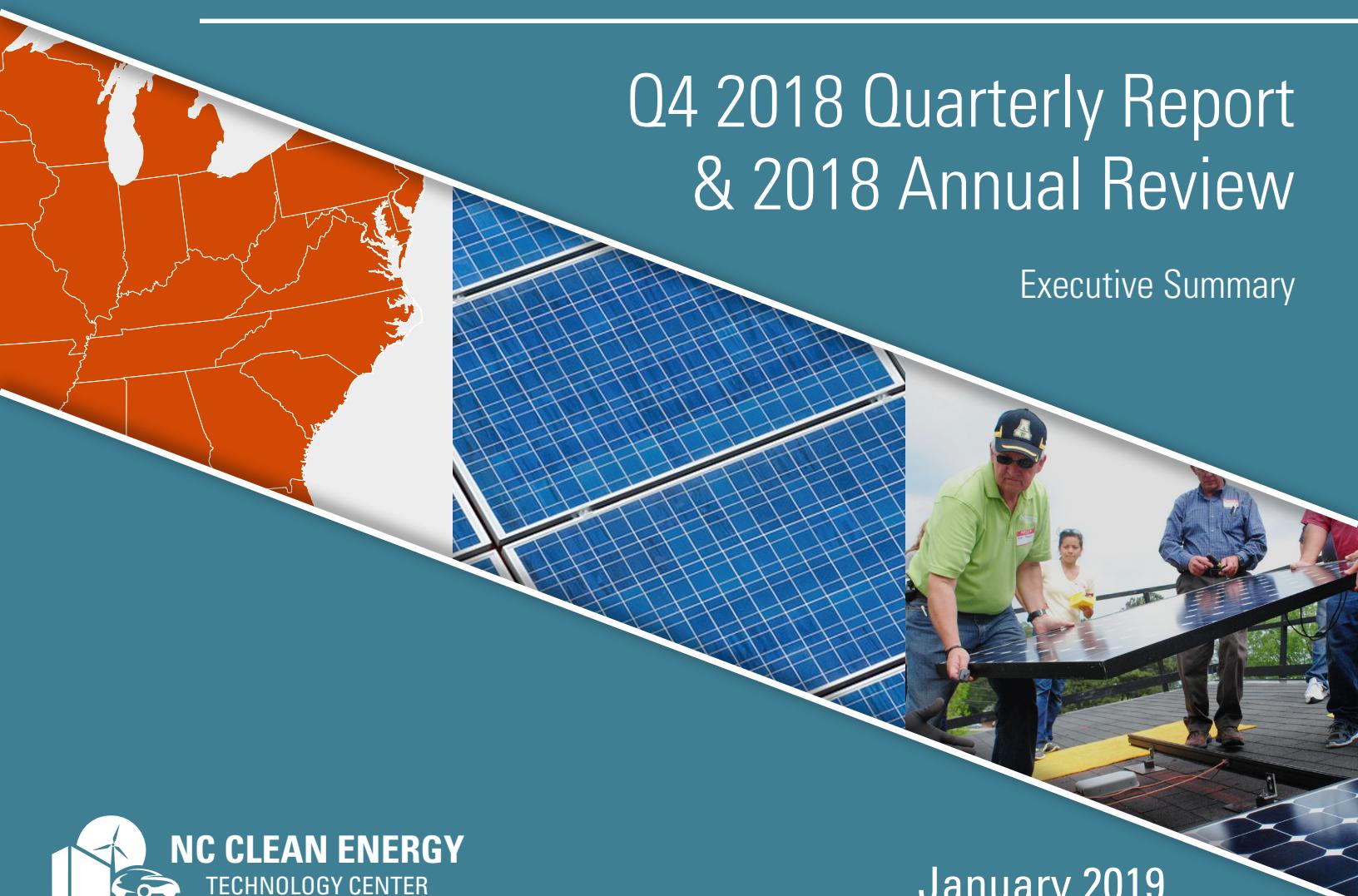


50 States of SOLAR

Q4 2018 Quarterly Report
& 2018 Annual Review

Executive Summary



NC CLEAN ENERGY
TECHNOLOGY CENTER

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The NC Clean Energy Technology Center is a UNC System-chartered Public Service Center administered by the College of Engineering at North Carolina State University. Its mission is to advance a sustainable energy economy by educating, demonstrating and providing support for clean energy technologies, practices, and policies. The Center provides service to the businesses and citizens of North Carolina and beyond relating to the development and adoption of clean energy technologies. Through its programs and activities, the Center envisions and seeks to promote the development and use of clean energy in ways that stimulate a sustainable economy while reducing dependence on foreign sources of energy and mitigating the environmental impacts of fossil fuel use.

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PREVIOUS EDITIONS

The 50 States of Solar is a quarterly publication. Previous executive summaries and older full editions of *The 50 States of Solar* are available [here](#).

The NC Clean Energy Technology Center also publishes the *50 States of Grid Modernization* and the *50 States of Electric Vehicles* on a quarterly basis. Executive summaries of these reports may be found [here](#). Please contact us for older issues of the 50 States of Solar.

ABOUT THE REPORT

PURPOSE

The purpose of this report is to provide state lawmakers and regulators, electric utilities, the solar industry, and other energy stakeholders with timely, accurate, and unbiased updates on state actions to study, adopt, implement, amend, or discontinue policies associated with distributed solar photovoltaics (PV). This report catalogs proposed and enacted legislative, regulatory policy, and rate design changes affecting the value proposition of distributed solar PV during the most recent quarter, with an emphasis on the residential sector.

The 50 States of Solar series provides regular quarterly updates of solar policy developments, keeping stakeholders informed and up to date on a timely basis.

APPROACH

The authors identified relevant policy changes through state utility commission docket searches, legislative bill searches, popular press, and direct communication with stakeholders and regulators in the industry.

Questions Addressed

This report addresses several questions about the changing U.S. solar policy landscape:

- How are (1) state legislatures and regulatory authorities and (2) electric utilities addressing fast-growing markets for distributed solar PV?
- What changes to traditional rate design features and net metering policies are being proposed, approved, and implemented?
- Where are distributed solar markets potentially affected by policy or regulatory decisions on community solar, third-party solar ownership, and utility-led residential rooftop solar programs?

Actions Included

This report series focuses on cataloging and describing important proposed and adopted policy changes affecting solar customer-generators of investor-owned utilities (IOUs) and large publicly-owned or nonprofit utilities (i.e., those serving at least 100,000 customers). Specifically, actions tracked in these reports include:

- Significant changes to state or utility **net metering** laws and rules, including program caps, system size limits, meter aggregation rules, and compensation rates for net excess generation
- Changes to statewide **community solar** or **virtual net metering** laws and rules, and individual utility-sponsored community solar programs arising from statewide legislation
- Legislative or regulatory-led efforts to study the **value of solar, net metering**, or **distributed solar generation policy**, e.g., through a regulatory docket or a cost-benefit analysis
- Actions related to **charges applicable only to customers with solar PV** or other types of distributed generation, such as added monthly fixed charges, demand charges, stand-by charges, or interconnection fees
- Utility-initiated rate requests that propose a 10% or larger increase in either **fixed charges** or **minimum bills** for all residential customers
- Changes to the legality of **third-party solar ownership**, including solar leasing and solar third-party solar power purchase agreements (PPAs), and proposed **utility-led rooftop solar** programs

In general, this report considers an “action” to be a relevant (1) legislative bill that has been passed by at least one chamber or (2) a regulatory docket, utility rate case, or rulemaking proceeding. Introduced legislation related to third-party sales is included irrespective of whether it has passed at least one chamber, as only a small number of bills related to this policy have been introduced. Introduced legislation pertaining to a regulatory proceeding covered in this report is also included irrespective of whether it has passed at least one chamber.

Actions Excluded

In addition to excluding most legislation that has been introduced but not advanced, this report excludes a review of state actions pertaining to solar incentives, as well as more general utility cost recovery and rate design changes, such as decoupling or time-of-use tariffs. General changes in state implementation of the Public Utility Regulatory Policies Act of 1978 and subsequent amendments, including changes to the terms of standard contracts for Qualifying Facilities or avoided cost rate calculations, are also excluded unless specifically related to the policies described above. The report also does not cover changes to a number of other policies that affect distributed solar, including solar access laws, interconnection rules, and renewable portfolio standards. Details and updates on these and other federal, state, and local government policies and incentives are available in the NC Clean Energy Technology Center’s Database of State Incentives for Renewables and Efficiency, at www.dsireusa.org.

EXECUTIVE SUMMARY

2018 SOLAR POLICY ACTION

State and utility solar policies continued to undergo review in 2018, with nearly every state in the country considering policy or rate design changes – a trend which is likely to continue through 2019 and beyond. Table 1 provides a summary of state actions related to DG compensation, rate design, and solar ownership during 2018. Of the 264 actions catalogued, the most common were related to residential fixed charge and minimum bill increases (77), DG compensation policies (71), and community solar policies (39). The actions occurred across 47 states plus DC in 2018 (Figure 1). The states that saw the most solar policy action, or the most impactful actions, during 2018 are highlighted below.

Table 1. 2018 Summary of Policy Actions

Policy Type	# of Actions	% by Type	# of States
Residential fixed charge or minimum bill increase	77	30%	36
DG compensation policies	71	27%	33 + DC
Community solar	39	15%	19 + DC
Solar valuation or net metering study	31	12%	20 + DC
Residential demand or solar charge	23	9%	8 + DC
Third-party ownership of solar	14	5%	6 + DC
Utility-led rooftop PV programs	9	3%	8
Total	264	100%	47 States + DC

Note: The "# of States/ Districts" total is not the sum of the rows, as some states have multiple actions. Percentages are rounded and may not add up to 100%.

TOP TEN MOST ACTIVE STATES OF 2018

While nearly every state in the country took some type of action on distributed solar policy or rate design during 2018, some states were particularly active, taking many different actions or especially impactful actions. The following states stood out in 2018 for their solar policy activity:

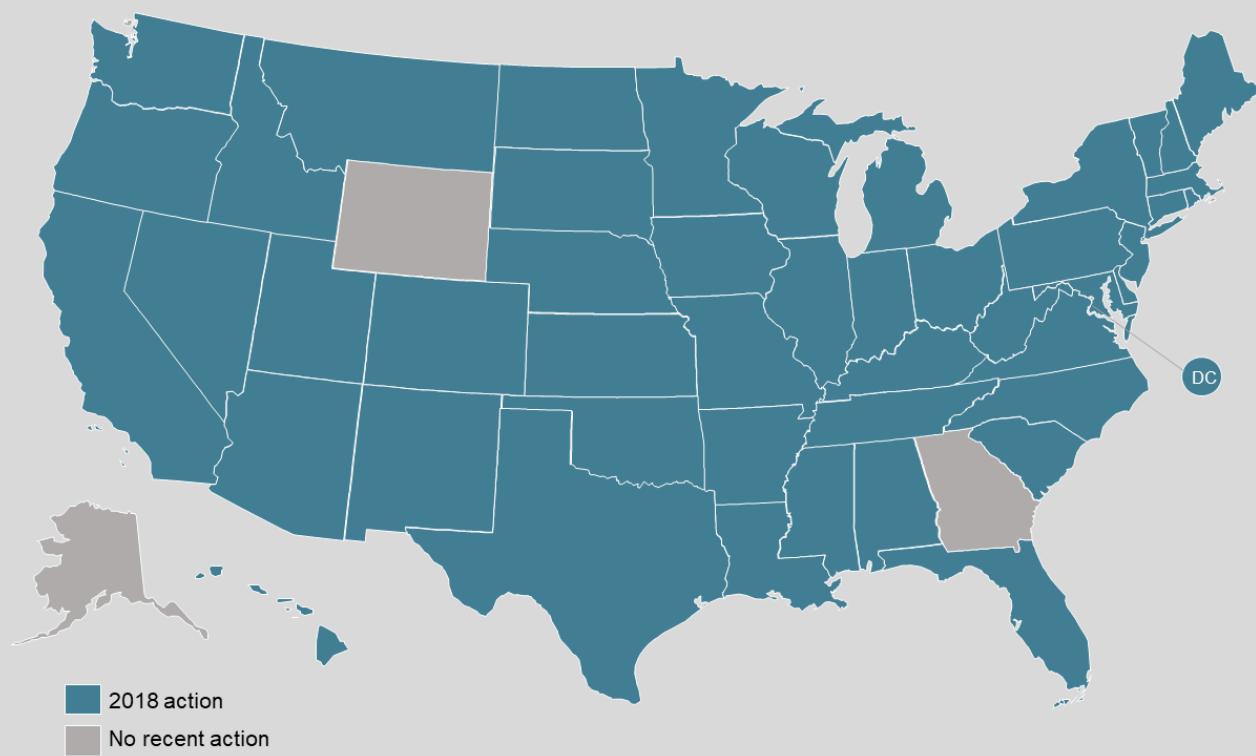
1. Michigan

The Michigan Public Service Commission approved a net metering successor tariff in 2018, which will move the state to an “inflow/outflow” compensation structure, with exported energy being credited at either the locational marginal price or power supply rate. The change is currently being implemented in DTE’s and UPPCO’s general rate cases, with the utilities both also proposing additional fees based on distributed generation system capacity.

2. South Carolina

South Carolina legislators considered bills addressing the state's aggregate cap on net metering and a successor tariff, although the proposals did not move forward. Later in the year, Duke Energy announced that it reached the aggregate cap and would be closing net metering to new customers. Duke Energy and stakeholders later reached an agreement that keeps net metering open until March 2019. Duke Energy Carolinas and Duke Energy Progress also filed general rate cases in 2018, with proposals to increase their residential fixed charges to \$28.00 and \$29.00.

Figure 1. 2018 Action on Net Metering, Rate Design, & Solar Ownership Policies



3. New York

The New York Public Service Commission continued to consider refinements to its Value of Distributed Energy Resources tariff and approved a "Hybrid Tariff" in late 2018 for solar facilities paired with energy storage. The Commission also considered options to increase low-income participation in the Community Distributed Generation program and approved a reduction in Central Hudson Gas & Electric's residential fixed charge.

4. Massachusetts

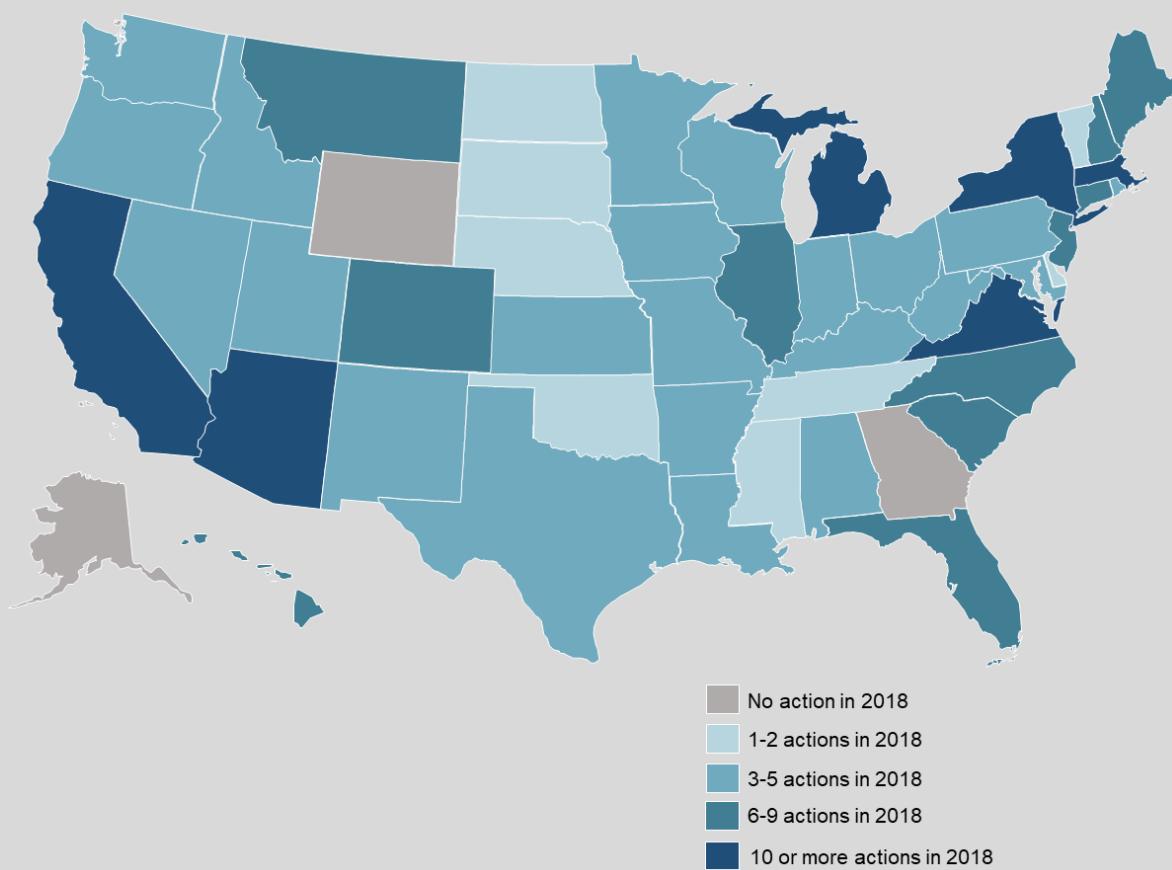
Massachusetts regulators approved the first mandatory demand charge for residential distributed generation customers of an investor-owned utility in early 2018. The charge was part of

Eversource's Monthly Minimum Reliability Contribution (MMRC). However, legislation enacted later in the year rendered the design of this demand charge no longer permissible. In November 2018, National Grid proposed an MMRC, with the charge taking the form of a fixed fee.

5. Arizona

The Arizona Corporation Commission issued a decision on Tucson Electric Power's and UNS Electric's distributed generation rate design proposals in 2018, approving initial export rates of 9.64 cents per kWh and 11.5 cents per kWh, respectively, while rejecting the additional fees put forward by the utilities. Later in the year, Salt River Project proposed two new rate options for distributed solar customers, including one without a demand charge component.

Figure 2. 2018 Solar Policy & Rate Design Action, by Number of Actions



6. Connecticut

The Connecticut General Assembly enacted legislation in 2018 creating a new shared clean energy program and requiring a transition to a net metering successor tariff, in addition to

increasing the state's renewable portfolio standard. The Public Utilities Regulatory Authority opened proceedings to implement the legislation and is also conducting a broad review of distribution system issues.

7. Maine

Maine's Governor vetoed proposed legislation making substantial changes to the state's new solar compensation policy in 2018. The Public Utilities Commission approved significant changes to the policy, though, first amending the date of implementation and later addressing metering costs and restoring traditional net metering for medium and large non-residential customers. The Commission also considered general rate cases from Emera and Central Maine Power.

8. New Jersey

In 2018, New Jersey became the 19th state to adopt a community solar policy with the enactment of A.B. 3723. The Board of Utilities worked to establish many of the program details throughout the remainder of the year. A.B. 3723 also increased the aggregate cap on net metering and enabled public entities to host remote net metering projects. The Board also considered general rate cases from Atlantic City Electric and PSE&G New Jersey.

9. Virginia

Legislation enacted early in 2018 initiated a stakeholder process to consider changes to the state's net metering and community solar programs, and the group's facilitator published a final report later in the year. The Virginia General Assembly also considered legislation related to third-party power purchase agreements, and the State Corporation Commission approved net metering rule changes related to small agricultural generators and meter aggregation.

10. Montana

NorthWestern Energy published its net metering cost-benefit study in 2018, finding a cost shift from net metering to non-net metering customers. Later in the year, NorthWestern Energy filed a general rate case, including a proposal to place residential net metering customers into a separate customer class and apply a demand charge to these customers. NorthWestern Energy also held a series of workshops throughout 2018 as part of its Customer Vision stakeholder process.

TOP SOLAR POLICY TRENDS OF 2018

Compensation Frameworks and Program Designs Growing Increasingly Complex

A record number of states considered net metering changes in 2018, with compensation structures becoming increasingly complex. Some programs feature separate rates for energy imports and exports, while others include time-varying rates, value-based rates, and locational components. Some community solar programs are also adopting more complex credit structures.

States Expanding Opportunities for Low-Income Customer Participation in Community Solar Programs

Much of the community solar activity occurring in 2018 focused on expanding opportunities for low-income customers to participate in these programs. New community solar rules in Connecticut and New Jersey include provisions to encourage low-income participation, while states with existing programs, such as Colorado and New York, considered changes to increase the number of low-income subscribers.

Policymakers and Regulators Authorizing Solar-Plus-Storage Net Metering

A growing number of states are considering the net metering eligibility of solar facilities paired with energy storage. In 2018, New York approved a tariff with multiple compensation options for systems paired with energy storage, and a proposed decision in California establishes equipment requirements for larger solar-plus-storage facilities to participate in net metering. Legislation enacted in Colorado also permits solar-plus-storage projects to net meter, and the Massachusetts Department of Public Utilities is currently considering the issue.

Regulators Approving Residential Demand Charges for Distributed Solar Customers

Until 2018, investor-owned utilities' requests to adopt mandatory demand charges for residential solar customers were continually denied. However, regulators approved three utilities' (Kansas City Power & Light – KS, Westar Energy – KS, and Eversource – MA) residential demand charge proposals in 2018. The Massachusetts General Assembly enacted legislation creating new requirements for demand charges, though, effectively repealing Eversource's charge.

Companies Seeking Clarity on Solar Leasing Legality

Although solar leases are commonly used in many states, the legal status of solar leasing is still unclear in some states. In 2018, solar companies filed petitions for declaratory rulings on the legality of their residential solar equipment leases in Florida and Wisconsin. The Florida Public Service Commission approved two companies' leasing agreements, while a decision is pending in Wisconsin.

Requests to Significantly Increase Residential Fixed Charges Slowing

Since 2016, the number of investor-owned and large public power utilities proposing residential fixed charge increases of at least 10% has steadily declined. In 2016, 47 utilities filed such requests, while this number dropped to 41 in 2017 and 34 in 2018. The median increase requested has also decreased since 2016. Among proposals filed in 2016, the median requested increase was \$4.07, while the median request was \$4.00 in 2017 and \$3.87 in 2018.

Solar Policies Being Addressed Within the Broader Scope of Grid Modernization

States are increasingly taking a more holistic view to energy policy discussions, with several states considering solar policy issues as part of expansive grid modernization proceedings. For example, Arkansas, Colorado, Illinois, Maryland, and New York are considering distributed solar as part of their grid modernization efforts. Furthermore, states are often considering policies applicable to distributed energy resources more broadly, rather than considering solar exclusively.

Mixed Decisions on Separate Customer Classes for Distributed Generation Customers

Several states and utilities are considering the option of placing distributed generation customers into a separate customer class. Regulators are reaching mixed decisions on this concept, though, with Idaho and Kansas regulators approving requests from Idaho Power and Kansas City Power & Light for a separate customer class, and the Iowa Utilities Board rejecting Interstate Power & Light's proposal. The Michigan Public Service Commission also determined, in its April 2018 net metering decision, that a separate customer class was not warranted.

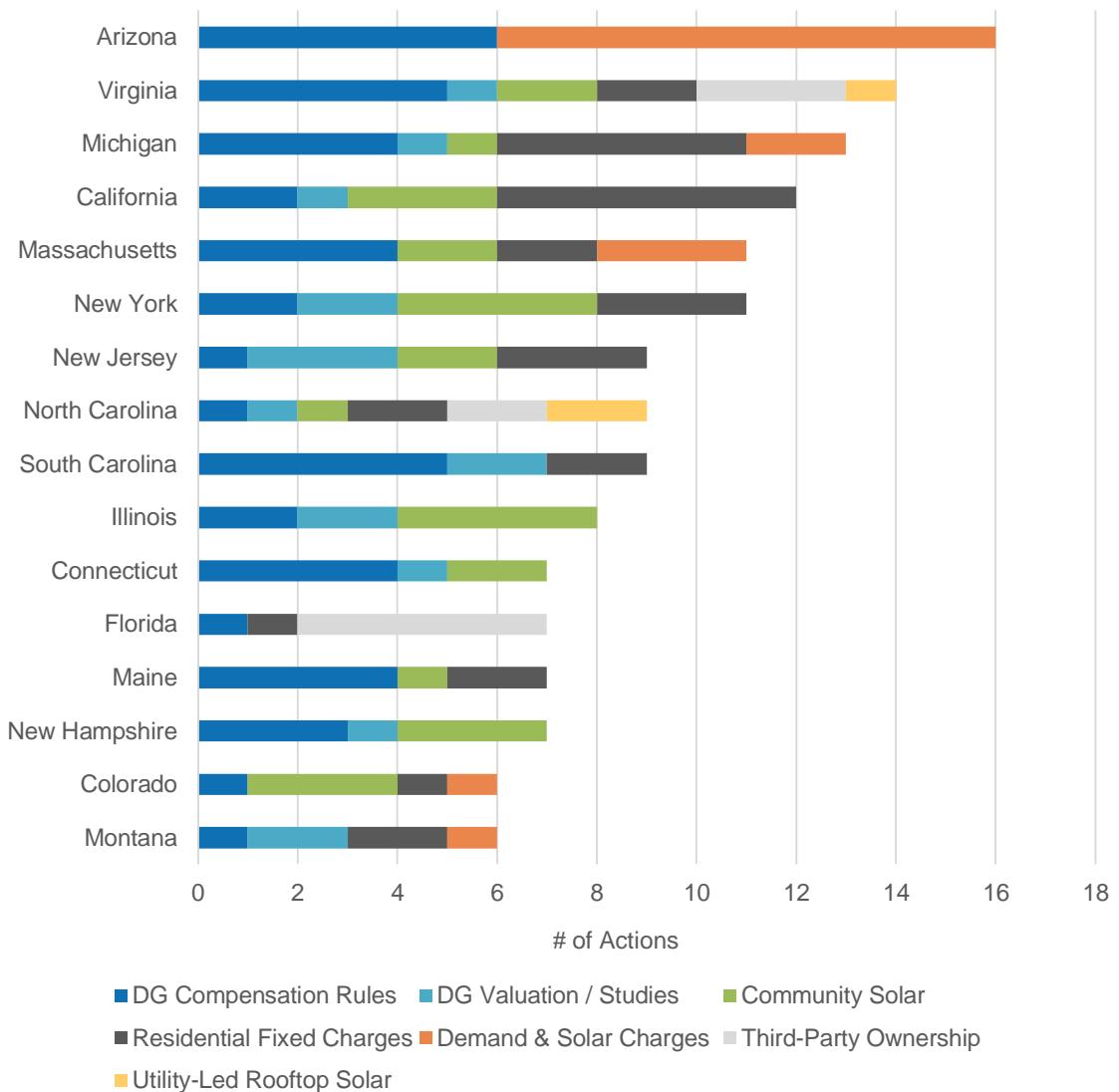
Increasing Customer Choice in Distributed Generation Rate Options

Several states and utilities are creating multiple compensation and rate options for distributed solar customers to choose from. In Massachusetts, the new Alternative On-Bill Credit mechanism provides an alternative to net metering. In Arizona, Salt River Project proposed two new rate options for solar customers, including a demand charge free option. Arizona and Maryland are rolling out pilots featuring time-varying credit rates, and New York's new hybrid tariff for facilities paired with storage includes four compensation options.

Exploring the Locational Value of Distributed Generation

In 2018, several states made efforts to determine the locational value of distributed generation, with the goal of eventually incorporating locational value into compensation frameworks. Regulators in Missouri, Nevada, and Washington considered distribution system planning rules addressing locational value, and the New Hampshire Public Utilities Commission decided to undertake a distribution-level locational value study. United Illuminating in Connecticut also rolled out a pilot program providing an adder for distributed resources on particular circuits.

Figure 3. Most Active States of 2018, by Type of Action

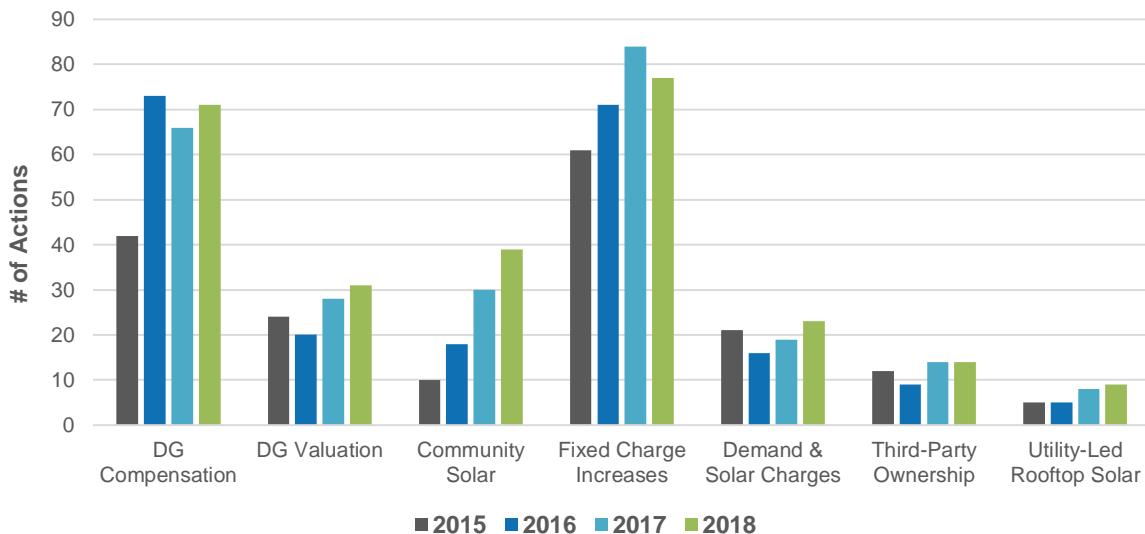


LOOKING BACK: 2015 - 2018

Distributed solar policy action has steadily increased over the past few years, with states and utilities taking approximately 175 actions in 2015, 212 actions in 2016, 249 actions in 2017, and 264 actions in 2018. Figure 4 shows the total number of solar policy actions taken in each year, by category, while Figure 5 displays the number of states taking action in each category. Note that several actions were considered over multiple years.

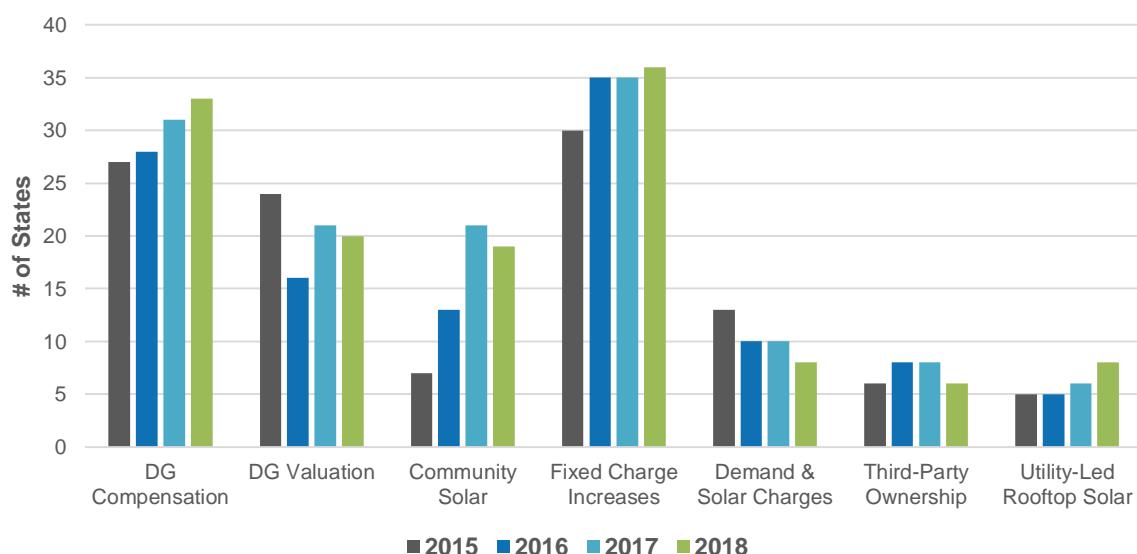
In 2018, activity increased in most categories. There was a slight decline in proposals to increase residential fixed charges by at least 10%, while actions related to third-party ownership held constant from 2017. Community solar is the only category showing a consistent increase in actions from 2015 to 2018.

Figure 4. Number of Solar Policy Actions 2015-2018



Distributed generation compensation is the only category showing a consistent increase in the number of states taking action from 2015 to 2018, with consideration of net metering successor tariffs, in particular, spreading to new states. The number of states considering demand and solar charges declined in 2018, although the number of actions increased. This is largely attributable to the high number of proposals under consideration from three Arizona utilities, Tucson Electric Power, Salt River Project, and UNS Electric. Although the number of states where utilities proposed significant increases in residential fixed charges grew, the number of new proposals filed in 2018 declined from previous years.

Figure 5. Number of States Taking Solar Policy Action 2015-2018



OVERVIEW OF Q4 2018 POLICY CHANGES

In the fourth quarter of 2018, 43 states plus DC took a total of 152 actions related to distributed solar policy and rate design (Figure 6). Table 2 provides a summary of state actions related to DG compensation, rate design, and solar ownership during Q4 2018. Of the 152 actions catalogued, the most common were related to residential fixed charge and minimum bill increases (41), followed by DG compensation rules (39), and community solar (29).

Table 2. Q4 2018 Summary of Policy Actions

Policy Type	# of Actions	% by Type	# of States
Residential fixed charge or minimum bill increase	41	27%	24
DG compensation rules	39	26%	25 + DC
Community solar	29	19%	16 + DC
DG valuation or net metering study	21	14%	17
Residential demand or solar charge	13	9%	7
Utility-led rooftop PV programs	5	3%	5
Third-party ownership of solar	3	2%	3
Total	152	100%	43 States + DC

Note: The "# of States/ Districts" total is not the sum of the rows, as some states have multiple actions. Percentages are rounded and may not add up to 100%.

TOP FIVE SOLAR POLICY DEVELOPMENTS OF Q4 2018

Five of the quarter's top policy developments are highlighted below.

Maine PUC Restores Net Metering for Medium and Large Customers

In December 2018, the Maine Public Utilities Commission (PUC) exempted medium and large non-residential customer-generators from the gross metering provisions of the state's new distributed generation compensation rules. The PUC found that the cost of installing a second meter to implement the gross metering provisions is not justified for these customers, due to the demand charge component of their bills.

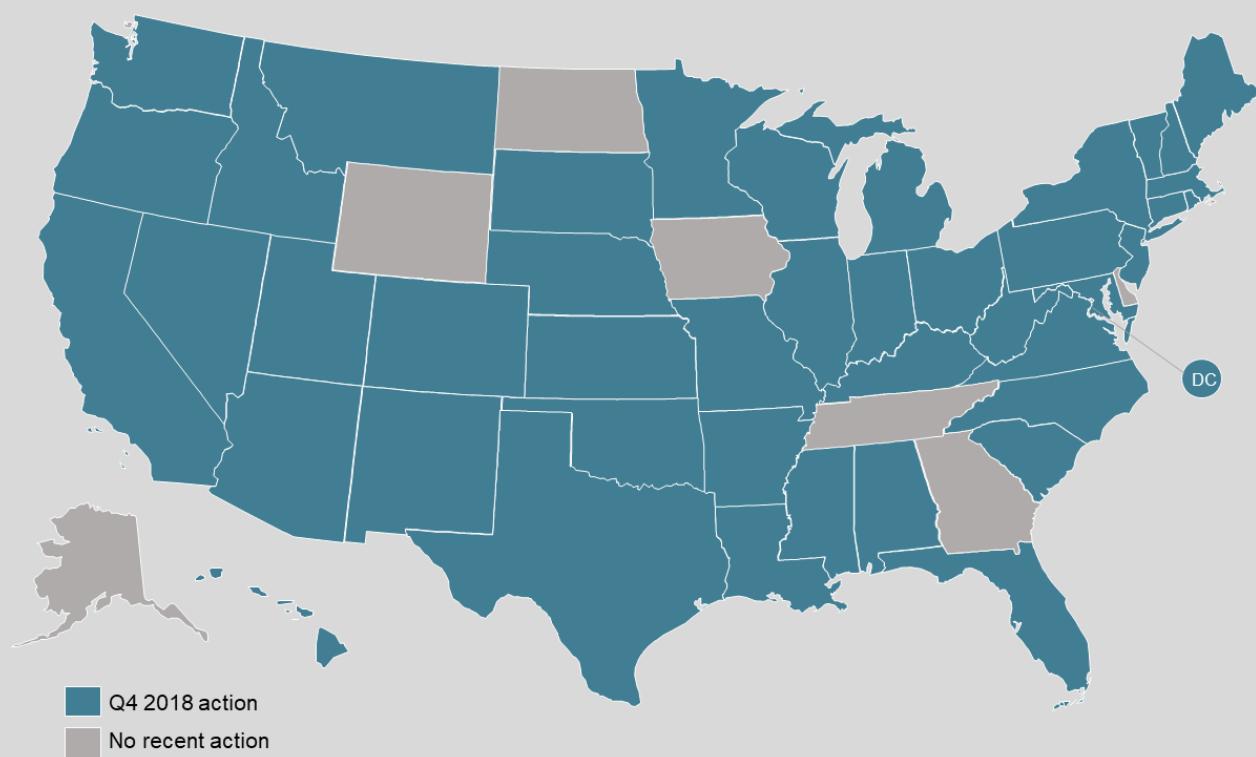
Wisconsin Regulators Consider Residential Solar Leasing

In December 2018, Sunrun filed a request for a declaratory ruling on the legality of its residential solar equipment lease. Currently, the legality of solar leasing and third-party power purchase agreements is unclear in Wisconsin. In 2017, the Public Service Commission determined that the issue of third-party power purchase agreements would be better addressed by the state legislature.

New York PSC Approves Compensation Tariff for Solar-Plus-Storage Systems

The New York Public Service Commission approved a new “Hybrid Tariff” for customers with value stack eligible generators that are paired with energy storage. The Hybrid Tariff includes four options based on different usage models and distinguishes between renewable and non-renewable energy injected into the grid, so that renewable energy injections may receive compensation for environmental benefits.

Figure 6. Q4 2018 Action on DG Compensation, Rate Design, & Solar Ownership Policies



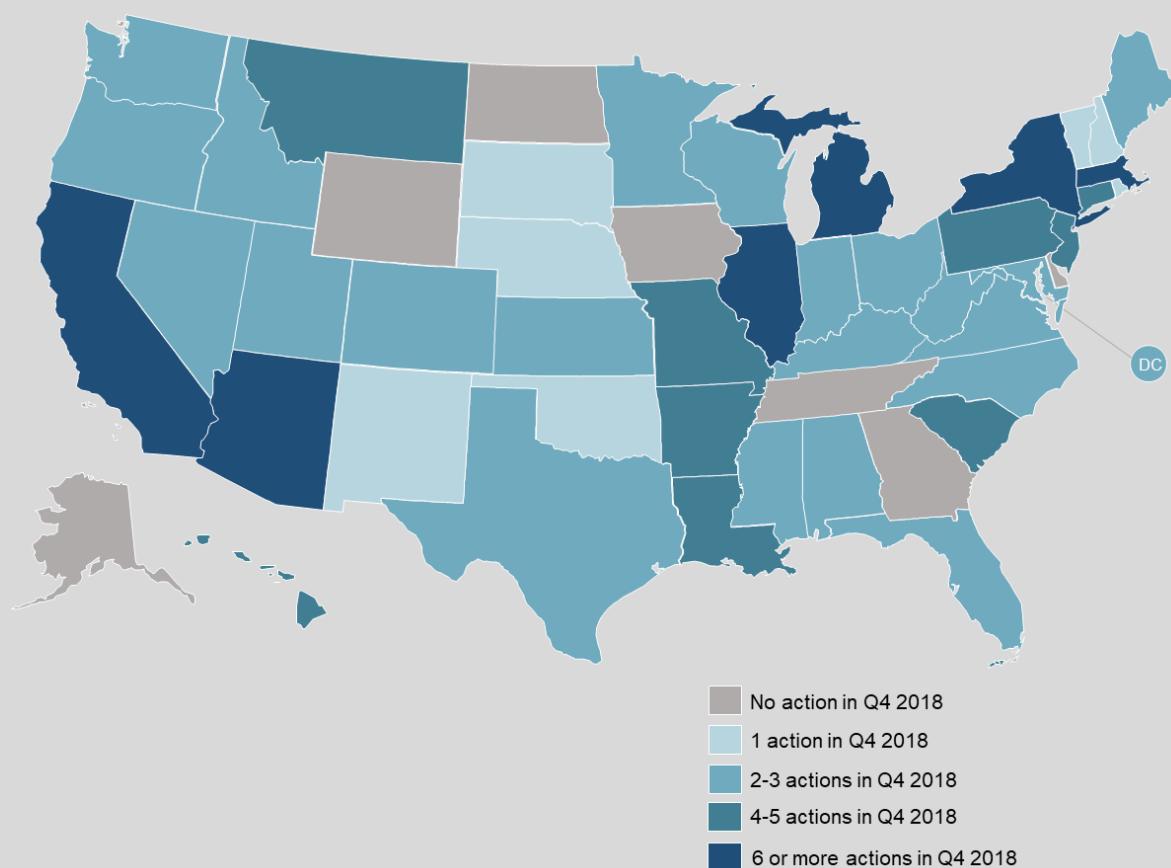
Kansas Regulators Approve Mandatory Demand Charge for KCP&L Residential DG Customers

The Kansas Corporation Commission approved Kansas City Power & Light’s request to implement a mandatory demand charge of \$9.00 per kW (summer) / \$2.00 per kW (winter) for residential distributed generation customers in December 2018. This is the third mandatory residential solar customer demand charge approved in 2018, although Eversource’s charge has since been overturned by legislation enacted in August.

Salt River Project Proposes New Rate Options for Customer-Generators

Salt River Project, a large municipal utility in Arizona, proposed two new rate options for customer-generators in December 2018. Currently customer-generators are required to pay a demand charge based on maximum monthly demand during system peak hours. One of the new options includes a demand charge based on an average of daily demand, while the other option does not include a demand charge, but provides a reduced credit rate for energy delivered to the grid.

Figure 7. Q4 2018 Action on Solar Policy & Rate Design, by Number of Actions



FULL REPORT DETAILS & PRICING

FULL REPORT DETAILS

Content Included in the Full Quarterly Report:

- Detailed policy tables describing each pending and recently decided state and utility action regarding:
 - Net Metering
 - Distributed Solar or DG Valuation
 - Community Solar
 - Residential Fixed Charge and Minimum Bill Increases
 - Residential Solar Charges (Demand Charges, Standby Charges, & Grid Access Charges)
 - Third-Party Ownership
 - Utility-Led Rooftop Solar
- Links to original legislation, dockets, and commission orders for each policy action
- Summary maps of action for each policy category above
- Excel spreadsheet file of all actions taken during the quarter and separate Powerpoint file of all summary maps available upon request
- Qualitative analysis and descriptive summaries of solar policy action and trends
- Outlook of action for the next quarter

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The 50 States of Solar allows those involved in the solar and electric utility industry to easily stay on top of legislative and regulatory changes. The report provides a comprehensive quarterly review of actions, an undertaking that would take any one business or organization weeks of time and thousands of dollars in staff time. At a cost of \$500 per issue (or \$1,500 annually), the 50 States of Solar offers an invaluable time and financial savings. With direct links to original sources for all actions, customers may stay on top of legislative and regulatory developments between quarterly reports.

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- Identify new market opportunities, as well as changing and risky markets
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- Give your own team a head start in tracking legislative and regulatory proceedings

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- Learn about the approaches being taken by other utilities facing similar challenges
- Stay on top of relevant state policy developments
- Utilize an objective source of information in legislative and regulatory proceedings

Investors and Financial Analysts

- Identify new investment opportunities and emerging areas of growth, as well as risky investments
- Access rate data that is often buried in regulatory filings

Advocacy Organizations

- Learn about the diverse solar policy and rate proposals in other states
- Learn about the outcomes of other state's policy and rate decisions
- Utilize an objective source of information in legislative and regulatory proceedings

Researchers and Consultants

- Access valuable data requiring an immense amount of time to collect first-hand
- Identify research needs to inform solar policy and rate design proceedings
- Cite an objective source in your own research and analysis

PRICING

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All-Tech Subscription <i>(Includes 50 States of Solar report, 50 States of Grid Modernization report, & 50 States of Electric Vehicles report; plus biweekly legislative & regulatory tracking; policy data sheets, & quarterly webinars for solar, grid modernization/energy storage, & electric vehicles)</i>	\$10,500	N/A

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