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

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

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

Points	Total Program Limit as Percentage of Peak Demand
+2.5	5% or greater; no limit
+2	Greater than 2%, but less than 5%
+1.5	Greater than 1%, but not greater than 2%
+1	Greater than 0.5%, but not greater than 1%
+0.5	Greater than 0.2%, but not greater than 0.5%
0	Greater than or equal to 0.1%, but not greater than 0.2%
-0.5	Less than 0.1%
Bonus	
+1	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.[4] This regulatory uncertainty inhibits renewable energy investment.

Restrictions on "Rollover"

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

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

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

To be successful, a net metering program must facilitate rollover so that customer-generators receive credit for excess energy generated during the seasons when renewable output is highest and apply it toward their consumption when output is lowest, allowing customers to achieve zero net energy consumption from the grid. Indefinite rollover provides the best approach to account for variations among different system technologies and locations. Customer-generators realize the most financial benefit from net metering in this manner.

Metering Issues

Points	Metering Provisions
+2	No meter change required—customer-sited generator uses existing meter
+2	New meter is provided by the utility at no cost to the customer-sited generator
+1	Dual meters or dual registers—utility pays for the additional meter
0	Dual meters or dual registers—customer pays for the additional meter
Points	**Metering Provisions Under Time-of-Use (TOU) rates**
+2	TOU meters with time bin carryover
+1	TOU meters with segregated time periods
-1	Segregated TOU rate disadvantage small generators

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

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

disadvantage customers by requiring them to pay extra fees or undervalue weekend and off-peak production.

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

Renewable Energy Credit Ownership

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

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

Eligible Technologies

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

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

metering. These factors have occasionally warranted special caveats in state net metering policies to account for some of these differences. Some of these caveats include allowing only micro-CHP as an eligible technology (usually systems under 30 kW), different excess generation rollover provisions and fuel restrictions.

Eligible Customers

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

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

Bonus for Aggregate Net Metering

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

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

Bonus for Retail Choice

Points	Bonus
+0.5	Net metering is allowed under retail choice

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.[5]

Bonus for Community Renewables

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

For a variety of reasons, customers may be unable to host an on-site renewable energy system. For example, a customer may be a tenant in a multiunit building where the landlord will not allow the installation of a solar system on the roof. Because renewable energy program rules often require a renewable energy system to be located on-site, these customers are prohibited from greening their energy supply despite their willingness to make that investment. Forward looking states are beginning to address this program gap and expand opportunities for customers to participate in renewable energy through