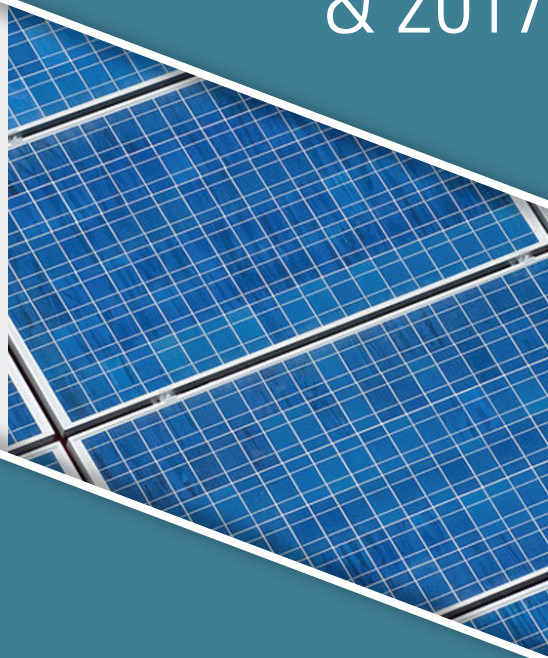


50 States of SOLAR

Q4 2017 Quarterly Report & 2017 Annual Review

Executive Summary



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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:

- [Q3 2017 Executive Summary](#)
- [Q2 2017 Executive Summary](#)
- [Q1 2017 Executive Summary](#)
- [Q4 2016 and 2016 Policy Review – Executive Summary](#)
- [Q3 2016 Executive Summary](#)
- [Q2 2016](#)
- [Q1 2016](#)
- [Q4 2015 and 2015 Policy Review](#)
- [Q3 2015](#)
- [Q2 2015](#)
- [Q1 2015](#)
- [Q4 2014](#)

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 catalogues 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 cataloguing 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
- Utility-initiated rate requests for **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

2017 SOLAR POLICY ACTION

State and utility solar policies continued to undergo review in 2017, with nearly every state in the country considering policy or rate design changes – a trend which is likely to continue through 2018 and beyond. Table 1 provides a summary of state actions related to DG compensation, rate design, and solar ownership during 2017. Of the 249 actions catalogued, the most common were related to residential fixed charge and minimum bill increases (84), DG compensation policies (66), and community solar policies (30). The actions occurred across 45 states plus DC in 2017 (Figure 1). The states that saw the most solar policy action, or the most impactful actions, during 2017 are highlighted below.

Table 1. 2017 Summary of Policy Actions

Policy Type	# of Actions	% by Type	# of States
Residential fixed charge or minimum bill increase	84	34%	35 + DC
DG compensation policies	66	27%	31 + DC
Community solar	30	12%	21
Solar valuation or net metering study	28	11%	21 + DC
Residential demand or solar charge	19	8%	10
Third-party ownership of solar	14	6%	8
Utility-led rooftop PV programs	8	3%	6
Total	249	100%	45 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 2017

While nearly every state in the country took some type of action on distributed solar policy or rate design during 2017, some states were particularly active, taking many different actions or especially impactful actions. The following states stood out in 2017 for their solar policy activity:

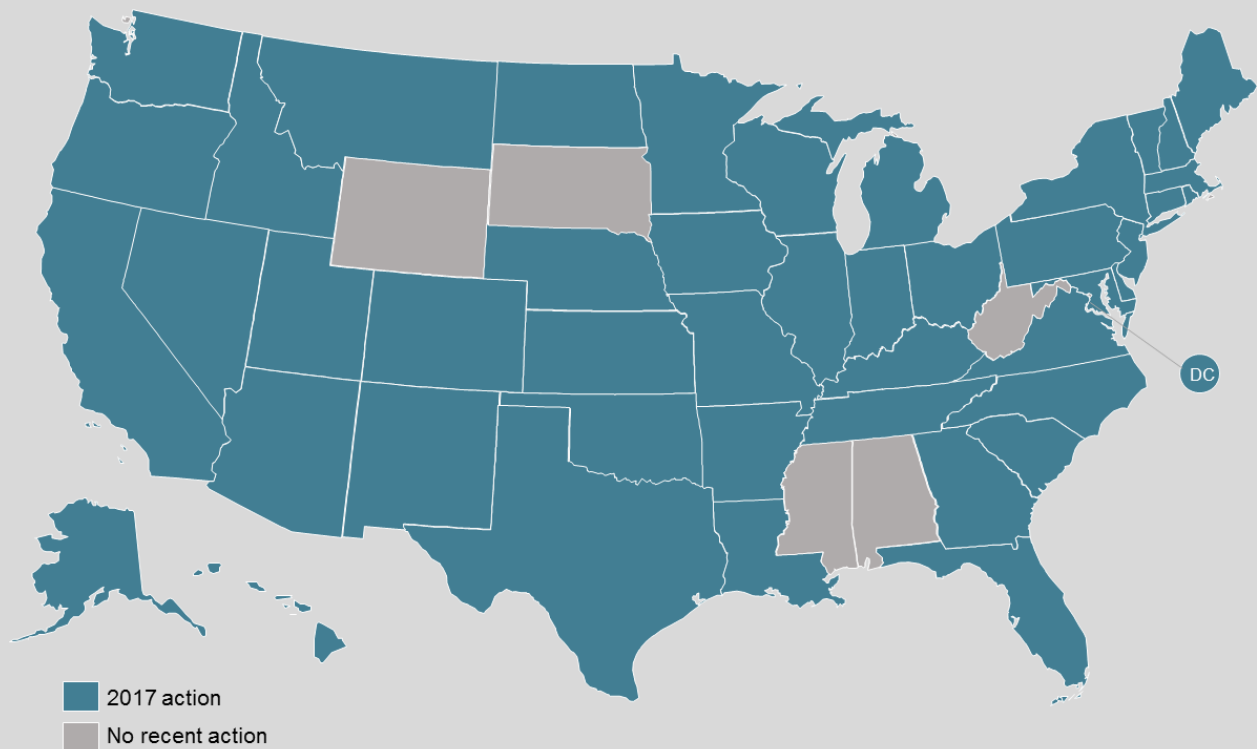
1. Nevada

A high level of solar policy action continued to take place in Nevada through 2017. The year began with debate over the Public Utilities Commission’s decision to restore retail net metering for a limited amount of capacity in Sierra Pacific Power territory, and was followed by major legislation restoring retail rate net metering across the state. Furthermore, regulators decided to reduce Nevada Power’s residential fixed charge, following the utility’s request for an increase.

2. North Carolina

Governor Cooper signed H.B. 589 into law in July 2017, making a suite of changes to the state's solar policies. In addition to major PURPA reforms, the bill initiated a net metering cost-benefit study and opens the door to net metering rate changes. The bill also created a community solar program and legalized solar leasing in the state for both utilities and third parties. In addition to these changes, the state's two largest utilities filed general rate cases including fixed charge increases.

Figure 1. 2017 Action on Net Metering, Rate Design, & Solar Ownership Policies



3. New York

A major order was issued in New York's ongoing Reforming the Energy Vision process in March 2017, adopting a value-based compensation structure for distributed energy resources. The new compensation structure is being phased in, while further value stack and rate design changes are being considered. An order was also issued related to utility-owned solar, and Central Hudson Gas & Electric and Penelec have requests pending for fixed charge increases.

4. Hawaii

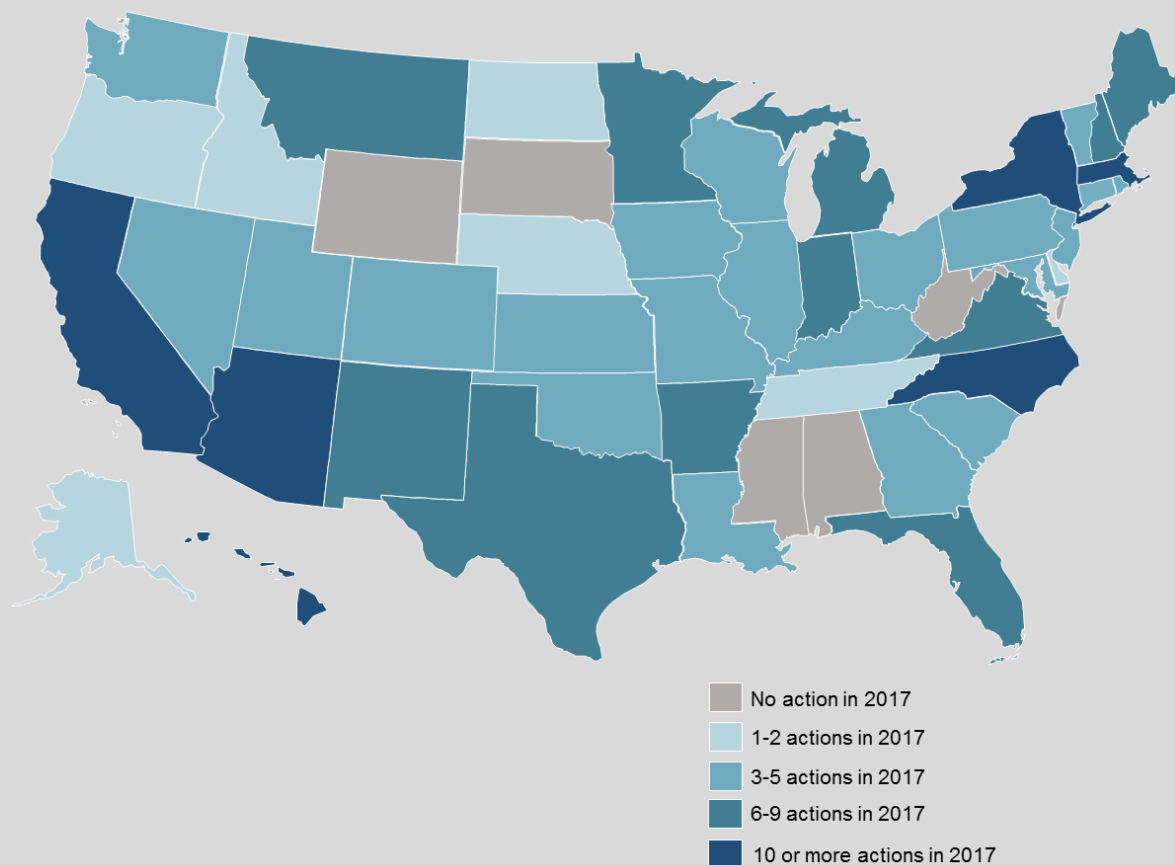
The Hawaii Public Utilities Commission approved revisions to its net metering successor tariffs during 2017, creating a new "smart export" option to encourage solar-plus-storage. The

Commission also adopted final rules for its community solar program late in the year. General rate cases, including proposed fixed charge increases, for the state's three investor-owned utilities were pending during the year.

5. Maine

After compromise legislation was vetoed in 2016, the Public Utilities Commission (PUC) adopted new DG compensation rules in 2017, which move from net metering to a buy-all, sell-all framework with a phase-down in the credit rate. Legislation was again proposed in the 2017 session to restore net metering and initiate a value of solar investigation, but the bill was also vetoed. Finally, late in the year, the PUC delayed implementation of the new rules until May 2018, and Emera Maine filed a general rate case, including a fixed charge increase.

Figure 2. 2017 Solar Policy & Rate Design Action, by Number of Actions



6. Arizona

Following a late 2016 decision from the Arizona Corporation Commission to move from net metering to a net billing policy with avoided cost crediting, initial credit rates and distributed generation customer rate design were considered in utility-specific proceedings during 2017. A settlement agreement was reached in Arizona Public Service's case, while proceedings are ongoing for Tucson Electric Power and UNS Electric.

7. New Hampshire

The New Hampshire Public Utilities Commission published a final net metering successor tariff order in 2017 and initiated a value of distributed energy resources study to collect more data before making further changes. Legislation related to low-income community solar was enacted, and two general rate cases, including two proposed fixed charge increases and one residential demand charge, were decided during the year.

8. Virginia

The Virginia state legislature addressed several solar policy issues in 2017, adopting a community solar pilot program, a third-party PPA pilot program, and making changes to net metering for agricultural generators. Stakeholders are reportedly considering further changes to net metering in the state, and multiple residential fixed charge increases were proposed during the year.

9. Michigan

Pursuant to legislation enacted in late 2016, stakeholders worked toward the creation of a net metering successor tariff during 2017 and began a study examining the costs and benefits of net metering. The Commission opted to continue net metering until the alternative tariff is completed, and the staff filed a proposed tariff in December. Several utilities in the state proposed residential fixed charge increases during the year.

10. Utah

Utah regulators issued a major decision on Rocky Mountain Power's proposed net metering and rate design changes for distributed solar customers. Regulators approved a net billing transition tariff, crediting exported energy at a rate slightly lower than retail, while rejecting a demand charge and added fixed fee. Finally, the Commission opened a new export credit proceeding, in which a more permanent credit rate for exported energy will be decided.

TOP SOLAR POLICY TRENDS OF 2017

Convergence Toward Net Billing as the New Net Metering

Thus far, the majority of states issuing net metering successor tariff decisions have opted to move to a net billing policy, allowing behind-the-meter consumption but crediting all exported energy at a rate other than retail. In 2017, Jacksonville Electric Authority, Indiana, New York, and Utah approved transitions from net metering to net billing. Net billing models are under consideration in several additional states, including Arkansas, Louisiana, and Michigan.

Diverse Credit Rate Approaches and Methodologies

While there is growing convergence toward the net billing framework, states are taking diverse approaches to credit rates for excess generation. The most common of these have been avoided cost and value-based crediting, although there are a wide variety of methodologies in use or under consideration for calculating avoided cost and the value of distributed generation.

Emphasis on Studies and Data

A theme present throughout 2017 was state policymakers' emphasis on studies and data in decision-making. Legislatures in Michigan, Montana, and North Carolina enacted bills opening the door to net metering changes, but only after cost-benefit studies are conducted. In New Hampshire and Utah, regulators made relatively minor changes distributed generation compensation rules, while initiating new studies and data collection efforts to aid in deciding further changes.

Community Solar Action Climbs

Action on state community solar policies and programs has steadily increased over the past three years, with 21 states taking a total of 30 actions during 2017. Thirteen states took 18 actions on community solar policies during 2016, while only seven states took 13 actions in 2015. Two states – North Carolina and Virginia – adopted new community solar policies in 2017.

Fixed Charge Increase Requests Frequently Partially Approved

Residential fixed charge action has increased steadily over the past three years, with 61 requests to increase charges pending or decided in 2015, 71 in 2016, and 84 in 2017. A total of 44 decisions were made on these requests during 2017, with regulators approving only a portion of utilities' requested increases in 57% of these cases. Of the partial increases granted, regulators approved, on average, 26% of the utility's original request. Only six utilities were granted their full requested increases.

Demand Charge Proposals Down, New Approaches Up

Only three investor-owned utilities proposed mandatory demand charges for residential distributed generation customers in 2017, down from five in 2016 and ten in 2015. However, demand charges showed up in other places during the year, including legislation. Legislation approved in multiple states specifically authorizes additional fees, including demand charges to be applied to distributed generation customers.

Net Metering and Rate Design Changes as Part of Broader Reforms

More states are considering net metering and rate design changes as part of broader solar policy or grid modernization reforms. In New Jersey and North Carolina, net metering is being addressed as part of a broader solar policy investigation or reform. DC, Illinois, Maryland, and New York are addressing distributed solar policy as part of grid modernization proceedings.

Solar-Plus-Storage Eligibility Emerges as a Key Net Metering Consideration

Several states, including Colorado, Massachusetts, New York, and Rhode Island, continued or initiated investigations into the net metering eligibility of solar-plus-storage systems. Meanwhile, the Hawaii Public Utilities Commission approved a new compensation tariff specifically for solar-plus-storage customers.

States Consider Time-Varying Rates for Distributed Solar Customers

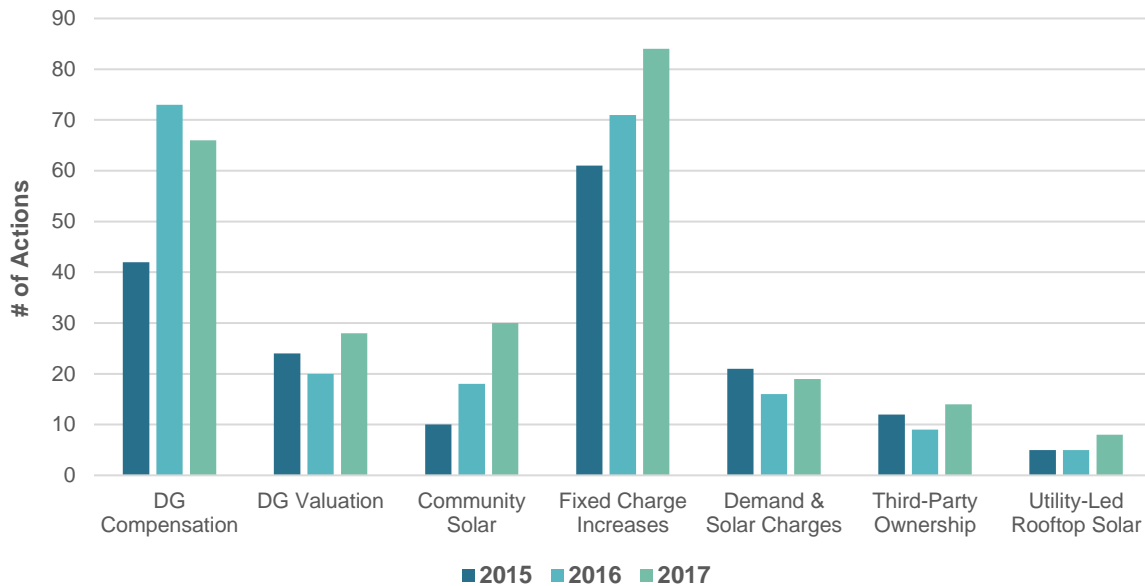
As states and utilities examine net metering successor tariffs and rate design changes for distributed solar customers, time-varying rates are gaining attention. In New Hampshire, regulators initiated a time-varying rates pilot program, while a pilot is also being designed in Maryland. The Vermont Public Service Department recommended exploring time-varying rates for net metering customers.

LOOKING BACK: 2015 - 2017

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, and 249 actions in 2017. Figure 3 shows the total number of solar policy actions taken in each year, while Figure 4 displays the total number of states taking action in each category. Note that several actions were considered over multiple years.

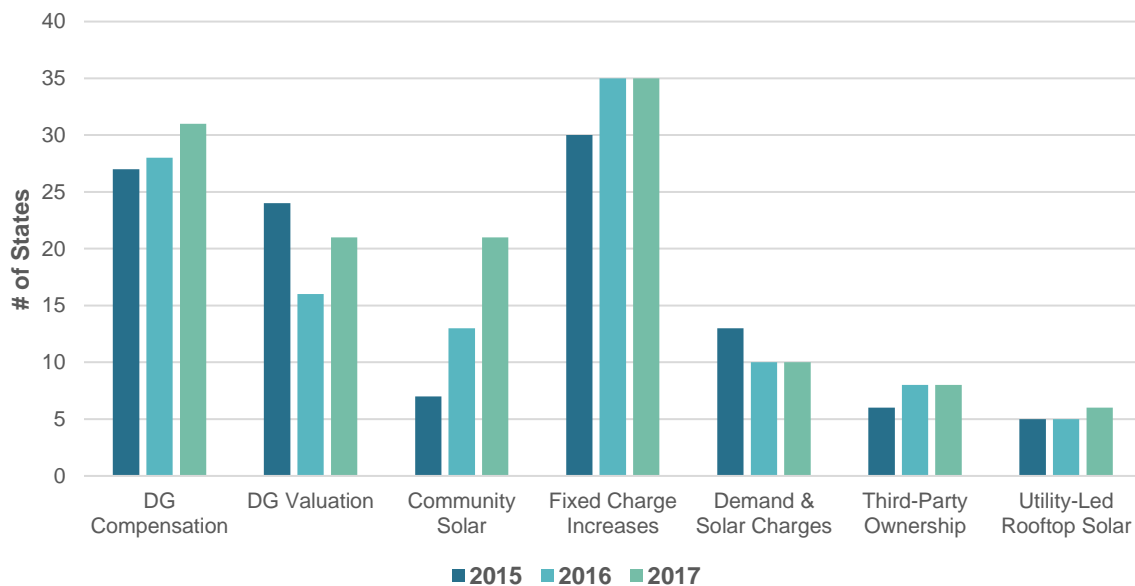
In 2017, activity increased in all categories except DG compensation, which showed a slight decline. Although slightly fewer DG compensation actions were taken in 2017, a greater number of states took action related to DG compensation during the year. Over the entire period from 2015 to 2017, a total of 39 states plus DC considered or adopted changes to DG compensation rules.

Figure 3. Number of Solar Policy Actions 2015-2017



Community solar and fixed charge action have shown steady increases in activity from 2015 to 2017. The number of total states taking action on community solar has also increased over this period, while the number of states in which utilities requested residential fixed charge increases remained steady in 2017.

Figure 4. Number of States Taking Solar Policy Action 2015-2017



OVERVIEW OF Q4 2017 POLICY CHANGES

In the fourth quarter of 2017, 42 states plus DC took a total of 141 actions related to distributed solar policy and rate design (Figure 5). Table 2 provides a summary of state actions related to DG compensation, rate design, and solar ownership during Q4 2017. Of the 141 actions catalogued, the most common were related to residential fixed charge and minimum bill increases (49), followed by DG compensation policies (39), and DG valuation or net metering studies (21).

Table 2. Q4 2017 Summary of Policy Actions

Policy Type	# of Actions	% by Type	# of States
Residential fixed charge or minimum bill increase	49	35%	25
DG compensation rules	39	28%	26 + DC
DG valuation or net metering study	21	15%	18 + DC
Community solar	12	9%	11
Residential demand or solar charge	11	8%	7
Third-party ownership of solar	5	4%	3
Utility-led rooftop PV programs	4	3%	4
Total	141	100%	42 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 2017

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

Maine Regulators Delay Implementation of New DG Compensation Rules

In December 2017, the Maine Public Utilities Commission ordered that implementation of the 10% transmission and distribution credit rate reduction portion of the state's new DG compensation rules be delayed until May 2018. The reduction was set to take effect beginning in January 2018.

Louisiana Public Service Commission Staff Publish Propose Net Billing, Community Net Metering

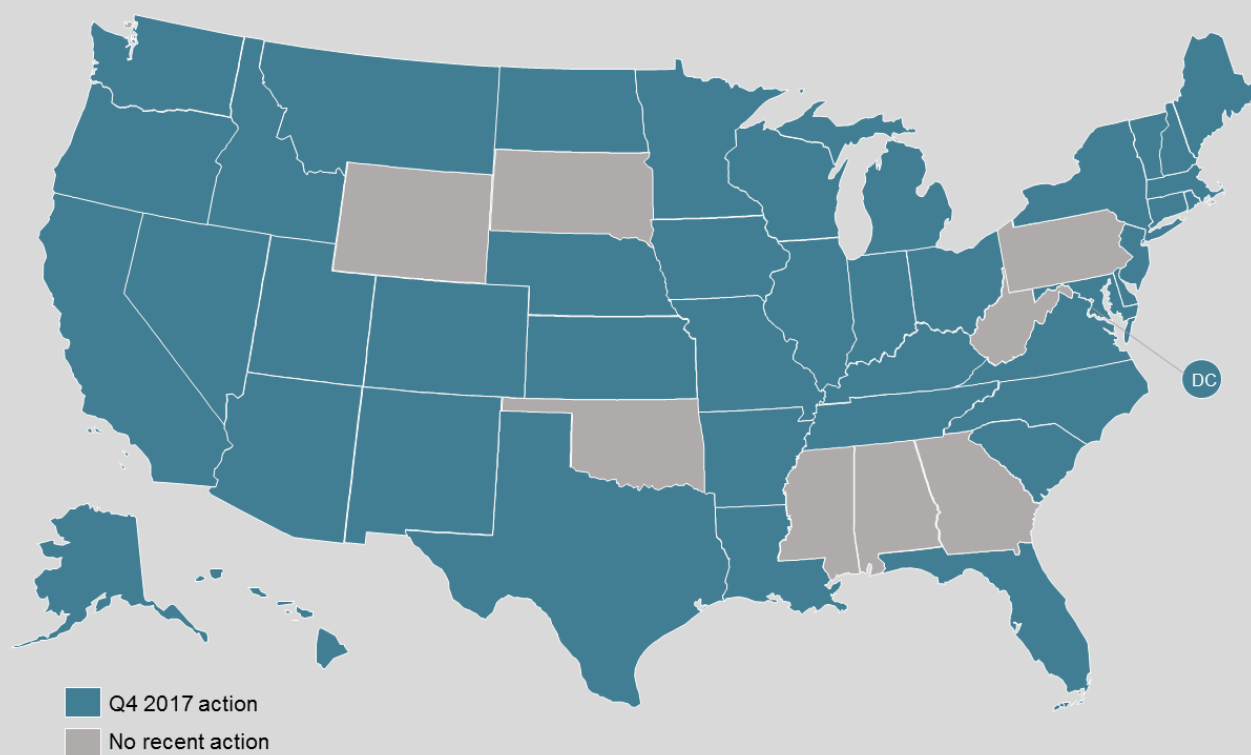
The Louisiana Public Service Commission staff filed its proposed modified net metering rules in November 2017 as part of the state's ongoing net metering proceeding. The proposed rules take the form of net billing and credit excess generation at an avoided cost rate. Notably,

utilities may propose “innovative” methodologies for calculating avoided cost, and the rules would allow community net metering in the state.

Public Utilities Commission of Nevada Orders Decrease in Nevada Power Residential Fixed Charge

Although Nevada Power had requested an increase in its residential fixed charge, the utility withdrew the request in November 2017, following strong public pressure. In December, the Public Utilities Commission of Nevada ordered a decrease in Nevada Power’s residential fixed charge, as well as its volumetric charge.

Figure 5. Q4 2017 Action on DG Compensation, Rate Design, & Solar Ownership Policies



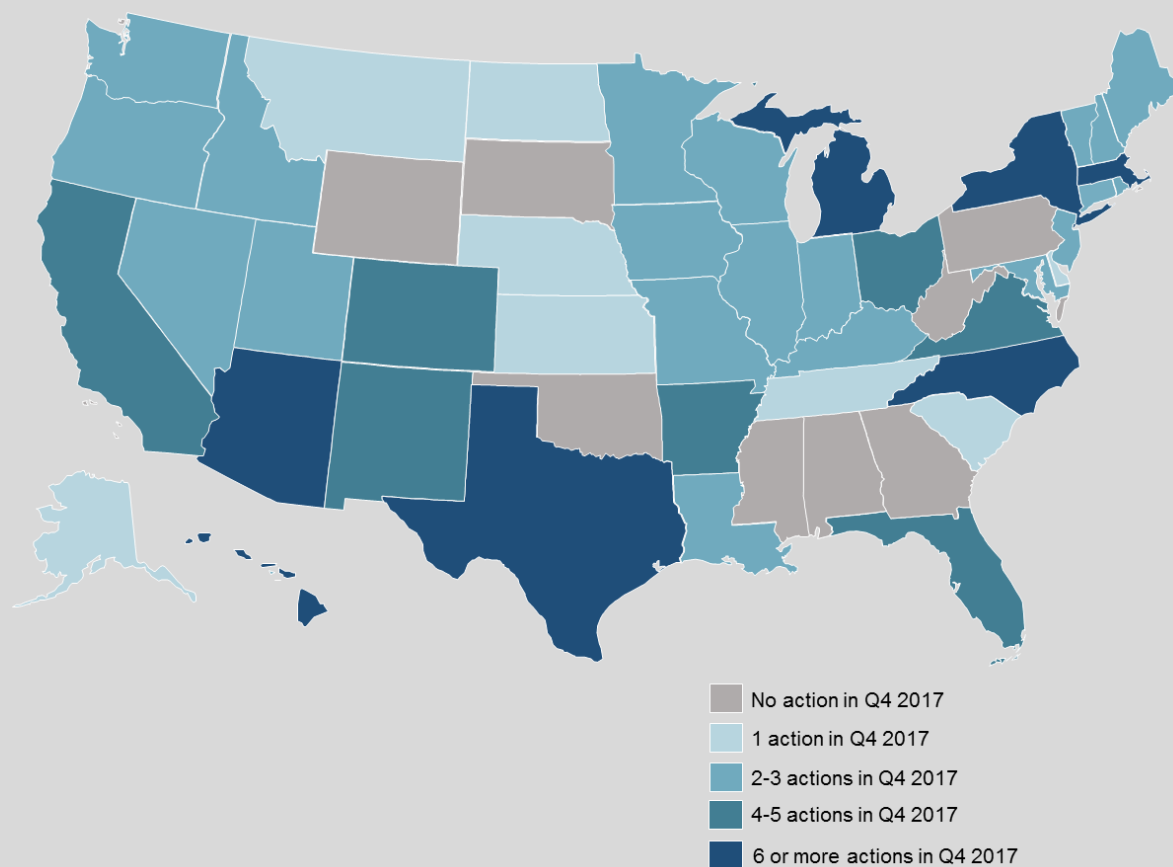
Jacksonville Electric Authority Approves Net Metering Successor

In October 2017, Jacksonville Electric Authority’s (a large public power utility in Florida) Board of Directors approved a move from net metering to a net billing program, in which customer-generators will be credited for excess generation at a rate of 3.25 cents per kWh. Existing net metering customers will be grandfathered for 20 years.

Hawaii Public Utilities Commission Approves Final Community Solar Rules

The Hawaii Public Utilities Commission issued an order in December 2017, establishing final rules for the state's community solar program. The program will take a phased approach, using flat credit rates for participants in Phase I (based on mid-day rates) and moving to time-varying credit rates in Phase II. Phase II will also offer special peaker credit rates to facilities delivering at least 85% of their output during peak periods, and allow utilities to develop, own, and/or operate projects as long as at least 50% of subscribers are from low to moderate income households.

Figure 6. Q4 2017 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, including a separate Powerpoint file of all summary maps
- Qualitative analysis and descriptive summaries of solar policy action and trends
- Outlook of action for the next quarter

WHO SHOULD PURCHASE THIS REPORT

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 \$1,600 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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- 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

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