Net metering policies have facilitated the expansion of renewable energy through on-site, also known as distributed, generation. Common distributed generation sources—which are often located at a house, school or business rather than utility-owned property—include:

- Solar panels
- Natural gas micro-turbines
- Methane digesters
- Small wind power generators

Net metering policies allow distributed generation customers to sell excess electricity to a utility at a retail rate and receive credit on their utility bill. This credit offsets the customer’s electricity consumption during other times of the day or year, which reduces the amount of electricity the customer purchases from a utility.

Increasing numbers of utility customers are using net metering to generate electricity on their property. According to the U.S. Energy Information Administration, net-metered solar saw significant growth in 2015, adding over 2,100 megawatts (MW) in generation capacity. This represents the fourth consecutive year of annual growth above 50 percent.

**State Net Metering Policies**

Net metering policies can assist states in meeting their renewable portfolio standards (RPS) or targets since a number of states have specific requirements for distributed generation. While a majority of states and territories have authorized net metering, they have taken differing approaches to policies with variations in capacity limits, eligible technology, net metering credit retention and renewable energy credit (REC) ownership.

Forty-one states, Washington, D.C., and four territories offer net metering, and utilities in two additional states—Idaho and Texas—have voluntarily adopted net metering programs. Four states—Georgia, Hawaii, Nevada and Mississippi—have statewide distributed generation compensation rules other than net metering. In Georgia, net metering customers are credited for net excess generation at a predetermined rate, which for Georgia Power—Georgia’s largest
electric power company—is the solar-avoided cost. Mississippi’s policy credits customers at the utility’s avoided cost plus a premium for electricity exports.

In 2015, regulators in Hawaii ended conventional net metering and created a new net metering policy. Reversing a previous decision, the Nevada Public Utilities Commission restored conventional net metering to customer who installed solar by December 31, 2015 (see “Notable Policy and Regulatory Developments”). New solar customers in Nevada are not eligible for conventional net metering and are instead compensated at the avoided cost rate. Finally, although Minnesota offers conventional net metering, the state has also created a value of solar rate, or tariff, as an alternative to net metering. For more information regarding these policies see the “Next Generation Approaches” and “Value of Solar” sections below.

Value of Solar

The Value of Solar (VOS) rate (or Value of Solar tariff) is an alternative to net metering designed to capture the value solar installations provide to the electric system. Under existing VOS program designs, solar customers continue to purchase all of their electricity from the grid at the utility’s retail rate and receive credit for the solar electricity exported to the grid at the approved VOS rate.

The VOS rate attempts to include the variety of costs and benefits that solar may create for the grid rather than simply paying the fixed retail rate. The VOS rate is locked in for a specified period of time—for example, at least 20 years in Minnesota—whereas net metering credits
fluctuate with the retail price. By including both costs and benefits, the VOS rate addresses the concerns of cost-shifting to non-solar customers.

Finally, VOS allows utilities to better understand and manage customer electricity generation, since the VOS decouples the solar electricity generated by the consumer from the electricity purchased for on-site consumption. Minnesota allows utilities to compensate rooftop solar and community solar garden systems at either the VOS or net metering rate. Only Minnesota and Austin, Texas, have adopted VOS policies, however no eligible utility has chosen to implement a VOS rate.

**Terminology**

States have implemented net metering policies using a range of terminology and definitions. For example, California enacted legislation authorizing “net energy metering,” defined as “measuring the difference between the electricity supplied through the electrical grid and the electricity generated by an eligible customer-generator and fed back to the electrical grid over a 12-month period.” Maine authorized “net energy billing” as “a billing and metering practice under which a customer and shared ownership customers are billed on the basis of net energy over the billing period taking into account accumulated unused kilowatt-hour credits from the previous billing period.”

**Capacity Limits**

Capacity limits regulate the individual system size of net metered installations in a variety of aspects and vary widely across states. Capacity limits can be determined by a kilowatt-based limit or a percentage limit. For example, Wisconsin has authorized net metering for systems up to 20 kilowatts (kW) while Arizona caps systems at 125 percent of a customer’s total connected load. New Jersey and Ohio have authorized net metering with no capacity limit. Vermont, South Carolina, Virginia and Wisconsin have authorized net metering for systems up to 20 kW in capacity while Massachusetts allows for systems up to 10 MW and New Mexico authorizes net metering for systems up to 80 MW. Nearly half of states with net metering policies authorize net metering for systems up to one or two MW in capacity.

Capacity amounts can also vary with regard to utility type, customer type, technology and system type. For example, a majority of states have adopted requirements that are only applicable to certain types of utilities, such as investor-owned utilities. States also have adopted capacity limits based on customer demographics. For example, West Virginia established different limits for commercial, industrial and residential customers, which are then based on the size of the utility serving the various customer demographics. Several states have established capacity limits based on technologies, such as in New York where solar, wind, micro-hydroelectric, fuel cell, biogas and micro-combined heat and power (CHP) systems all have different capacity limits (which then vary based on customer type).

States can also adopt different capacity limits for individual systems, aggregate net metering systems and community or virtual net metering systems, which are discussed under “Shared Renewable Energy” later in this document. Arkansas, for example, has established system
capacity limits for individual customers but has no aggregate net metering capacity limit. Kansas has established a kilowatt-based capacity limit for individual customers but limits aggregate net metering capacity to 1 percent of a utility’s retail peak demand.

**Eligible Technology**

States include a variety of technologies in net metering policies. While all states with net metering include solar energy in their policies, they may also include: wind and micro-turbines, combined heat and power or cogeneration, biomass, biogas, landfill gas, municipal solid waste, anaerobic digesters, geothermal electric, fuel cells, small hydroelectric, tidal energy, wave energy, ocean thermal and renewable fuel cells.

**Compensation**

State policies also have addressed how long customers can maintain or “roll over” bill credits for net metered electricity. Virtually all states credit excess generation to the next monthly billing period or allow distributed generation customers to select this option. North Dakota, an exception to this practice, reconciles excess generation monthly at avoided cost rate.

An important distinction in states’ policies is whether credits for excess generation can expire or can be carried over indefinitely; states have taken a range of approaches to address this. For example, Alaska credits excess generation to a customer’s next bill and credits may be carried over indefinitely. In Hawaii, excess generation is credited to a customer’s next bill at retail rate but excess credits are granted to the utility at the end of an annual billing cycle. California credits excess generation to a customer’s next bill at retail rate. After a 12-month period customers can choose whether to roll credits over indefinitely or receive a payment for credits at the wholesale rate. If no option is selected, credits are granted to the utility with no customer compensation.

States vary compensation policies based on factors such as system size or technology. For example, Minnesota determines net excess generation policies based on the capacity of the distributed generation system, while New York differentiates net excess generation policies based on technology.

**REC Ownership**

Net metering policies may specify ownership of renewable energy credits (RECs) created by the system. Renewable energy producers earn RECs for electrical generation and states can determine if the distributed generation customer, or the utility that purchases excess electricity, owns the REC. REC ownership can be important to meeting state renewable portfolio standards (RPS), whether the requirements are for distributed generation carve-outs or broader utility requirements. In Colorado, where the state RPS requires a percentage of retail sales to come from distributed generation, RECs are owned by distributed generation customers. Utilities in Kansas, where there is no distributed generation requirement in the state RPS, own distributed generation RECs. A majority of states with net metering have determined that distributed generation customers own RECs.
Net Metering System Types

In recent years, a number of states have differentiated how net metering policies apply to different customer types.

- **Conventional net metering**, sometimes referred to as individual net metering, connects a generating source to a single meter, such as a house or building. The recent expansion of net metering policies allows generating sources to be connected to multiple meters or multiple properties.
- **Aggregate net metering** and **virtual or community net metering** have authorized net metering for new customer types, including non-profits, multi-unit residences, multi-property owners, renters, municipalities and others who cannot install distributed generation. Under conventional net metering, these customer types could not have benefitted from net metering.

Note: See Map "State Net Metering Policies" for conventional net metering authorization.

Aggregate Net Metering

According to the Database of State Incentives for Renewables and Efficiency (DSIRE), meter aggregation, also called aggregate net metering, is a program design that allows a single customer to offset electrical use from multiple meters on his or her property, using a single renewable energy generating system also located on the owner’s property. For example, aggregate net metering allows a farmer to use net metering credits generated from a single
renewable energy system to offset the load from multiple meters on the farmer’s same property or adjacent farm properties.

At least 17 states have authorized aggregated net metering, including Arkansas, California, Colorado, Connecticut, Delaware, Maine, Maryland, Minnesota, Nevada, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Utah, Washington and West Virginia.

Certain states have placed specific requirements on aggregated net metering systems based on customer type (such as Maryland and New York), technology type (such as Nevada and New York) or the distance between meters and the renewable energy system (such as New Jersey and West Virginia). States have also required customers to request for meters to be aggregated, required customers to cover the expense of meter aggregation or established separate capacity limits for aggregated systems. State legislative activity is included in the table below.

<table>
<thead>
<tr>
<th>STATE</th>
<th>ENABLING STATUTE, CODE OR ORDER</th>
<th>ESTABLISHED</th>
<th>SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>Order No. 7 in Docket No. 12-060-R</td>
<td>2013</td>
<td>Customers with multiple meters located within a single utility’s service territory are allowed to offset those meters using a single net metering system or multiple systems. Customers must designate the additional meter or meters to be offset when requesting meter aggregation.</td>
</tr>
<tr>
<td>California</td>
<td>Senate Bill 594</td>
<td>2012</td>
<td>A single customer is allowed to aggregate the electric load of their multiple meters on the same or adjacent properties and apply the generation credits from a renewable energy system located on adjacent property to all meters.</td>
</tr>
<tr>
<td>Colorado</td>
<td>4 CCR 723-3, Rules 3664</td>
<td>2012</td>
<td>A customer with multiple meters located on the same or adjacent property is allowed to offset the load measured at more than one meter. Customers must request meter aggregation, give the utility a 30-day notice and specify the order in which to apply net metering credits at the multiple meters.</td>
</tr>
<tr>
<td>Connecticut</td>
<td>House Bill 6360</td>
<td>2013</td>
<td>Allows municipal, state or agricultural customers to aggregate all electric meters billable to the customer.</td>
</tr>
<tr>
<td>Delaware</td>
<td>Senate Bill 267</td>
<td>2010</td>
<td>Individual customers with multiple meters are allowed to aggregate all</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>State</th>
<th>Reference</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maryland</td>
<td>COMAR 20.50.10.07</td>
<td>2011</td>
<td>Meter aggregation is allowed for agricultural, non-profit and municipal or county government customers. Customers must provide details on how to distribute excess generation credits when they request meter aggregation.</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Minn. Statute §216B.164</td>
<td>2015</td>
<td>Customers are allowed to aggregate meters located on the same or adjacent properties owned by the same customer. The customer must designate the rank order for meters for applying net metering credits. Utilities may charge administrative fees for meter aggregation. The capacity of all aggregated meters is limited to 1 MW.</td>
</tr>
<tr>
<td>Nevada</td>
<td>Assembly Bill 359</td>
<td>2011</td>
<td>Meter aggregation is allowed for hydropower facilities with a generating capacity up to 1 MW. Meters offset by hydropower facilities must be located on adjacent properties. Wind energy devices installed during 2012 on property owned or leased by an institution of higher learning and used for research and workforce training are also eligible for meter aggregation.</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Senate Bill 1925</td>
<td>2012</td>
<td>Public entities including state and local governments, local agencies and school districts are eligible for meter aggregation of solar facilities. All meters must be located within the customer’s territorial jurisdiction, and for state projects, all facilities must be located within five miles of one another. The</td>
</tr>
<tr>
<td>State</td>
<td>Code/Act</td>
<td>Year</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>New York</td>
<td>Assembly Bill 6270</td>
<td>2011</td>
<td>Farm-based and non-residential customer generators are eligible for remote net metering of solar, wind, farm-based biogas and micro-hydroelectric host meter receives credit for excess generation at the retail rate and all other meters are credited at the wholesale rate.</td>
</tr>
<tr>
<td>Oregon</td>
<td>Or. Admin. Code R. 860-039</td>
<td>2007</td>
<td>Aggregate net metering is allowed for all net metering facilities located on the same property or adjacent properties. When requesting meter aggregation, customers must designate the rank order of meters for applying net metering credits.</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>PA Code Chapter 75</td>
<td>2008</td>
<td>Meter aggregation is allowed for all meters located within two miles of the boundaries of the individual’s property and within the same electric distribution company’s service territory. Customers are responsible for the cost of meter aggregation.</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>R.I. Gen. Laws §39-26.4</td>
<td>2011</td>
<td>Aggregate net metering is allowed for meters located on an individual customer’s property. Meter aggregation is allowed for public entities and special provisions exist for farm-based systems.</td>
</tr>
<tr>
<td>Utah</td>
<td>Rule R746-312</td>
<td>2010</td>
<td>Meter aggregation is allowed for meters located on a customer’s adjacent properties. Customers must identify the meters to be aggregated and a ranking order for applying net metering credits to meters at the time of request for aggregation.</td>
</tr>
<tr>
<td>Washington</td>
<td>Rev. Code Wash. §80.60.030; House Bill 1140</td>
<td>2007</td>
<td>All meters on property owned by a customer within a single utility’s service territory are eligible for meter aggregation. Customers are limited to 100 kW in capacity. Generated electricity is first used to offset the electricity provided by the utility to the customer and any excess kilowatt-hours are credited equally to the customer’s remaining meters.</td>
</tr>
<tr>
<td>West Virginia</td>
<td>General Order No. 258</td>
<td>2010</td>
<td>All of a customer’s meters located within two miles of the point of generation are...</td>
</tr>
</tbody>
</table>
Shared Renewable Energy

Shared renewable energy programs offer customers who might be unable or unwilling to install on-site distributed generation systems the opportunity to benefit from distributed renewable energy generation. Shared renewables programs can provide access to renewable energy to customers in multi-family residences, condominiums or those with roofs incompatible with solar arrays.

States can take one of two legislative paths to authorize shared renewables—virtual net metering or community renewables programs—or they can take a hybrid approach. At least 15 states and Washington, D.C., have legislation authorizing shared renewables.

Virtual net metering expands conventional net metering to allow multiple customers, including tenants in a multi-family property or condominium owners, to offset their energy use from one or several shared distributed generation systems.

The second legislative route to shared renewable energy is through legislation authorizing community-based renewables programs or pilot projects. Also known as shared or community solar, community solar gardens or shared clean energy, these programs allow multiple customers to purchase interest in shared renewable energy systems located on-site or off-site. Participating customers are allocated benefits from the shared system through either virtual net metering or bill credits.

While the majority of shared renewables projects are solar projects, there is also a small number of wind projects operating in several states. Additionally, at least 10 of the states with shared renewables legislation include provisions to allow for additional renewable energy technologies, such as wind, biomass or geothermal, in programs.

State Action

In recent years, state legislatures have taken an active role in navigating net metering. While net metering policies have been responsible for expanding access to the benefits of renewable energy, they have generated questions of equity with regard to distributed solar systems.

Critics argue that the economic compensation received by net metering customers unintentionally allows them to avoid compensating utilities for the cost of maintaining infrastructure and the electric grid. All electricity users pay for the grid that supports electric infrastructure through charges on their utility bill, however, since net metered customers may
end up paying very low electricity bills, they inadvertently avoid these charges. Additionally, some feel distributed generation users should not be credited at the retail rate for excess electricity generation, but rather at the avoided cost or wholesale rate.

Net metering supporters contend that these policies provide utilities with energy at peak times when energy is most valuable, reduce the need for transmission upgrades or new generation, and contribute to reliability and clean air goals.

Numerous state legislatures and public utility commissions are debating the best way to balance customer demand for distributed generation with the impacts new technologies have on the electric power grid, including exploring ways to assess the actual costs and benefits to the utility, the grid and all customers.

**Next Generation Approaches to Net Metering**

- In 2013, **California** passed legislation (**AB 327**) requiring the California Public Utilities Commission (CPUC) to create a successor tariff for net metering that will be effective when net metering is no longer available. According to the bill, investor-owned utilities with more than 100,000 service connections are required to make net metering available until the utilities reach their net metering capacity or until July 1, 2017. The legislation assigned program limits for the state’s three major utilities based on generating capacity. Once programs reach their determined limits or beginning July 1, 2017, utilities must offer distributed generation customers a standard contract or tariff that is to be determined by the California Public Utility Commission. In accordance with this legislation, the CPUC made a decision in January 2016 to preserve the retail rate credit through 2019 and preserve net metering for existing customers for 20 years after their interconnection. The decision also requires customers under the net metering successor tariff to pay an interconnection fee and non-bypassable charges for all electricity consumed from the grid and to transition to a time-of-use rate. The state also enacted **Senate Bill 43** in 2013, which authorized virtual net metering (see “Shared Renewable Energy” above).

- In 2015, the **Hawaii** Public Utilities Commission issued a ruling that ended conventional net metering. While regulators grandfathered in existing net metering customers and allowed them to continue with conventional net metering, all new net metering customers after Oct. 12, 2015 are required to choose between a “Grid-Supply” and a “Self-Supply” option. The Grid-Supply option functions like conventional net metering, however customers are compensated at the reduced, wholesale rate for excess electricity sent to the grid. Customers under the Self-Supply option are not allowed to export excess electricity to the grid, however, they are allowed to use energy storage devices to decrease their electricity consumption from the grid and reduce their electricity bill. Self-Supply customers are also eligible for an expedited review and approval of their systems. Under the Self-Supply option, residential customers are required to pay a minimum bill of $25 per month and small commercial customers are required to pay a minimum bill of $50 per month.

- **Minnesota** enacted legislation in 2013 (**House File 729**) requiring the Minnesota Department of Commerce to develop a “value of solar” methodology for the Minnesota Public Utilities Commission (PUC). The tariff will serve as a voluntary alternative to net metering. The Department of Commerce was required to submit a final methodology in January 2014 to the PUC and the PUC approved the tariff in April 2014 (see “Value of Solar” above). The legislation also authorized community solar gardens (see “Community Net Metering” above) and the value of solar is applied to community solar garden customers.
In 2014, **New York** created the Reforming the Energy Vision (REV) plan, which will serve as a state-wide, comprehensive roadmap for building a clean, resilient and affordable energy system. One of the New York REV’s seven initiatives is renewable energy. This arm is focused on supporting a broad range of renewable options, including rooftop solar and grid-scale wind farms, and integrating distributed energy resources into the grid. Additionally, in 2015, the New York Public Service Commission (PSC) denied petitions from two utilities to stop offering net metering once the state’s six percent net metering cap was met. The PSC requires all New York utilities to continue to accept applications for net metering until net metering is addressed as a part of REV.

**Notable Policy and Regulatory Developments**

Several states recently reviewed their existing net metering policies, either expanding or revising programs, or developing alternatives to net metering.

A number of state utility commissions have explored their net metering policies and capacity limits, including those listed below.

**Arizona**

For more than three years, Arizona has been debating net metering and how to compensate net metered customers. In November 2013, the Arizona Corporation Commission (ACC) authorized the Arizona Public Service Company (APS) to establish a monthly charge, roughly $5, for new rooftop solar panel installations connected to the electric grid through net metering, effective January 2014.

Additionally, in December 2014, the ACC approved APS and Tucson Electric Power (TEP) for utility-owned residential solar programs. During the next rate case, in April 2015, APS proposed increasing the grid-access charge for residential solar customers to $3 per kW ($21 per month), which APS withdrew in September, 2015. The ACC proceeded with a docket in June 2015 to evaluate the cost of service and the value of solar. The ACC was scheduled to provide evidence by June 2016, however the investigation is still on-going.

In February 2016, UniSource Energy Services (UES) filed a rate case proposing to raise rates for all customers, impose demand charges on rooftop solar customers and reduce the compensation under net metering. The Commission’s decision in August 2016 rejected these proposals, upheld the principle of grandfathering existing solar customers, avoided mandatory charges for solar customers and approved a basic service fee of $15, instead of the proposed $20. Additionally, the Commission’s ruling created an alternative to net metering, called the **renewable portfolio standard (RPS) credit**, for solar exports. The credit is separated into a series of decreasing allotments, or tranches, beginning at $0.11 per kilowatt-hour for the first tranche. New solar customers can lock in a 20-year contract at the going credit rate. The Commission delayed a decision regarding solar rates until after the value of solar docket concludes. APS and TEP also filed new rate cases in 2016, however the Commission will wait until after the Value of Solar docket concludes—likely in November, 2016—to offer rulings. Other utilities in state, including Salt River Project, have also been active in the state’s net metering debate.
Colorado

The Colorado Public Utilities Commission opened a docket in March 2014 to consider issues regarding retail renewable distributed generation and net metering. In August 2015, the Commission voted to preserve the current net metering rules and close the docket. In August, 2016, Colorado’s largest utility, Xcel Energy, signed onto an unprecedented settlement along with 26 other parties, including solar and consumer interest groups. The settlement will institute two voluntary pilot programs: a time-of-use rate trial that will charge customers more for the power they use during hours of peak demand, and a time-differentiated rate demand charge program that will base bills on customer’s monthly peak use of power. Additionally, the plan requires Xcel to add 225 MW of solar to its voluntary clean energy program between 2017 and 2019, and also to add 105 MW of new capacity to community solar gardens.

Nevada

In 2015, Nevada enacted legislation requiring the Nevada Public Utilities Commission to develop a new net metering tariff once the state’s net metering cap was reached. After the cap was reached in August 2015, Nevada regulators implemented a new solar tariff structure that reduced the compensation rate for the electricity sold to the grid from the retail rate to the avoided cost rate. The Nevada PUC did not allow existing net metering customers to continue with conventional net metering and applied the new tariffs to all net metering customers, becoming the first state to make such a move. Highly vocal protest from solar system owners and others lead to revisions of the ruling. In September, 2016, Nevada restored retail net metering for the more than 30,000 residential customers who applied for systems before 2016. Additionally, a state district court ruled against the PUC’s 2015 decision and sent the case back to the PUC, stating that customers were not given adequate notice of the change in rates. Governor Brian Sandoval also convened a task force to address the topic.

Additional Resources

- Database of State Incentives for Renewables and Efficiency, Net Metering (Raleigh, NC: North Carolina State University, 2016).
- North Carolina Clean Energy Technology Center, Rethinking Standby and Fixed Cost Charges: Regulatory and Rate Design Pathways to Deeper Solar Cost Reductions (Raleigh, NC: North Carolina State University, 2014).