Freeing the Grid
Best Practices in State Net Metering Policies and Interconnection Procedures
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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 did not receive a grade in this edition.

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“I’d put my money on the sun and solar energy. What a source of power! I hope we don't have to wait until oil and coal run out before we tackle that.”

—Thomas Edison
The 2011 Edition of *Freeing the Grid* marks the 5th year of the report. With the astronomical growth of the renewable energy industry and a heavy focus on distributed generation resources, these five years have felt like a lifetime. Much has changed in that period, and much has been for the better. For instance, community solar and virtual net metering arrangements are now commonplace in many jurisdictions. This policy element didn’t exist when *Freeing the Grid* was first introduced.

As a sign of how far *Freeing the Grid* has come, this year the U.S. Department of Energy will grant awards to state and local governments through its innovative SunShot program and *Freeing the Grid* is playing an important role. The program’s mission is to bring the installed cost of residential solar down to one dollar per watt by 2018. Currently price is roughly five to seven dollars per watt, depending on system size and location. Integral to this mission are good net metering policies and interconnection procedures; so much so that the DOE is basing some of its award metrics on *Freeing the Grid* grading. It is an honor and a responsibility the authors of this report take very seriously.

More report content will be posted online to reduce reliance on a report that is published only once annually. There are numerous instances where policymakers changed their programs after the report was issued then inquire as to when their improved grade would be posted only to learn that the next annual edition would not be released for six or seven months. An online presence will allow us to stay current with the latest trends and developments in real time and will better position the material to fulfill its mission to promote best practices.

Staying on top of changing events is going to be increasingly important as the race for a clean renewable energy future continues. Clean, distributed generation technologies are a critical piece of this race. Financing incentives and structures are clearly the engines that are driving us forward. Market leaders in California and New Jersey embody this with their diverse and scalable financing programs. Of course, even a top-of-the-line engine with many resources invested in the vehicle will not perform well without a smooth road on which to travel.

This is what world-class net metering rules and interconnection programs do. They provide the smooth roads that transition us from dependence on centralized, dirty power generation to a system that embraces clean, distributed resources. Without effective policy, that road is going to be rocky and tumultuous.

This is why we are proud to continue this important work. We are now in the decade of retail grid parity for photovoltaics (PV), and as the price of renewables aligns with that of grid supply, good net metering and interconnection policies are going to be more important than ever.
Interconnection and Net Metering:
What is the Difference?

**Interconnection**: the technical rules and procedures allowing customers to “plug in” to the grid.

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

* A kilowatt-hour (kWh) is the unit of energy equal to 1,000 watts of power used over the course of an hour. It is also the energy required to run a 100 watt light bulb for 10 hours.
Introduction to the 2011 Edition

As the number of customer-sited renewable energy installations continues to surge nationwide, state policymakers have supported net metering for solar and other clean technologies for a variety of reasons:

» To encourage in-state economic development and the creation of jobs
» To enhance the security and reliability of the electric grid
» To reduce air pollution and greenhouse gas emissions
» To increase energy independence

A dozen states are clearly in the vanguard of best practices that go beyond merely enabling customer-sited Distributed Generation (DG) by actively encouraging these clean energy systems. Since the premier edition of Freeing the Grid, many states have embraced these best practices. The federal Energy Policy Act of 2005 (EPAct 2005) acted as a catalyst to these improvements by modifying the Public Utility Regulatory Policies Act (PURPA) to require state public utility commissions to “consider” standards for net metering and interconnection. Section 1251 of EPAct 2005 required states to consider a net metering standard and make a “determination” regarding the standard by August 2008. Section 1254 of EPAct 2005 required states to consider an interconnection standard and make a determination regarding the standard by August 2007.1 Several states took this as an opportunity to implement or upgrade their net metering and interconnection procedures.

Since the sunset of the EPAct 2005 provisions, states have continued to expand and improve their policies. Net metering and interconnection grades are rising, and states are expanding the meaning of what constitutes “best practices.” As such, the Interstate Renewable Energy Council (IREC), The Vote Solar Initiative and the Network for New Energy Choices (NNEC) revised the methodology used in Freeing the Grid 2010 to reflect policy evolution and the current state of best practices.

---

1. Several states took this as an opportunity to implement or upgrade their net metering and interconnection procedures.
In order to gauge U.S. electric utility perspectives on net metering, the Solar Electric Power Association (SEPA) and IREC published a report in 2008 based on a survey of utilities. Their findings suggest that there is a great deal for some utilities to learn from the experience of those that have developed efficient, flexible systems for net metering as the number of photovoltaic (PV) installations increase, rather than making retroactive fixes as problems arise.

The most successful net metering programs had all been in place for five or more years; did not require a second meter, extra fees or additional insurance; used the IEEE 1547 technical standards for interconnection; and dedicated at least one full-time employee to process applications. Almost all of the utilities that responded to the survey indicated that there were few problems associated with reading the meters—most of which were single electromechanical meters, but with a growing number of time-of-use (TOU) meters and smart meters as well.

The most common problems reported were associated with billing systems and a lack of proper documentation from the customer. Most utilities in the study stated that their billing systems were unable to easily accommodate net-metered customers and adjustments were needed for the system. The cost of upgrading current billing software may be high, but the report advises that future billing systems incorporate net metering capabilities at the onset.

Incomplete documentation from the customer was the most common cause of delay reported in the interconnection process, and the report suggests that more standard requirements, revision of documentation and materials, and clearer communication between the utility, inspectors and the community could solve these problems. The analysis forecasts a rapid increase in the number of PV installations over the next ten years and encourages future research into methods for streamlining and expediting the net metering process.

California still dominates in terms of installed capacity, New Jersey maintains second place and Colorado narrowly beats out Arizona for third.

As an indicator of how the solar market is diversifying, Nevada, New Jersey and Hawaii are leading the pack.

### Solar Markets in 2010
California maintains the number-one position, but its market dominance is eroding. In 2009, California held 49% of the U.S. market share. In 2010, it fell to 28%. Nevada, New Mexico and Texas are on the 2010 list due to a single large solar installation. Interestingly, Nevada’s 58 MW solar installation sells it energy to a California utility in support of meeting the utility’s RPS obligations.

### Continuing Education
To address remaining issues and concerns with grid-tied solar systems, the U.S. Department of Energy (DOE) created the Solar America Board for Codes

---

**Table 1: Change in Installed Capacity for the Top-Ten States from 2009 to 2010**

<table>
<thead>
<tr>
<th>State</th>
<th>2010 (MW_{dc})</th>
<th>2009 (MW_{dc})</th>
<th>2009 – 2010 % change</th>
<th>2010 Market Share</th>
<th>2009 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>252</td>
<td>213.7</td>
<td>18%</td>
<td>28%</td>
<td>1</td>
</tr>
<tr>
<td>New Jersey</td>
<td>132.4</td>
<td>57.3</td>
<td>131%</td>
<td>15%</td>
<td>2</td>
</tr>
<tr>
<td>Nevada</td>
<td>68.3</td>
<td>2.5</td>
<td>2598%</td>
<td>8%</td>
<td>15</td>
</tr>
<tr>
<td>Arizona</td>
<td>63.6</td>
<td>21.1</td>
<td>201%</td>
<td>7%</td>
<td>5</td>
</tr>
<tr>
<td>Colorado</td>
<td>62</td>
<td>23.4</td>
<td>165%</td>
<td>7%</td>
<td>4</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>46.5</td>
<td>4.4</td>
<td>947%</td>
<td>5%</td>
<td>13</td>
</tr>
<tr>
<td>New Mexico</td>
<td>40.9</td>
<td>1.4</td>
<td>2815%</td>
<td>5%</td>
<td>20</td>
</tr>
<tr>
<td>Florida</td>
<td>34.8</td>
<td>35.7</td>
<td>-2%</td>
<td>4%</td>
<td>3</td>
</tr>
<tr>
<td>North Carolina</td>
<td>28.7</td>
<td>6.6</td>
<td>332%</td>
<td>3%</td>
<td>10</td>
</tr>
<tr>
<td>Texas</td>
<td>25.9</td>
<td>4.2</td>
<td>517%</td>
<td>3%</td>
<td>14</td>
</tr>
</tbody>
</table>
and Standards (Solar ABCs), as part of the federal Solar America Initiative. The Solar ABCs website hosts additional resources for those interested in net metering and interconnection, as well as other topics and issues surrounding the deployment of solar power.7

**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.8

**How to Drive a Solar Market: Net Metering and Interconnection in the Context of a Cost-Effective Solar Policy**

Designing economically sustainable solar markets requires the coordination of complementary policy mechanisms. To illustrate, the Solar Alliance has developed a resource describing the “Four Pillars” of effective state policy. The Four Pillars take into consideration the best practices of net metering (Pillar 2) and interconnection (Pillar 3). Incentives (Pillar 1) and utility rates and revenue policies (Pillar 4) are also crucial components in developing a world-class solar market. 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.9

Each edition of this report shows states moving from lower to higher grades. But as states like Delaware, Colorado, Maine and Massachusetts continue to raise the bar, others will need to follow the best practices represented in this report and in IREC’s Model Net Metering Rules and Model Interconnection Procedures to move to the head of the class.

**End Notes**

Table 2: State Grades for 2011

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

**Note:** A lack of a grade indicates no statewide policy.
The timing and requirements of EPAct 2005 are not straightforward, and this article clarifies both.

2. The IEEE 1547 standard “establishes criteria and requirements for interconnection of distributed resources with electric power systems” [in order to] “provide a uniform standard for interconnection of distributed resources with electric power systems. It provides requirements relevant to the performance, operation, testing, safety considerations, and maintenance of the interconnection.” The standard was approved in 2003. An overview of the IEEE 1547 standards can be viewed at: http://grouper.ieee.org/groups/scc21/1547/1547_index.html.


5. Ibid.

6. Ibid.


8. The document is available at www.irecusa.org.

9. For more information on the Four Pillars, visit the Solar Alliance website: www.solaralliance.org.

### Table 3: Cumulative State Net Metering and Interconnection Grades by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>6</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>2008</td>
<td>6</td>
<td>15</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>2009</td>
<td>11</td>
<td>16</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>2010</td>
<td>15</td>
<td>22</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>2011</td>
<td>17</td>
<td>18</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>8</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>11</td>
<td>3</td>
<td>9</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>2009</td>
<td>1</td>
<td>14</td>
<td>6</td>
<td>6</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>2010</td>
<td>4</td>
<td>16</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>2011</td>
<td>6</td>
<td>17</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>
Metrics of Success

A Standard Policy Framework
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 following 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.

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.

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).1 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.

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.2

Policy Points: Net Metering

**Individual System Capacity**

<table>
<thead>
<tr>
<th>Points</th>
<th>Largest System Allowed to Net Meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>+5</td>
<td>2 MW or greater</td>
</tr>
<tr>
<td>+4</td>
<td>Greater than 1 MW, but less than 2 MW</td>
</tr>
<tr>
<td>+3</td>
<td>Greater than 500 kW, but not greater than 1 MW</td>
</tr>
<tr>
<td>+2</td>
<td>Greater than 100 kW, but not greater than 500 kW</td>
</tr>
<tr>
<td>+1</td>
<td>Greater than or equal to 50 kW, but not greater than 100 kW</td>
</tr>
<tr>
<td>0</td>
<td>Less than 50 kW</td>
</tr>
<tr>
<td>-1</td>
<td>Only residential systems allowed and capped at less than 20 kW</td>
</tr>
</tbody>
</table>

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.3

**Total Program Capacity Limits**

<table>
<thead>
<tr>
<th>Points</th>
<th>Total Program Limit as Percentage of Peak Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2.5</td>
<td>5% or greater; no limit</td>
</tr>
<tr>
<td>+2</td>
<td>Greater than 2%, but less than 5%</td>
</tr>
<tr>
<td>+1.5</td>
<td>Greater than 1%, but not greater than 2%</td>
</tr>
<tr>
<td>+1</td>
<td>Greater than 0.5%, but not greater than 1%</td>
</tr>
<tr>
<td>+0.5</td>
<td>Greater than 0.2%, but not greater than 0.5%</td>
</tr>
<tr>
<td>0</td>
<td>Greater than or equal to 0.1%, but not greater than 0.2%</td>
</tr>
<tr>
<td>-0.5</td>
<td>Less than 0.1%</td>
</tr>
</tbody>
</table>

| Bonus  | For excluding from the aggregate limit generators that do not export electricity, or basing measurement on energy produced, instead of total capacity. |

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.

**Restrictions on “Rollover”**

<table>
<thead>
<tr>
<th>Points</th>
<th>Rollover Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1.5</td>
<td>Indefinite rollover at retail rate.</td>
</tr>
<tr>
<td>+1</td>
<td>Monthly rollover at retail rate for one year, annual payment at retail rate</td>
</tr>
<tr>
<td>+0.5</td>
<td>Monthly rollover at retail rate for one year, annual payment at wholesale rate or avoided cost</td>
</tr>
<tr>
<td>0</td>
<td>Monthly rollover at retail rate for one year, excess energy donated to utility annually</td>
</tr>
<tr>
<td>-2</td>
<td>Monthly payment at wholesale rate or avoided cost</td>
</tr>
<tr>
<td>-4</td>
<td>No rollover permitted, excess energy donated to utility monthly</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Points</th>
<th>Metering Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>No meter change required—customer-sited generator uses existing meter</td>
</tr>
<tr>
<td>+2</td>
<td>New meter is provided by the utility at no cost to the customer-sited generator</td>
</tr>
<tr>
<td>+1</td>
<td>Dual meters or dual registers—utility pays for the additional meter</td>
</tr>
<tr>
<td>0</td>
<td>Dual meters or dual registers—customer pays for the additional meter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Points</th>
<th>Metering Provisions Under Time-of-Use (TOU) rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>TOU meters with time bin carryover</td>
</tr>
<tr>
<td>+1</td>
<td>TOU meters with segregated time periods</td>
</tr>
<tr>
<td>-1</td>
<td>Segregated TOU rate disadvantage small generators</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Points</th>
<th>Renewable Energy Credit (REC) Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Owned by customer</td>
</tr>
<tr>
<td>-1</td>
<td>REC ownership not addressed</td>
</tr>
<tr>
<td>-2</td>
<td>REC given to the utility for exported electricity</td>
</tr>
<tr>
<td>-5</td>
<td>REC transferred to utility without appropriate incentive</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Points</th>
<th>Eligible Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Solar, wind and other renewable and low emission technologies</td>
</tr>
<tr>
<td>+0.5</td>
<td>Solar and wind only</td>
</tr>
<tr>
<td>0</td>
<td>Excludes solar or wind</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Points</th>
<th>Customer Class Eligibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>No eligible class restrictions</td>
</tr>
<tr>
<td>+1</td>
<td>Non-residential class permitted to meter up to state capacity limits while residential class limited to no more than 10 kW</td>
</tr>
<tr>
<td>0</td>
<td>Residential class only</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Points</th>
<th>Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>A customer may aggregate all meters on his or her contiguous property for the purposes of net metering</td>
</tr>
</tbody>
</table>

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 Retail Choice

<table>
<thead>
<tr>
<th>Points</th>
<th>Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0.5</td>
<td>Net metering is allowed under retail choice</td>
</tr>
</tbody>
</table>

This criteria was evaluated based on a variety of policy provisions, including whether or not competitive suppliers are required to offer net metering, whether distribution charges are netted for retail choice customers and whether there is a non-discriminatory clause for retail choice customers who wish to engage in net metering. For this point value, the authors relied on an IREC report, The Intersection of Net Metering and Retail Choice, which based its conclusions on a combination of net metering statute and regulation review and communications with Commission and utility staff.³

Bonus for Community Renewables

<table>
<thead>
<tr>
<th>Points</th>
<th>Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>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</td>
</tr>
</tbody>
</table>

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
community renewables programs. Under a community 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 community 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**

<table>
<thead>
<tr>
<th>Points</th>
<th>Fee Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3</td>
<td>Safe harbor language protects customers from unspecified additional equipment, fees, requirements to change tariffs, etc.</td>
</tr>
<tr>
<td>0</td>
<td>Not addressed</td>
</tr>
<tr>
<td>-1</td>
<td>The utility imposes fees or decision on whether to add fees is left to the utility</td>
</tr>
<tr>
<td>-1</td>
<td>Minor additional fees for net metering are imposed</td>
</tr>
<tr>
<td>-5</td>
<td>Significant additional charges or fees are imposed</td>
</tr>
<tr>
<td>-5</td>
<td>Per A per-kWh fee on all production (in addition to other fees) is imposed</td>
</tr>
</tbody>
</table>

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

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

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

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

**Policy Coverage**

<table>
<thead>
<tr>
<th>Points</th>
<th>Utilities Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Rules apply to all utilities</td>
</tr>
<tr>
<td>0</td>
<td>Rules apply to investor-owned utilities only</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Points</th>
<th>Third-Party Power Purchase Agreement Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Presumed allowed to net meter</td>
</tr>
<tr>
<td>0</td>
<td>Not specified</td>
</tr>
<tr>
<td>-1</td>
<td>Presumed not allowed to net meter</td>
</tr>
</tbody>
</table>

Over the past couple of 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.8

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 Procedures**

**Eligible Technologies**

<table>
<thead>
<tr>
<th>Points</th>
<th>Customers that Qualify</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>All customer-sited generators qualify</td>
</tr>
<tr>
<td>-1</td>
<td>Only renewable generators permitted</td>
</tr>
</tbody>
</table>

While public policy may emphasize renewable energy, the system and engineering impacts of a system 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.

**INDIVIDUAL SYSTEM CAPACITY**

<table>
<thead>
<tr>
<th>Points</th>
<th>System Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Generators up to 20 MW permitted</td>
</tr>
<tr>
<td>-0.5</td>
<td>up to 10 MW permitted</td>
</tr>
<tr>
<td>-1</td>
<td>up to 2 MW</td>
</tr>
<tr>
<td>-2</td>
<td>up to 1 MW</td>
</tr>
<tr>
<td>-4</td>
<td>Less than 500 kW</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Points</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Four levels</td>
</tr>
<tr>
<td>0</td>
<td>Three levels</td>
</tr>
<tr>
<td>-1</td>
<td>Two levels</td>
</tr>
<tr>
<td>-2</td>
<td>No breakpoints, one process for all generators regardless of size</td>
</tr>
</tbody>
</table>

**Bonus**

| +1     | Progressive standards that allow larger systems in any category |

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 consensus is to position applicants at four breakpoints in system size: 10 kW, 2 MW, 10 MW (non-exporting systems), and a track for systems 20 MW and larger.

**Timelines**

<table>
<thead>
<tr>
<th>Points</th>
<th>Timelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Timelines are shorter than the FERC standards</td>
</tr>
<tr>
<td>0</td>
<td>Timelines are the same as the FERC standards</td>
</tr>
<tr>
<td>-1</td>
<td>Timelines are longer than the FERC standards</td>
</tr>
</tbody>
</table>

Time is money, and for a device like a rooftop PV system, 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. There is room for improvement in this area, and some states have elected to trim the amount of time allowed for the different steps. Some states have a shorter time allotted for the read-through of an application with small generators using UL-listed equipment.

**Interconnection Charges**

<table>
<thead>
<tr>
<th>Points</th>
<th>Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3</td>
<td>Fees are waived for net-metered customers and interconnection charges are capped</td>
</tr>
<tr>
<td>+2</td>
<td>Fees are waived for net-metered customers</td>
</tr>
<tr>
<td>+1</td>
<td>Fees are lower than the FERC standards</td>
</tr>
<tr>
<td>+0.5</td>
<td>Scale or “breakpoint” based fees, which are generally lower than the FERC standards</td>
</tr>
<tr>
<td>0</td>
<td>Fees are the same as the FERC standards</td>
</tr>
<tr>
<td>-1</td>
<td>Fees are greater than the FERC standards</td>
</tr>
<tr>
<td>-3</td>
<td>Fees are generally double or more than the FERC standards</td>
</tr>
</tbody>
</table>

Interconnection application fees along with other fees can create challenges, especially if these fees are unknown at the onset of project development. Reasonable fee levels have been established in the FERC procedures and have been subject to an extensive compromise and negotiation process.

**Engineering Charges**

<table>
<thead>
<tr>
<th>Points</th>
<th>Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Engineering fees are fixed</td>
</tr>
<tr>
<td>0</td>
<td>Engineering fees are not fixed</td>
</tr>
</tbody>
</table>

An interconnection standard may require an engineering review for certain systems; where it does, it is important for the parties involved to know what the fees are beforehand. The engineering charges are commonly a fixed dollar per hour rate or a dollar per study rate.

**External Disconnect Switch**

<table>
<thead>
<tr>
<th>Points</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Redundant external disconnect switch prohibited for all systems</td>
</tr>
<tr>
<td>+0.5</td>
<td>Redundant external disconnect switch prohibited for systems under 10 kW</td>
</tr>
<tr>
<td>0</td>
<td>Redundant external disconnect switch not addressed</td>
</tr>
<tr>
<td>-1</td>
<td>Redundant external disconnect switch at utility’s discretion</td>
</tr>
<tr>
<td>-2</td>
<td>Redundant external disconnect switch required</td>
</tr>
</tbody>
</table>

In theory, a grid-tied DG system presents a safety hazard if the grid goes down and the system continues to produce power without the utility’s knowledge (a situation utilities call islanding). Potentially, line workers could come into contact with an unexpectedly energized line. Many utilities cite these safety concerns as justification for requiring owners of grid-tied DG systems to install and test an external
disconnect switch. However, the practical effect is that, like hidden interconnection fees, requiring an additional external disconnect switch only adds unnecessary costs and discourages customers from investing in renewable energy systems.9

External disconnect switches are unnecessary because all inverters that meet IEEE standards have automatic shut-off capabilities integrated within the systems.10 In the event of grid failure, a DG system’s inverter will detect the loss of power and shut themselves off.11 It is important to note that not one accident resulting from the islanding of net-metered renewable energy systems has been reported.12 More importantly, utility workers are trained to treat all lines as live, and a variety of other safety precautions are required as part of standard operating procedures.13 An external disconnect switch represents a fourth or fifth level of redundancy that is only relevant if a utility worker ignores his or her training. If a utility worker is following proper protocol, none of the levels of safety measures preceding an external disconnect switch will ever be used, much less the switch itself.11

Certification

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.

While some states have provided for additional options (e.g., the reuse of certification on equipment individually type-tested by utilities), others have used conflicting technical standards—a critical flaw that may in fact affect the safety and security of the grid. Still others have added idiosyncratic or unspecified blanket clauses that introduce uncertainties. In such cases, potential investors in DG systems do not know when such a clause might arise to disqualify them.

**Technical Screens**

<table>
<thead>
<tr>
<th>Points</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>UL 1741 / IEEE 1547 standards are used in addition to other options (e.g., self-certification)</td>
</tr>
<tr>
<td>0</td>
<td>UL 1741 / IEEE 1547 standards are used</td>
</tr>
<tr>
<td>-1</td>
<td>UL 1741 / IEEE 1547 standards are not used, or modified elements of IEEE 1547 are used</td>
</tr>
<tr>
<td>-4</td>
<td>Standard used is in conflict with, or in excess of IEEE 1547</td>
</tr>
</tbody>
</table>

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 copied by many jurisdictions; any significant revision to these widely used benchmarks introduces difficulties to the process.
and may increase system costs, as configurations or programming must be adjusted to comply with novel regulations.

**Network Interconnection**

<table>
<thead>
<tr>
<th>Points</th>
<th>Spot/Area Secondary Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>Both spot and area network interconnections are allowed with flexible criteria based on customer load characteristics</td>
</tr>
<tr>
<td>+1</td>
<td>Either spot or area network interconnections are allowed at maximum capacity</td>
</tr>
<tr>
<td>0</td>
<td>Networks are allowed but limited to 50 kW for spot network and/or 500 kW for area network interconnection</td>
</tr>
<tr>
<td>+2</td>
<td>Bonus: Networks are allowed provided the generating facility is inverter-based and uses additional non-exporting protective schemes</td>
</tr>
<tr>
<td>+1</td>
<td>Bonus: Networks are allowed with a single protective feature</td>
</tr>
<tr>
<td>-1</td>
<td>Penalty: Spot and/or Area not addressed or allowed</td>
</tr>
</tbody>
</table>

A spot network is designed to serve a large single location, such as a corporate campus or high-rise building; an area network describes the power distribution system in an area dense with users, such as a downtown area. These types of networks are designed to increase reliability by creating more potential paths from generation to load. However, the types of systems that may be connected are usually restricted—often to those that are inverter based, as these networks are less tolerant of exported electricity.

Some jurisdictions have extended this concern to ban network interconnections completely. However, the very area networks that jurisdictions aim to protect are generally those most in need of the relief that DG can contribute. A more appropriate approach would be to create more stringent technical standards for networked systems or simply require that they install specified high-speed equipment that assures that area network generation will not exceed the load on the network at any time.15

**Standard Form Agreement**

<table>
<thead>
<tr>
<th>Points</th>
<th>Form Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Standard agreement with friendly clauses</td>
</tr>
<tr>
<td>0</td>
<td>Standard agreement with standard clauses</td>
</tr>
<tr>
<td>-0.5</td>
<td>No standard agreement</td>
</tr>
<tr>
<td>-1</td>
<td>Standard agreement with excessively complex or hostile clauses</td>
</tr>
</tbody>
</table>

BONUS

<table>
<thead>
<tr>
<th>Points</th>
<th>Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Simplified form for all levels of interconnection</td>
</tr>
<tr>
<td>+0.5</td>
<td>Simplified form for systems under 10 kW</td>
</tr>
</tbody>
</table>

The point where the rubber meets the road in any interconnection framework is the agreement. Without a standard agreement, the interconnection process is immediately more complex. If the standard is overly complicated or includes clauses hostile to the customer—such as requiring the customer to indemnify the utility for a broad list of potential liabilities with no equivalent protection from the utility—then the standard loses much of its value.

**Insurance Requirements**

<table>
<thead>
<tr>
<th>Points</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>No additional insurance required for non-inverter based systems under 50 kW or inverter-based systems under 1 MW</td>
</tr>
<tr>
<td>0.5</td>
<td>Additional insurance required, but not more than a typical customer would carry</td>
</tr>
<tr>
<td>0</td>
<td>Insurance is not addressed or is left to the development of the standard form agreement</td>
</tr>
<tr>
<td>-1</td>
<td>Utility is listed as additional insured or other restrictive requirements</td>
</tr>
<tr>
<td>-2</td>
<td>Additional and disproportionately burdensome insurance requirements for smaller systems</td>
</tr>
</tbody>
</table>
Because of potential personal injury and property damage liability risks associated with interconnection, many states allow utilities to impose liability insurance requirements on DG system owners. Some states require customer-sited generators to carry coverage to protect utilities from being held financially responsible for problems caused by interconnected systems.

However, to the authors’ knowledge there has never been a documented case of a small, net-metered system causing electrical failure or creating potential personal injury or property damage liabilities for a utility. Renewable energy technologies manufactured and installed in compliance with technical interconnection guidelines significantly reduce the risk of potential safety issues.

Excessive insurance requirements only serve to discourage customers from investing in renewable energy systems and participating in net metering programs. Requiring customer-sited generators—especially those with relatively small DG systems—to obtain and maintain million-dollar insurance policies is impractical, because the high premiums will likely exceed the economic benefits of net metering.

**Rule Coverage**

<table>
<thead>
<tr>
<th>Points</th>
<th>Utilities Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>Rules apply to all utilities</td>
</tr>
<tr>
<td>0</td>
<td>Rules apply to investor-owned utilities only</td>
</tr>
</tbody>
</table>

Interconnection procedures may cover all utilities in the state or just investor-owned utilities.

**Miscellaneous**

- Adverse system impact check required for systems under 2 MW = -1. This type of check is for the potential impact of a customer-sited generator on the grid. It should not be applied to small generators, for which it is largely irrelevant.
- Provide for local code official refusal when certificate of completion required = -1. Some states require that a local code official sign or certify documentation associated with the interconnection process. Since these officials do not generally certify documents other than their own inspections, they can be resistant to filling out an unfamiliar form, delaying or complicating the process.
- Interconnection process is significantly different from the FERC standards = -1. The overall framework of the FERC standards is well understood and should be the basic underpinning of any standard.
- Note: 7.5 points are added to interconnection scores to achieve grading parity with net metering scoring.
End Notes


2. The Freeing the Grid methodology has also been adopted for use in the National Renewable Energy Laboratory’s annual State of the States report as well as the US Department of Energy’s SunShot program.


6. A per-kWh charge effectively offsets any economic benefit from net metering, will be administratively burdensome and requires more expensive metering than simple net metering, resulting in the significant negative score.


“The future is already here—it’s just not very evenly distributed.”

—William Gibson
Grading

Net Metering

**A** Full retail credit with no subtractions. Customers protected from fees and additional charges. Rules actively encourage use of DG.

**B** Generally good net metering policies with full retail credit, but there could be certain fees or costs that detract from full retail equivalent value. There may be some obstacles to net metering.

**C** Adequate net metering rules, but there could be some significant fees or other obstacles that undercut the value or make the process of net metering more difficult.

**D** Poor net metering policies with substantial charges or other hindrances. Many customers will forgo an opportunity to install DG because net metering rules subtract substantial economic value.

**F** Net metering policies that deter customer-sited DG.

- No statewide policy exists

Interconnection

**A** No restrictions on interconnection of DG systems that meet safety standards. Policies actively facilitate the interconnection of grid-tied customer DG and represent most or all state best practices.

**B** Good interconnection rules that incorporate many best practices adopted by states. Few or no customers will be blocked by interconnection barriers. There may be some defects in the standards, such as a lack of standardized interconnection agreements and expedited interconnection to networks.

**C** Adequate for interconnection, but systems incur higher fees and longer delays than necessary. Some systems will likely be precluded from interconnection because of remaining barriers in the interconnection rules.

**D** Poor interconnection procedures that leave in place many needless barriers to interconnection. A few best practices possibly included, but many excluded. A significant number of systems will experience delays and high fees for interconnection, and a sizable percentage may be blocked because of these rules.

**F** Interconnection procedures include many barriers to interconnection. Few to no generators will experience expedited interconnection, and few to no state best practices are adopted. Many to most DG systems will be blocked from interconnecting because of the standards.

- No statewide policy exists

**Note:** The following grade cards contain summaries of states’ net metering programs and interconnection procedures using information from the Database of State Incentives for Renewables & Efficiency (DSIRE) and IREC’s Connecting to the Grid monthly newsletter. Some states graded in past editions may be scored as ’N/A’ in this year’s edition. The editors believe these “interconnection guidelines” to be insufficient or not comprehensive enough to constitute “state-wide interconnection procedures,” thus deserving a grade.

The summaries presented here are based on information available as of September 13, 2011. For further information, details and updates on state net metering policies and interconnection procedures, visit:

DSIRE: www.dsireusa.org
IREC: www.irecusa.org
## Alaska

### Net Metering

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Utilities with annual retail sales of 5,000,000 kWh or more</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>System Capacity Limit:</td>
<td>25 kW</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>1.5% of average retail demand</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Net Excess Generation:</td>
<td>Utilities with annual retail sales of 5,000,000 kWh or more</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
<td>–</td>
<td>–</td>
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<td>–</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
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<td>–</td>
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### Interconnection

<table>
<thead>
<tr>
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<td>Eligible Renewable/Other Technologies:</td>
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<tr>
<td>System Capacity Limit:</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Standard Agreement:</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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</tbody>
</table>

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

**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

<table>
<thead>
<tr>
<th>Year</th>
<th>B</th>
<th>A</th>
<th>A</th>
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<td>2007</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
<td></td>
</tr>
</tbody>
</table>

**Eligible Renewable/Other Technologies:**

**Applicable Sectors:**
- Commercial, Industrial, Residential, Nonprofit, Schools, Local Government, State Government, Institutional

**Applicable Utilities:**
- Investor-owned utilities, electric co-ops

**System Capacity Limit:**
- No capacity limit specified, but system must be sized to meet part or all of customer’s electric load and may not exceed 125% of customer’s total connected load

**Aggregate Capacity Limit:**
- No limit specified

**Net Excess Generation:**
- Credited to customer’s next bill at retail rate; excess reconciled annually at avoided-cost rate

**REC Ownership:**
- Customer owns RECs (must be relinquished to utility in exchange for distributed generation payments)

**Meter Aggregation:**
- Not addressed

**Recommendation:**
- Adopt safe harbor language to protect customer-generators from extra and/or unanticipated fees

#### Interconnection

<table>
<thead>
<tr>
<th>Year</th>
<th>C</th>
<th>C</th>
<th>C</th>
<th>-</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
<td></td>
</tr>
</tbody>
</table>

**Eligible Renewable/Other Technologies:**
- Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies

**Applicable Sectors:**
- Commercial, Industrial, Residential

**Applicable Utilities:**
- Investor-owned utilities, SRP

**System Capacity Limit:**
- Varies by utility

**Standard Agreement:**
- Varies by utility

**Insurance Requirements:**
- Varies by utility

**External Disconnect Switch:**
- Varies by utility

**Net Metering Required:**
- No

**Recommendation:**
- Make the regulatory requirements uniform, using IREC standard interconnection recommendations, for all utilities

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

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities (municipal utilities not subject to commission rules)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>300 kW for non-residential; 25 kW for residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>No limit specified</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer’s next bill at retail rate; granted to utility at end of 12-month billing cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer owns RECs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Interconnection

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities (municipal utilities not subject to commission rules)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>300 kW for non-residential; 25 kW for residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Not addressed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Not required for certain inverter-based systems; required for all other systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Recommendation:**
- 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

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.
<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Metering</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eligible Renewable/Other Technologies:</td>
<td>Photovoltaics, Wind, Fuel Cells, Biogas from manure methane production or as a byproduct of the anaerobic digestion of biosolids and animal waste</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Industrial, Residential, Agricultural</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities (except LADWP): solar and wind; Investor-owned utilities: solar, wind, biogas and fuel cells</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>1 MW (10 MW for up to 3 biogas digesters)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>5% of utility's peak demand (statewide limit of 50 MW for biogas digesters; 112.5 MW for fuel cells)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer's next monthly bill at retail rate. Customer may decide NEG treatment annually.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Virtual meter aggregation on multi-family affordable housing allowed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interconnection</strong></td>
<td></td>
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<tr>
<td>Applicable Sectors:</td>
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<td></td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>No limit specified</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by commission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Varies by utility and system size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Recommendation:**
- Remove system size limitations to allow customers to meet all on-site energy needs
- 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.
**Net Metering**

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td><strong>Applicable Sectors:</strong></td>
<td>Commercial, Industrial, Residential</td>
<td>Commercial, Industrial, Residential, Nonprofit, Schools, Utility, Agricultural, Institutional</td>
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<td></td>
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<tr>
<td><strong>Applicable Utilities:</strong></td>
<td>All utilities (exceptions for small municipal utilities)</td>
<td>All utilities (exceptions for small municipal utilities)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Capacity Limit:</strong></td>
<td>120% of the customer’s average annual consumption. Muni and co-op customers: 25 kW for non-residential &amp; 10 kW for residential.</td>
<td>10 MW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aggregate Capacity Limit:</strong></td>
<td>No limit specified</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net Excess Generation:</strong></td>
<td>Credited to customer’s next bill at retail rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>REC Ownership:</strong></td>
<td>Customer owns RECs (must be relinquished to utility for 20 years in exchange for incentives)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meter Aggregation:</strong></td>
<td>Allowed for IOU customers; rules under development</td>
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</table>

**Interconnection**

<table>
<thead>
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<th>2008</th>
<th>2009</th>
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<td>All utilities (exceptions for small municipal utilities)</td>
<td>All utilities (exceptions for small municipal utilities)</td>
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<td></td>
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<tr>
<td><strong>System Capacity Limit:</strong></td>
<td>10 MW</td>
<td></td>
<td></td>
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<tr>
<td><strong>Standard Agreement:</strong></td>
<td>Yes</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insurance Requirements:</strong></td>
<td>Vary by system size and/or type; levels established by commission</td>
<td>Vary by system size and/or type; levels established by commission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External Disconnect Switch:</strong></td>
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<td>Not addressed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net Metering Required:</strong></td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Recommendation:**
- None

**Recommendation:**
- 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.
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

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Small Hydroelectric, Fuel Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>DP&amp;L: 2 MW for non-residential DP&amp;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</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>5% of peak demand (utilities may increase limit)</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>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.</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer retains ownership of RECs associated with electricity produced and consumed by the customer</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
</tr>
</tbody>
</table>

**Recommendation:**
- Allow net metering for third parties using the PPA model

#### Interconnection

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Fuel Cells, Other Distributed Generation Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities (only Delmarva Power is subject to commission rules)</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>10 MW</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>&quot;Additional&quot; liability insurance not required for systems that meet certain technical standards</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Required for systems larger than 25 kW</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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. **Delaware greatly improved their interconnection rules in 2011 by adopting IREC’s model standards. They are subject of Freeing the Grid’s in focus section.**
### District of Columbia

#### Net Metering

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Residential</td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>1 MW</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>No limit specified</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>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</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer and utility own RECs</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>10 MW</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by commission</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Not required for inverter-based systems up to 10 kW; required for all other systems</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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

<table>
<thead>
<tr>
<th>Net Metering</th>
<th>Interconnection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eligible Renewable/Other Technologies:</strong></td>
<td><strong>Eligible Renewable/Other Technologies:</strong></td>
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<tr>
<td><strong>Applicable Sectors:</strong></td>
<td><strong>Applicable Sectors:</strong></td>
</tr>
<tr>
<td><strong>Applicable Utilities:</strong></td>
<td><strong>Applicable Utilities:</strong></td>
</tr>
<tr>
<td>Investor-owned utilities</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td><strong>System Capacity Limit:</strong></td>
<td><strong>System Capacity Limit:</strong></td>
</tr>
<tr>
<td>2 MW</td>
<td>2 MW</td>
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<tr>
<td><strong>Aggregate Capacity Limit:</strong></td>
<td><strong>Aggregate Capacity Limit:</strong></td>
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<tr>
<td>No limit specified</td>
<td>No limit specified</td>
</tr>
<tr>
<td><strong>Net Excess Generation:</strong></td>
<td><strong>Net Excess Generation:</strong></td>
</tr>
<tr>
<td>Credited to customer’s next bill at retail rate; excess reconciled annually at avoided-cost rate</td>
<td>Credited to customer’s next bill at retail rate; excess reconciled annually at avoided-cost rate</td>
</tr>
<tr>
<td><strong>REC Ownership:</strong></td>
<td><strong>REC Ownership:</strong></td>
</tr>
<tr>
<td>Customer owns RECs</td>
<td>Customer owns RECs</td>
</tr>
<tr>
<td><strong>Meter Aggregation:</strong></td>
<td><strong>Meter Aggregation:</strong></td>
</tr>
<tr>
<td>Not allowed</td>
<td>Not allowed</td>
</tr>
<tr>
<td><strong>Insurance Requirements:</strong></td>
<td><strong>Insurance Requirements:</strong></td>
</tr>
<tr>
<td>Vary by system size and/or type; levels established by commission</td>
<td>Vary by system size and/or type; levels established by commission</td>
</tr>
<tr>
<td><strong>External Disconnect Switch:</strong></td>
<td><strong>External Disconnect Switch:</strong></td>
</tr>
<tr>
<td>Not required for inverter-based systems up to 10 kW; required for all other systems</td>
<td>Not required for inverter-based systems up to 10 kW; required for all other systems</td>
</tr>
<tr>
<td><strong>Net Metering Required:</strong></td>
<td><strong>Net Metering Required:</strong></td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**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

**Recommendation:**
- Increase covered capacity from 2 MW to 20 MW
- Remove requirements for redundant external disconnect switch on larger systems
- Remove requirements for additional insurance 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.
<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Net Metering</th>
<th>Eligible Renewable/Other Technologies:</th>
<th>–</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Sectors:</td>
<td>Photovoltaics, Wind, Fuel Cells</td>
<td>Applicable Sectors:</td>
<td>–</td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>Commercial, Industrial, Residential</td>
<td>Applicable Utilities:</td>
<td>–</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>All utilities</td>
<td>System Capacity Limit:</td>
<td>–</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>100 kW non-residential; 10 kW residential</td>
<td>Standard Agreement:</td>
<td>–</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>0.2% of utility's peak demand during previous year</td>
<td>Insurance Requirements:</td>
<td>–</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Credited to customer’s next bill at a predetermined rate filed with the commission</td>
<td>External Disconnect Switch:</td>
<td>–</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
<td>Net Metering Required:</td>
<td>–</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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

**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

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Photovoltaics, Wind, Biomass, Hydroelectric, Small Hydroelectric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>100 kW for HECO, MECO, HELCO customers; 50 kW for KIUC customers</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>3% of utility’s peak demand for HELCO and MECO; 1% of utility’s peak demand for KIUC and HECO</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer’s next bill at retail rate; granted to utility at end of 12-month billing cycle</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>No limit specified</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Amount not specified</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Required</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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

**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.**

<table>
<thead>
<tr>
<th><strong>Net Metering</strong></th>
<th><strong>Interconnection</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eligible Renewable/Other Technologies:</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>Applicable Utilities:</strong></td>
<td>Investor-owned utilities, alternative retail electric suppliers</td>
</tr>
<tr>
<td><strong>System Capacity Limit:</strong></td>
<td>40 kW</td>
</tr>
<tr>
<td><strong>Aggregate Capacity Limit:</strong></td>
<td>1% of utility’s peak demand in previous year</td>
</tr>
<tr>
<td><strong>Net Excess Generation:</strong></td>
<td>Credited to customer’s next bill at retail rate; granted to utility at end of 12-month billing cycle</td>
</tr>
<tr>
<td><strong>REC Ownership:</strong></td>
<td>Customer owns RECs</td>
</tr>
<tr>
<td><strong>Recommendation:</strong></td>
<td>» Expand interconnection procedures to all utilities (i.e., munis and co-ops)</td>
</tr>
<tr>
<td><strong>Meter Aggregation:</strong></td>
<td>Not addressed</td>
</tr>
<tr>
<td><strong>Eligible Renewable/Other Technologies:</strong></td>
<td>Photovoltaics, Wind, Biomass, Hydroelectric, Anaerobic Digestion, Small Hydroelectric, Fuel Cells using Renewable Fuels, Microturbines</td>
</tr>
<tr>
<td><strong>Applicable Utilities:</strong></td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td><strong>System Capacity Limit:</strong></td>
<td>No limit specified</td>
</tr>
<tr>
<td><strong>Standard Agreement:</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Insurance Requirements:</strong></td>
<td>Vary by system size and/or type; levels established by commission</td>
</tr>
<tr>
<td><strong>External Disconnect Switch:</strong></td>
<td>Required</td>
</tr>
<tr>
<td><strong>Net Metering Required:</strong></td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**

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

» Increase capacity to at least 5% of a utility’s peak demand
**Net Metering**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>1 MW</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>1% of utility's most recent peak summer load</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer's next bill at retail rate; carries over indefinitely</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
</tr>
</tbody>
</table>

**Interconnection**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities, regulated municipal utilities, regulated electric cooperatives</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>No limit specified</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Amount specified by IURC for net-metered systems; not specified for other systems</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Utility's discretion</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**

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

Indiana's 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.
### Net Metering

<table>
<thead>
<tr>
<th>Year</th>
<th>Code</th>
<th>Eligible Renewable/Other Technologies</th>
<th>Applicable Sectors</th>
<th>Applicable Utilities</th>
<th>System Capacity Limit</th>
<th>Aggregate Capacity Limit</th>
<th>Net Excess Generation</th>
<th>REC Ownership</th>
<th>Meter Aggregation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>C</td>
<td>Photovoltaics, Wind, Biomass, Hydroelectric, Municipal Solid Waste, Small Hydroelectric</td>
<td>Commercial, Industrial, Residential</td>
<td>Investor-owned utilities</td>
<td>500 kW</td>
<td>No limit specified</td>
<td>Credited to customer’s next bill at retail rate; carries over indefinitely</td>
<td>Not addressed</td>
<td>Not addressed</td>
</tr>
<tr>
<td>2008</td>
<td>C</td>
<td></td>
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<tr>
<td>2009</td>
<td>C</td>
<td></td>
<td></td>
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<td>2010</td>
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<td>2011</td>
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### Interconnection

<table>
<thead>
<tr>
<th>Year</th>
<th>Code</th>
<th>Eligible Renewable/Other Technologies</th>
<th>Applicable Sectors</th>
<th>Applicable Utilities</th>
<th>System Capacity Limit</th>
<th>Insurance Requirements</th>
<th>External Disconnect Switch</th>
<th>Net Metering Required</th>
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<tbody>
<tr>
<td>2008</td>
<td>F</td>
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<tr>
<td>2009</td>
<td>F</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2010</td>
<td>B</td>
<td></td>
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<tr>
<td>2011</td>
<td>B</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Recommendation:**
- 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)

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.

**Recommendation:**
- Prohibit requirement for redundant external disconnect switch
- Prohibit requirements for additional insurance
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.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>200 kW for non-residential; 25 kW for residential</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>1% of utility's peak demand during previous year</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer’s next bill at retail rate; granted to utility at end of 12-month billing cycle</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Utility owns RECs</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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)
### Kentucky

#### Net Metering

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Net Metering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Sectors:</td>
<td>Photovoltaics, Wind, Biomass, Hydroelectric, Biogas, Small Hydroelectric</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>Investor-owned utilities, electric co-ops (except TVA distribution utilities)</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>30 kW</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>1% of utility’s single-hour peak load during previous year</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Credited to customer’s next bill at retail rate; carries over indefinitely</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Customer owns RECs</td>
</tr>
</tbody>
</table>

#### Interconnection

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Photovoltaics, Wind, Biomass, Small Hydroelectric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities, electric co-ops (except TVA distribution utilities)</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>30 kW</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>“Additional” liability insurance not required for systems that meet certain technical standards</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Utility’s discretion</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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

Kentucky’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

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

**Recommendation:**
- 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

- 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

<table>
<thead>
<tr>
<th>Net Metering</th>
<th>Interconnection</th>
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</thead>
<tbody>
<tr>
<td><strong>C 2007</strong></td>
<td><strong>2007</strong></td>
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<tr>
<td><strong>C 2008</strong></td>
<td><strong>2008</strong></td>
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<tr>
<td><strong>B 2009</strong></td>
<td><strong>2009</strong></td>
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<tr>
<td><strong>B 2010</strong></td>
<td><strong>A 2010</strong></td>
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<tr>
<td><strong>B 2011</strong></td>
<td><strong>A 2011</strong></td>
</tr>
</tbody>
</table>

### Eligible Renewable/Other Technologies:
- Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, (CHP/Cogeneration since April 30, 2009), Small Hydroelectric, Tidal Energy

### Applicable Sectors:
- Commercial, Industrial, Residential

### Applicable Utilities:
- All utilities
- All Transmission and Distribution Utilities

### System Capacity Limit:
- 660 kW for IOU customers; 100 kW for muni and co-op customers (although they may offer up to 660 kW voluntarily)
- Not specified

### Aggregate Capacity Limit:
- No limit specified
- Varies by system size

### Net Excess Generation:
- Credited to customer’s next bill at retail rate; granted to utility at end of 12-month billing cycle
- Not required for inverter-based systems up to 1 MW; Vary by system size and/or type

### REC Ownership:
- Not addressed
- Not required

### External Disconnect Switch:
- Not required

### Meter Aggregation:
- Allowed
- Not required

### Recommendation:
- » Remove system size limitations to allow customers to meet all on-site energy needs
- » 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 state’s 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

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</thead>
<tbody>
<tr>
<td>Eligible Renewable/Other Technologies:</td>
<td>Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion</td>
<td></td>
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<td></td>
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<tr>
<td>Applicable Utilities:</td>
<td>All utilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>2 MW generally, (30 kW for micro-CHP)</td>
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<tr>
<td>Aggregate Capacity Limit:</td>
<td>1,500 MW (~8% of peak demand)</td>
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<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer's next bill at retail rate; reconciled annually at the wholesale energy rate</td>
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</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer owns RECs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
<td></td>
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</table>

### Interconnection

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<tr>
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</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>10 MW</td>
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<td></td>
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<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by commission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
<td></td>
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</table>

### Recommendation:

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

Maryland 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.

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.
### Net Metering

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Other Distributed Generation Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>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</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>1% of utility’s peak load in general; 2% of utility’s peak load for net metering by municipalities or governmental entities</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Varies by system type and customer class</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer owns RECs</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Neighborhood net metering allowed</td>
</tr>
</tbody>
</table>

**Recommendation:**
- Increase overall enrollment to at least 5% of peak capacity
- Extend net metering to all utilities

### Interconnection

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>No limit specified</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by commission</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Utility’s discretion</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**
- 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.
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

<table>
<thead>
<tr>
<th>Net Metering</th>
<th>Interconnection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C 2007</strong></td>
<td><strong>F 2007</strong></td>
</tr>
<tr>
<td><strong>C 2008</strong></td>
<td><strong>F 2008</strong></td>
</tr>
<tr>
<td><strong>C 2009</strong></td>
<td><strong>F 2009</strong></td>
</tr>
<tr>
<td><strong>B 2010</strong></td>
<td><strong>D 2010</strong></td>
</tr>
<tr>
<td><strong>F 2011</strong></td>
<td><strong>D 2011</strong></td>
</tr>
</tbody>
</table>

Eligible Renewable/Other Technologies:
- Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Other Distributed Generation Technologies

Eligible Renewable/Other Technologies:
- Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Microturbines, Other Distributed Generation Technologies

Applicable Sectors:
- Commercial, Industrial, Residential

Applicable Sectors:

Applicable Utilities:
- All utilities

Applicable Utilities:
- All utilities

System Capacity Limit:
- Less than 40 kW

System Capacity Limit:
- 10 MW

Aggregate Capacity Limit:
- No limit specified

Standard Agreement:
- Yes

Net Excess Generation:
- Reconciled monthly; customer may elect to take compensation as a payment or as a bill credit at the retail utility energy rate

Insurance Requirements:
- Vary by system size and/or type; levels established by commission

REC Ownership:
- Not addressed

External Disconnect Switch:
- Required

Net Metering Required:
- No

#### Recommendation:
- 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
- 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

<table>
<thead>
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<tbody>
<tr>
<td>Eligible Renewable/Other Technologies:</td>
<td>Solar Thermal Electric, Photovoltaics, Wind, Hydroelectric, Small Hydroelectric, Fuel Cells using Renewable Fuels</td>
<td></td>
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</tr>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>100 kW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>5% of utility’s single-hour peak load during previous year</td>
<td></td>
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<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer’s next bill at avoided-cost rate; granted to utility at end of 12-month period</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
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<td>Meter Aggregation:</td>
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#### Interconnection

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<td>Applicable Sectors:</td>
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<td>System Capacity Limit:</td>
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<tr>
<td>Standard Agreement:</td>
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<td>Insurance Requirements:</td>
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<tr>
<td>External Disconnect Switch:</td>
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</tr>
<tr>
<td>Net Metering Required:</td>
<td>–</td>
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</tbody>
</table>

**Recommendation:**

» 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

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.

**Recommendation:**

» The state should adopt IREC’s model interconnection procedures
## Montana

### Net Metering

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tr>
<td>Eligible Renewable/Other Technologies:</td>
<td>Photovoltaics, Wind, Hydroelectric, Small Hydroelectric</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Industrial, Residential</td>
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<td>Net Excess Generation:</td>
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### Interconnection

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<td>System Capacity Limit:</td>
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<td>Standard Agreement:</td>
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<td>Insurance Requirements:</td>
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<tr>
<td>External Disconnect Switch:</td>
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</tr>
<tr>
<td>Net Metering Required:</td>
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<td></td>
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</table>

**Recommendation:**

» 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

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.
<table>
<thead>
<tr>
<th><strong>Net Metering</strong></th>
<th><strong>Interconnection</strong></th>
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<tbody>
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</tr>
<tr>
<td><strong>2007</strong></td>
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<td><strong>–</strong></td>
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<td><strong>2011</strong></td>
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<tr>
<th>Eligible Renewable/Other Technologies:</th>
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<tbody>
<tr>
<td>Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Anaerobic Digestion, Small Hydroelectric</td>
<td>–</td>
</tr>
<tr>
<td>Applicable Sectors:</td>
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<tr>
<td>Commercial, Industrial, Residential, Agricultural</td>
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<tr>
<td>Applicable Utilities:</td>
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<tr>
<td>All utilities</td>
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<tr>
<td>System Capacity Limit:</td>
<td>–</td>
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<tr>
<td>25 kW</td>
<td>–</td>
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<tr>
<td>Aggregate Capacity Limit:</td>
<td>–</td>
</tr>
<tr>
<td>1% of utility's average monthly peak demand</td>
<td>–</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>–</td>
</tr>
<tr>
<td>Credited to customer’s next bill at avoided-cost rate; excess reconciled at end of annual period</td>
<td>–</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>–</td>
</tr>
<tr>
<td>Customer owns RECs</td>
<td>–</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>–</td>
</tr>
<tr>
<td>Not addressed</td>
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</tbody>
</table>

**Recommendation:**
- 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

**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 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 1% 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.

**Recommendation:**
- 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

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<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric</th>
</tr>
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<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Industrial, Residential</td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>1 MW</td>
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<tr>
<td>Aggregate Capacity Limit:</td>
<td>1% of utility’s peak capacity</td>
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<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer’s next bill at retail rate; carries over indefinitely</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer owns RECs (must be relinquished to utility if utility subsidizes system)</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Not addressed</td>
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<table>
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<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Solar Thermal Electric, Photovoltaics, Wind, Biomass, Geothermal Electric</th>
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<td>Applicable Utilities:</td>
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<tr>
<td>System Capacity Limit:</td>
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<td>Standard Agreement:</td>
<td>No</td>
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<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by commission</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Not addressed in interconnection procedures</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
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</table>

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**Nevada**
### New Hampshire

#### Net Metering

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<tr>
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<tr>
<td>System Capacity Limit:</td>
<td>1 MW for most renewables, 100 kW for wind, 30 kW for CHP</td>
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<tr>
<td>Aggregate Capacity Limit:</td>
<td>50 MW, 2 MW for CHP</td>
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<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer's next bill at retail rate; carries over indefinitely</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>REC Ownership:</td>
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<td>Meter Aggregation:</td>
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#### Interconnection

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<td>Applicable Utilities:</td>
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<tr>
<td>System Capacity Limit:</td>
<td>1 MW for most renewables, 100 kW for wind</td>
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</tr>
<tr>
<td>Standard Agreement:</td>
<td>No</td>
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<td></td>
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<tr>
<td>Insurance Requirements:</td>
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<td></td>
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<tr>
<td>External Disconnect Switch:</td>
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<tr>
<td>Net Metering Required:</td>
<td>Yes</td>
<td></td>
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</table>

**Recommendation:**
- 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

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 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

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<tr>
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<tbody>
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<tr>
<td>B 2011</td>
<td>B 2011</td>
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</table>

#### Eligible Renewable/Other Technologies:
- Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies

#### Applicable Sectors:
- Commercial, Industrial, Residential

#### Applicable Utilities:
- Investor-owned utilities, electric co-ops
- Investor-owned utilities, electric co-ops

#### System Capacity Limit:
- 80 MW
- 80 MW

#### Aggregate Capacity Limit:
- No limit specified
- System Capacity Limit: 80 MW

#### Net Excess Generation:
- Credited to customer’s next bill at avoided-cost rate or reconciled monthly at avoided-cost rate
- Generally not required for systems up to 250 kW. Utilities may require insurance for systems > 250 kW, with limits set by commission

#### REC Ownership:
- Utility owns RECs
- External Disconnect Switch: Not required for inverter-based systems up to 10 kW; utility’s discretion for all other systems

#### Recommendation:
- 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
- Prohibit requirements for a redundant external disconnect switch
- Prohibit requirements for additional insurance
- Net Metering Required: No

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**

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<thead>
<tr>
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<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Microturbines</th>
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</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>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</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>1% of utility’s 2005 demand for solar, agricultural biogas, residential micro-CHP and fuel cells; 0.3% of utility’s 2005 demand for wind</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Generally credited to customer’s next bill at retail rate; excess generally reconciled annually at avoided-cost rate</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Allowed for non-residential and farm-based customers</td>
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### Interconnection

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<th>C</th>
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<th>B</th>
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<td>2007</td>
<td>C</td>
<td>C</td>
<td>2008</td>
<td>B</td>
<td>B</td>
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<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
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<td>System Capacity Limit:</td>
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<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Insurance not required</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Not required for inverter-based systems up to 25 kW; required for all other systems</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**

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

New York 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

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

Interconnection

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor Owned Utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>No limit specified</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by commission</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Not required for inverter-based systems up to 10 kW; utility’s discretion for all other systems</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

Recommendation:

» 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

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.
### Net Metering

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Eligible Renewable/Other Technologies:</td>
<td>Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, CHP/ Cogeneration, Small Hydroelectric</td>
<td></td>
<td></td>
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<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Industrial, Residential</td>
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<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
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<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
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<td>Aggregate Capacity Limit:</td>
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</tr>
<tr>
<td>Net Excess Generation:</td>
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</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer and utility share RECs</td>
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<tr>
<td>Meter Aggregation:</td>
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### Interconnection

<table>
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<tr>
<td>Applicable Utilities:</td>
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<tr>
<td>System Capacity Limit:</td>
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<td>Standard Agreement:</td>
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<td>Insurance Requirements:</td>
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</tr>
<tr>
<td>Net Metering Required:</td>
<td>–</td>
<td></td>
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</tbody>
</table>

**Recommendation:**

- 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)

**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

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Industrial, Residential</td>
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</tr>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities, competitive retail electric service providers</td>
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<tr>
<td>System Capacity Limit:</td>
<td>No limit specified (limit based on customer's load)</td>
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<tr>
<td>Aggregate Capacity Limit:</td>
<td>No limit specified</td>
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<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer's next bill at unbundled generation rate; customer may request refund of excess at end of 12-month billing period</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>REC Ownership:</td>
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<td></td>
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</tr>
<tr>
<td>Meter Aggregation:</td>
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#### Interconnection

<table>
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<tbody>
<tr>
<td>Applicable Utilities:</td>
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<td>System Capacity Limit:</td>
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<td>Standard Agreement:</td>
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<tr>
<td>Insurance Requirements:</td>
<td>“Additional” liability insurance not required</td>
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<td>External Disconnect Switch:</td>
<td>Required</td>
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<tr>
<td>Net Metering Required:</td>
<td>No</td>
<td></td>
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</tbody>
</table>

**Recommendation:**

- 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

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 EPAct 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.
### Net Metering

|------|--------|--------|--------|--------|--------|

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

|------|--------|--------|--------|--------|--------|

<table>
<thead>
<tr>
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<td>Applicable Utilities:</td>
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<td>System Capacity Limit:</td>
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<td>Standard Agreement:</td>
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<tr>
<td>Insurance Requirements:</td>
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<tr>
<td>External Disconnect Switch:</td>
<td>–</td>
</tr>
<tr>
<td>Net Metering Required:</td>
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</tbody>
</table>

### Recommendation:

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

Oklahoma's 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 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

<table>
<thead>
<tr>
<th></th>
<th>Net Metering</th>
<th>Interconnection</th>
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<tbody>
<tr>
<td><strong>Applicable Utilities:</strong></td>
<td>Investor-owned utilities</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td><strong>System Capacity Limit:</strong></td>
<td>5 MW for microgrid and emergency systems; 3 MW for non-residential; 50 kW for residential</td>
<td>5 MW (seek utility guidance for systems above 2MW)</td>
</tr>
<tr>
<td><strong>Aggregate Capacity Limit:</strong></td>
<td>No limit specified</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Net Excess Generation:</strong></td>
<td>Credited to customer’s next bill at retail rate; reconciled at end of year at “price-to-compare”</td>
<td>“Additional” liability insurance not required</td>
</tr>
<tr>
<td><strong>REC Ownership:</strong></td>
<td>Customer owns RECs</td>
<td>Required</td>
</tr>
<tr>
<td><strong>Meter Aggregation:</strong></td>
<td>Virtual meter aggregation allowed</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Recommendation:**
- Expand net metering to include all utilities (i.e., munis and co-ops)
- 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.
Puerto Rico enacted net metering legislation in August 2007, allowing customers of Puerto Rico Electric Power Authority (PREPA) to use electricity generated by solar, wind or “other” renewable-energy resources to offset their electricity usage. This law applies to residential systems with a generating capacity of up to 25 kilowatts (kW) and non-residential systems up to one megawatt (MW) in capacity. Customer net excess generation (NEG) is carried over as a kilowatt-hour (kWh) credit to the following month, but NEG credit is limited to a “daily maximum” of 300 kWh for residential customers and 10 megawatt-hours (MWh) for commercial customers. PREPA promulgated interconnection rules in August 2008 that apply to all distributed generation (DG) projects that interconnect to PREPA’s electric distribution system. Interconnected systems must meet all safety and performance standards established by IEEE Standard 1547 as well as local construction and safety codes. A manual external disconnect switch is required for all interconnected systems.

### Puerto Rico

#### Net Metering

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Eligible Renewable/Other Technologies:</td>
<td>Photovoltaics, Wind, “Other Sources” of Renewable Energy</td>
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<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Industrial, Residential, Nonprofit, Schools, Multi-Family Residential, Agricultural, Institutional</td>
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<tr>
<td>Applicable Utilities:</td>
<td>PREPA</td>
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<tr>
<td>System Capacity Limit:</td>
<td>1 MW for non-residential; 25 kW for residential</td>
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<tr>
<td>Aggregate Capacity Limit:</td>
<td>No limit specified</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer’s next bill at utility’s retail rate (with certain limitations); excess reconciled at end of 12-month billing cycle</td>
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<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
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<tr>
<td>Meter Aggregation:</td>
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#### Interconnection

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<th>Year</th>
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<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tr>
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<td>Photovoltaics, Wind, “Other Sources” of Renewable Energy</td>
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<tr>
<td>Applicable Utilities:</td>
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<tr>
<td>System Capacity Limit:</td>
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<tr>
<td>Standard Agreement:</td>
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<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by PREPA</td>
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<tr>
<td>External Disconnect Switch:</td>
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<tr>
<td>Net Metering Required:</td>
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</table>

**Recommendation:**
- Remove system size limitations to allow customers to meet all on-site energy needs
- Allow customers to retain all RECs associated with generation

- The territory should adopt IREC’s model interconnection procedures
## Rhode Island

### Net Metering

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>5 MW (systems must be “reasonably designed” to generate only up to 100% of annual electricity consumption)</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>3% of peak load (2 MW reserved for systems under 50 kW)</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Credited at avoided cost; rolled over to next bill or purchased by utility</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Yes</td>
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### Interconnection

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Anaerobic Digestion, Small Hydroelectric, Ocean Thermal, Fuel Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
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<tr>
<td>System Capacity Limit:</td>
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<td>Standard Agreement:</td>
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<td>Insurance Requirements:</td>
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<tr>
<td>External Disconnect Switch:</td>
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</tr>
<tr>
<td>Net Metering Required:</td>
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</tbody>
</table>

### Recommendation:

- 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)

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. The Rhode Island interconnection score is based on Narragansett Electric Company’s “Standards for Connecting Distributed Generation,” as it existed on 8/1/11. The score takes into account House Bill 6222 which sets certain fees and timelines for renewable generators. Narragansett filed a revised tariff on 8/26/11 to reflect these legislative changes, but, as of printing of this edition of Freeing the Grid, the tariff was not effective. Any approved changes will be evaluated in subsequent editions.
### Net Metering

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eligible Renewable/Other Technologies:</strong></td>
<td>Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Small Hydroelectric</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Applicable Utilities:</strong></td>
<td>Duke Energy, Progress Energy, SCE&amp;G</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>System Capacity Limit:</strong></td>
<td>100 kW for non-residential; 20 kW for residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aggregate Capacity Limit:</strong></td>
<td>0.2% of utility's SC jurisdictional retail peak demand for previous calendar year</td>
<td></td>
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</tr>
<tr>
<td><strong>Net Excess Generation:</strong></td>
<td>Credited to customer's next bill at applicable time-of-use rate or less; granted to utility (annually) at beginning of each summer</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>REC Ownership:</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Meter Aggregation:</strong></td>
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</tbody>
</table>

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

### Interconnection

<table>
<thead>
<tr>
<th>Year</th>
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<th>2008</th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td><strong>Eligible Renewable/Other Technologies:</strong></td>
<td>Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Anaerobic Digestion, Small Hydroelectric, Microturbines, Other Distributed Generation Technologies</td>
<td></td>
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<tr>
<td><strong>Applicable Utilities:</strong></td>
<td>Investor-owned utilities</td>
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<tr>
<td><strong>System Capacity Limit:</strong></td>
<td>100 kW for non-residential; 20 kW for residential</td>
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<tr>
<td><strong>Standard Agreement:</strong></td>
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<tr>
<td><strong>Insurance Requirements:</strong></td>
<td>Vary by system size and/or type; levels established by commission</td>
<td></td>
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<tr>
<td><strong>External Disconnect Switch:</strong></td>
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<tr>
<td><strong>Net Metering Required:</strong></td>
<td>No</td>
<td></td>
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</tbody>
</table>

**Recommendation:**
- The state should adopt IREC’s model interconnection procedures

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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

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tr>
<td>Aggregate Capacity Limit:</td>
<td>–</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

#### Interconnection

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>10 MW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Vary by system size and/or type; levels established by commission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Utility’s discretion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Recommendation:

- The state should adopt IREC’s model net metering rules
- 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.
### Net Metering

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Sectors:</td>
<td>—</td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>—</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>—</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>—</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>—</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>—</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>—</td>
</tr>
</tbody>
</table>

### Interconnection

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Industrial, Residential</td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>10 MW</td>
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<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Required</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**

- The state should adopt IREC’s model net metering rules
- 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.
<table>
<thead>
<tr>
<th>Net Metering</th>
<th>Interconnection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2007</strong></td>
<td><strong>2007</strong></td>
</tr>
<tr>
<td><strong>D 2008</strong></td>
<td><strong>F 2008</strong></td>
</tr>
<tr>
<td><strong>A 2009</strong></td>
<td><strong>F 2008</strong></td>
</tr>
<tr>
<td><strong>A 2010</strong></td>
<td><strong>A 2009</strong></td>
</tr>
<tr>
<td><strong>A 2011</strong></td>
<td><strong>A 2011</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities, electric co-ops</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>2 MW for non-residential; 25 kW for residential</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>20% of 2007 peak demand for Rocky Mountain Power; 0.1% of utility’s 2007 peak demand for co-ops</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>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</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Customer owns RECs</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Allowed at same or adjacent location</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities, electric co-ops</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>20 MW</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Varies by system size</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Not required for inverter-based systems up to 25 kW; required for all other systems</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
</tr>
</tbody>
</table>

**Recommendation:**
- Prohibit external disconnect switch requirements for all inverter-based systems

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.
**Net Metering**

<table>
<thead>
<tr>
<th>Year</th>
<th>A 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
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<tr>
<td>2008</td>
<td>B</td>
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<tr>
<td>2009</td>
<td>B</td>
</tr>
<tr>
<td>2010</td>
<td>B</td>
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**Interconnection**

<table>
<thead>
<tr>
<th>Year</th>
<th>C 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>C</td>
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<tr>
<td>2008</td>
<td>C</td>
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<tr>
<td>2009</td>
<td>C</td>
</tr>
<tr>
<td>2010</td>
<td>C</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>2.2 MW for military systems; 20 kW for micro-CHP; 500 kW for all other systems</td>
</tr>
<tr>
<td>Aggregate Capacity Limit:</td>
<td>4% of utility's 1996 peak demand or peak demand during most recent calendar year (whichever is greater)</td>
</tr>
<tr>
<td>Net Excess Generation:</td>
<td>Credited to customer's next bill at retail rate; excess credits not used within 12 months of generation granted to utility</td>
</tr>
<tr>
<td>REC Ownership:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>Meter Aggregation:</td>
<td>Group net metering allowed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
<th>Photovoltaics, Wind, Biomass, Fuel Cells, CHP/Cogeneration, Anaerobic Digestion, Microturbines, Other Distributed Generation Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Residential, Agricultural</td>
</tr>
<tr>
<td>Applicable Utilities:</td>
<td>All utilities</td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>No limit specified</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>Not addressed</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Required</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No (separate interconnection procedures exist for net-metered systems 150 kW and under)</td>
</tr>
</tbody>
</table>

**Recommendation:**

- 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

**Recommendation:**

- 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

<table>
<thead>
<tr>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

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

**Recommendation:**
- 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

<table>
<thead>
<tr>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
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<td>F</td>
<td>F</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

- **Eligible Renewable/Other Technologies:** Solar Thermal Electric, Photovoltaics, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Tidal Energy, Wave Energy
- **Applicable Utilities:** All utilities
- **System Capacity Limit:** 20 MW
- **Standard Agreement:** Varies by system size
- **Insurance Requirements:** Vary by system size and/or type; levels established by commission
- **External Disconnect Switch:** Utility’s discretion
- **Net Metering Required:** No (separate interconnection procedures exist for net-metered systems)

**Recommendation:**
- 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

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

**Recommendation:**
- 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

<table>
<thead>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Applicable Utilities:</td>
<td>Investor-owned utilities</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Capacity Limit:</td>
<td>20 MW</td>
<td></td>
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</tr>
<tr>
<td>Standard Agreement:</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>“Additional” liability insurance generally not required for net-metered systems. For other systems, requirements vary by system application and/or size; levels established by commission.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>Generally required for systems up to 300 kW; not addressed for larger systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>No</td>
<td></td>
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</tr>
</tbody>
</table>

**Recommendation:**
- 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.
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.

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

- Remove system capacity limit
### Wisconsin

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

| **Eligible Renewable/Other Technologies:** | Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/ Cogeneration, Microturbines, Other Distributed Generation Technologies |
| **Applicable Utilities:** | Investor-owned utilities, municipal utilities |
| **System Capacity Limit:** | 15 MW |
| **Standard Agreement:** | Yes |
| **Insurance Requirements:** | Vary by system size and/or type; levels established by PSC |
| **External Disconnect Switch:** | Required |
| **Net Metering Required:** | No |

**Recommendation:**
- 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

**Recommendation:**
- 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

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

#### Interconnection

<table>
<thead>
<tr>
<th>Eligible Renewable/Other Technologies:</th>
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<tr>
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</tr>
<tr>
<td>System Capacity Limit:</td>
<td>–</td>
</tr>
<tr>
<td>Standard Agreement:</td>
<td>–</td>
</tr>
<tr>
<td>Insurance Requirements:</td>
<td>–</td>
</tr>
<tr>
<td>External Disconnect Switch:</td>
<td>–</td>
</tr>
<tr>
<td>Net Metering Required:</td>
<td>–</td>
</tr>
</tbody>
</table>

### Recommendation:

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

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 without Statewide Net Metering

<table>
<thead>
<tr>
<th>Alabama</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idaho*</td>
</tr>
<tr>
<td>Mississippi</td>
</tr>
<tr>
<td>South Carolina*</td>
</tr>
<tr>
<td>South Dakota</td>
</tr>
<tr>
<td>Tennessee</td>
</tr>
<tr>
<td>Texas*</td>
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States without Statewide Interconnection Procedures

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* Voluntary net metering available
Worst Practices
In Focus: Standby Charges

The imposition of additional charges, such as standby charges or access fees, on net metering customers can have a significant negative impact on the economics of distributed, clean energy systems. For that reason, we examined this issue closely in determining a state’s net metering score.

The justification for standby charges for net metering customers typically follows this rationale: if a generator meeting all or part of a customer’s energy needs fails, the utility will then be required to meet that customer’s energy needs. The utility must at all times be ready to meet this customer’s load, including the load that is currently offset by on-site generation. Accordingly, a standby charge can be justified to recoup the costs of the utility standing ready to serve.

While no one would argue that a utility should not be able to recover its costs to serve its customers, the issue of standby charges requires careful consideration of the costs—if any—actually imposed by net metering customers. Historically, standby charges were designed for customers who operated onsite generation or combined heat and power plants (CHP). Typical onsite generation or CHP systems range in size from small (<1 MW) to large (20–100 MW) in capacity and have the capability to produce electricity in a stable, 24/7 manner. From a utility’s viewpoint, a significant load is now being served by the onsite generation, and scheduled downtime or outage will require the utility to meet the entire host customer’s load over the period of time in which the onsite system is not operating. From the customer’s perspective, having the choice of standby service is an important consideration for the times that onsite generation may be inoperative, so long as these costs take into account high reliability of CHP and the low probability that customer generation at different sites may be down at the same time. The costs of the utility standing by to meet this load are rightfully recovered from the respective onsite generator or CHP customer in these situations.

Intermittent resources, like PV, operate in a much different fashion. First, as their name suggests, intermittent resources produce power only when their fuel source, such as the sun, is available and their output varies over time based on a multitude of factors. Because of this, the utility continues to meet the host customer’s demand at periods when the plant is not productive, such as nighttime and in low production hours where a customer’s energy needs are greater than the energy supplied by their renewable energy resource. In this way, the utility is not “standing by” in the same sense as a CHP customer, but rather serving a customer with a load that varies over time—just as other customer’s loads vary over time. Second, given this situation, it’s not entirely clear that standby charges, which were developed for much larger onsite-generation customers whose expected load profiles are fundamentally different than the load profiles of customers installing intermittent generation resources, would appropriately recover any additional costs a utility experiences in serving customers with intermittent generation.

Simply put, without a careful cost-of-service study to certify the claim that customers installing net metering systems impose costs on a utility, it is inappropriate to impose standby charges on customers investing in renewable energy generation that were designed for an entirely different class of customer. A utility or commission cannot know whether a standby charge is justified for a class of customers or generators until it performs a comprehensive cost-of-service study.
Such a study should employ a methodology that considers both the costs and benefits of an intermittent generator, including load diversity benefits, transmission and distribution facility upgrade deferral, avoided capacity, avoided fuel costs and any environmental or social benefits. Moreover, research on the topic is showing that customers who install renewable generation actually impose less of a cost on a utility than other utility customers because of changes in their load profiles versus a utility’s peak.

Therefore, a policy that imposes a per-kWh fee on all renewable energy production in the absence of a cost-of-service study (to justify the charge) received the most significant penalty available in *Freeing the Grid*—a five point deduction. Standby charges should only be allowed where they are justified on a cost-causation basis.

Moreover, *Freeing the Grid* awards three points to states that create a “safe harbor” provision in their net metering statutes or rules, thereby protecting customers from the unilateral imposition of these fees because of the ambiguity surrounding the appropriateness of imposing standby or other similar charges on customers who invest in renewable energy resources.

Finally, to avoid discriminating against distributed generation, standby charges must be based on a methodology that gives a true representation of the costs of serving customer-generators. Recently, legislatures in Virginia and New Mexico approved procedures for utilities to impose standby charges on customer-generators. Because the methodology for calculating the standby charges is not well defined, these bills leave a great deal of uncertainty as to how the charges will be calculated. Accordingly, this cost uncertainty makes these standby charge bills an obstacle to new generation and a worst practice.
In Focus: Virginia Standby Charges

In March 2011, Virginia enacted House Bill 1983 (H 1983), which authorizes utilities to seek Commission approval to impose standby charges on net-metered customers. Under the bill, customer-generators with systems over 10 kW may face standby charges where the utility can show that it is only recovering the “portion of the supplier’s infrastructure costs that are properly associated with serving such eligible customer-generators.”

In Focus: New Mexico Access Fee

New Mexico enacted HB 181 in 2010 which, similarly to Virginia, authorizes utilities to seek approval of “interconnected customer rate riders to recover the costs of ancillary and standby services.” HB 181 requires the Public Regulation Commission to consider the “reasonably determinable embedded and incremental costs of the utility to serve new interconnected customers and the reasonably determinable benefits to the utility system provided by new interconnected customers. The Public Service Company of New Mexico (PNM) recently proposed a $0.08/kWh rider (pursuant to HB 181); even though the cost-of-service study showed that the benefits of distributed generation to the system exceeded the utility’s costs of service for DG customers. PNM’s methodology spread the benefits of DG to all customers (resulting in a low per-kWh benefit) and assigned the costs associated with DG solely to DG customers. The proposal was ultimately withdrawn, but this example highlights why it is so important to review any claims of costs very carefully.

“Additional charges or fees can have a significant negative impact on the economics clean energy systems.”
Best Practices

In Focus: Delaware

Delaware’s road to best practices began in 1999 with the creation of limited net metering as part of Delaware’s electric restructuring. Unfortunately, the state legislature’s initial net metering program was limited to renewable energy systems with a capacity of less than 25 kW, and only residential and small commercial customers could participate. Since then, however, the legislature has actively pursued best practices in the state’s net metering policy that, among other things, expanded the availability of net metering to all customer classes, increasing the individual system size limit to 2 MW, and increasing the program capacity limit to 5% of utility peak demand. At each move through the years, Delaware has taken steps to adopt best practices in net metering with the end result being a Freeing the Grid score of “A” for Delaware since 2009.

As noted before, strong net metering rules are only one component of a comprehensive renewable energy policy. Robust interconnection procedures, utility rate polices, and incentives are also necessary to have a renewables program firing on all cylinders. Unfortunately, while Delaware’s Renewable Portfolio Standard (RPS) program provides solid incentives for renewable DG, including net-metered systems, the state’s interconnection procedures have historically fallen far short of best practices, receiving a grade of “F” in last year’s edition of Freeing the Grid. Intriguingly, this situation occurred despite legislation in 2005 requiring that interconnection procedures be modeled after IREC’s model interconnection procedures and best practices promulgated by the U.S. Department of Energy.

In July 2010, an opportunity arose to bring Delaware’s interconnection procedures in line with best practices with the enactment of S.B. 267. This legislation expanded the state’s already solid net metering program to allow for aggregate net metering and community renewables. As part of the development of rules to implement these new policies, staff at the Public Service Commission committed to taking a hard look at the state’s interconnection procedures to bring them into compliance with the 2005 legislation.

The results of this effort are outstanding. As of mid-2011, Delaware is poised to adopt interconnection procedures that are among the strongest in the country and have received a score of “A” in Freeing the Grid 2011. In addition, the adoption of rules for aggregate metering and community renewables has greatly expanded opportunities for investment in renewable energy among customer groups who previously would have been unable to fully utilize the state’s solid net metering program. Most importantly, Delaware’s renewable energy policies are finally aligned to bring significant investment in renewable energy to the state.

Features of Delaware’s Programs

Delaware’s net metering rules and interconnection procedures are among the best in the country and are poised to significantly expand the number of participating customers and renewable capacity in the state.

» Simplified Interconnection Procedures

Within Delaware’s interconnection procedures is a review process that is based on the complexity of the system under consideration. Smaller systems receive a fast track through the process using simplified, objective screening.
High System Size Limits
High system size limits allow non-residential customers, which typically have larger loads, to install systems capable of meeting their entire energy needs if they so choose, resulting in installation of systems with a lower cost per-kW and allowing these systems to contribute to meeting the state’s RPS goals.

Aggregate Net Metering
Meter aggregation allows customers, such as farmers or universities who may have more than one meter on their property to combine net metering credits generated by a multiple renewable energy systems onto one meter to offset consumption at multiple meters, allowing for more cost effective systems.

Community Renewables
Community renewables programs allow customers who are unable to host an on-site renewable energy system for various reasons to receive net metering credits from a renewable energy system located off-site. States adopting a community renewables program allow renters, homeowners with a shaded roof, and those residing in historic homes, for example, to invest in renewable energy resources as other utility customers do. This is fair given that, just as other utility customers, they are paying into renewable programs through their utility bills.

Third-party Ownership Allowed
Under this scenario, customers interested in investing in renewable energy systems are allowed to contract with a third-party for the ownership and management of the system. This allows customers to avoid the large upfront costs of purchasing a system and allows customers to make the most efficient use of available incentives. Both of these benefits have made third-party ownership an increasingly important part of renewable energy development.

In Focus: Community Renewables—Expanding the Benefits of Net Metering
As interest in renewable energy continues to grow, states are seeking ways to expand access to renewable energy for customers interested in investing in greening their energy supply. Community renewables is an emerging vehicle by which renters, customers with shaded roofs, residents of multitenant properties and other customers that may not have an ideal location of their own for installation of renewables can invest in a renewable energy system and reap the benefits of net metering. In fact, a recent study by the National Renewable Energy Laboratory found that only 22-27% of residential rooftops by area are a good fit for hosting an on-site solar energy system. With less than a third of the potential residential market available to participate in on-site solar programs, other program options are going to be necessary in order for renewables to continue their breakneck pace of growth. Moreover, as a matter of equity, programs should be developed that allow all ratepayers to participate as they all contribute to the cost of the programs.

Community renewables programs are addressing these issues by removing the requirement that a system be located on a customer’s site in order for the customer to net meter. In this sense, community renewables programs allow groups of customers to participate jointly in a single renewable energy system, such as a solar garden, and receive the benefits of their investment.

Moreover, community renewables programs are often coupled with meter aggregation to allow customers with multiple meters to more cost-effectively invest in renewable energy resources. The combination of these two program concepts has allowed net metering to expand out of its traditional function as a mechanism to efficiently offset onsite customer load at a single facility and into a policy that more fully enables all customers—and their varied situations—to participate in renewable energy programs to help their state reach its renewable energy goals.

States that are creating or that have implemented community renewables programs often have different variations on the idea to suit their states’ specific policy goals. For example, while many municipal utilities have undertaken community solar initiatives in order to offer customer shares in a single, large
solar facility and the ability to gain credits based on the size of the share and the facility’s output, they don’t always offer the same types of programs. The Sacramento Municipal Utility District’s (SMUD) Solar Shares program offers customers access to blocks of solar capacity for a fixed fee each month depending on the size of the system they choose. Customers receive a net metering credit on their monthly bill based on the estimated production from the amount of capacity they’ve enrolled in under the program. Florida Key Electric Coop (FKEC) offers a similar program called Simple Solar. However, under the FKEC’s program, customers lease panels from FKEC and the customer’s net metering credit is based on the actual production of the panel(s) they have leased.

One common feature between these two programs however, is that they use “virtual” net metering to distribute the benefits to participants. Net metering of system output under programs such as these is considered “virtual” because the renewable energy system is not directly connected to the participant’s meter. Rather, credits are assigned to customer accounts as part of the billing process rather than having a physical meter that spins backward when production exceeds consumption. Aside from this feature, net metering of community renewables facilities operates similarly to onsite programs.

Programs differ in other ways including ownership of the community renewables facilities, the maximum system size that could be installed under the program, and the value given to the net metering credits produced by the system; all issues that must be handled carefully to insure program success. To assist with the development of successful community renewables programs that run smoothly, a number of resources have been designed for stakeholders to use while creating a program.

One of the most comprehensive resources is “A Guide to Community Solar: Utility, Private, and Non-profit Project Development” published by the U.S. Department of Energy. This guidebook contains a host of information on community solar project models, state policies to support community solar, tax and legal issues and model rules developed by IREC. The guide was designed to assist stakeholders in developing community solar programs that meet each jurisdiction’s diverse needs.

End Notes
2. See FKEC’s Simple Solar website at: http://www.fkec.com/Green/simplesolar.cfm
NET METERING
MODEL RULES
2009 EDITION
MODEL
INTERCONNECT
PROCEDURES
2009 EDITION
Applying the lessons from existing statewide net metering programs and interconnection procedures, IREC has drafted model interconnection procedures and net metering rules for use by state utility commissions and other stakeholders. As states consider adopting or revising programs, these models provide an easy way to emulate effective policies and avoid wasteful mistakes.

Critically, these models already represent a negotiated compromise and best practices regime—one proven to safeguard the grid and other ratepayers, while permitting distributed generation to flourish. It is the authors’ view that to renegotiate the provisions within these models would simply consume resources in an attempt to reinvent the wheel.

Ideally, a uniform national renewable energy policy would stem from federal leadership. The current discrepancy in the design and implementation of several dozen vastly different state programs has created an uneven playing field for renewable energy service providers and utilities alike, and is preventing distributed renewable energy technologies from reaching economies of scale. Uniform federal interconnection and net metering standards could create a level playing field and provide greater regulatory predictability than the existing patchwork of state policies.

See Appendix B to download IREC’s model rules.
## Appendix A:
### Net Metering

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**Notes:** 7.5 points are added to interconnection scores to achieve grading parity with net metering.

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

Interstate Renewable Energy Council’s 2009 Model Net Metering Rules and Model Interconnection Procedures

Model Net Metering Rules
Interstate Renewable Energy Council’s (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/ICmodel09

### Appendix C

**Abbreviations and Acronyms**

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<td>kW</td>
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<td>Net Excess Generation</td>
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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.

The Vote Solar Initiative
www.votesolar.org

America’s energy problems — from economic crisis to global climate change — will only be solved by a national transition to renewables. Clean, homegrown, reliable solar energy is ready to play a large part of the solution. It is the fastest growing energy source in the world, but we have still just scratched the surface of solar’s vast energy potential. In order to bring the technology to scale, we need to bring down costs. Vote Solar works to build the economies of scale necessary to bring solar into the mainstream.

The North Carolina Solar Center
www.ncsc.ncsu.edu

Created in 1988, the North Carolina Solar Center, as part of the College of Engineering at North Carolina State University (NCSU), works closely with state and local government and the renewable energy industry. It manages and maintains the NCSU Solar House and serves as a resource for innovative, green energy technologies through research and demonstration, technical assistance, education, outreach and training. It also administers the Database of Incentives for Renewables & Efficiency (DSIRE), a resource providing financial incentives and policies.

Network for New Energy Choices
www.newenergychoices.org

Network for New Energy Choices promotes environmentally responsible energy policies and technologies through in-depth reports and web content. NNEC, formed in 2006, is a program of GRACE.