19	2	2	2	2	2	2	5	-	-	-	2
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 highly influential in New Jersey and Colorado, which are widely considered to have the best net metering policies in the United 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](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:

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

## About Us



The Interstate Renewable Energy Council (IREC) is a non-profit organization accelerating the use of renewable energy since 1982. IREC's programs and policies lead to easier, more affordable connection to the utility grid; fair credit for renewable energy produced; best practices for states, municipalities, utilities and industry; and quality assessment for the growing green workforce through the credentialing of trainers and training programs

[irecusa.org](http://irecusa.org)



Founded in 2002, the Vote Solar Initiative is a grassroots non-profit organization working to combat climate change and foster economic development by bringing solar energy into the mainstream.

[votesolar.org](http://votesolar.org)