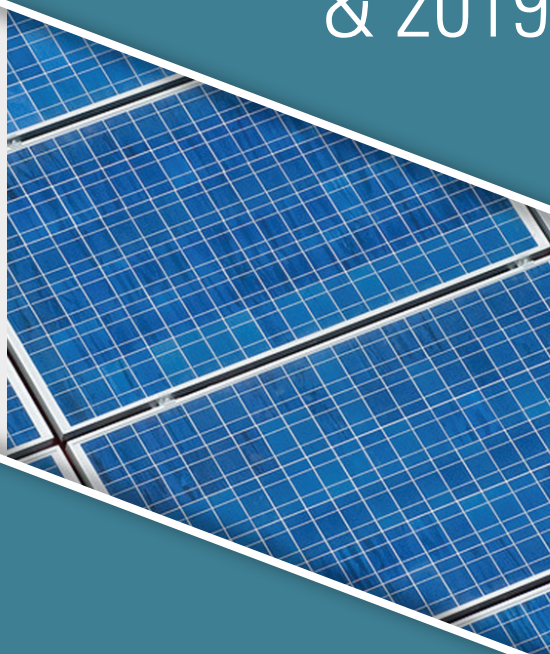


50 States of SOLAR

Q4 2019 Quarterly Report
& 2019 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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ABOUT THE REPORT

PURPOSE

The purpose of this report is to provide state lawmakers and regulators, electric utilities, the solar industry, and other 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.

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 state legislatures, regulatory authorities, and 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
- 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 they are related specifically 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

2019 SOLAR POLICY ACTION

State and utility solar policies continued to undergo review in 2019, with nearly every state in the country considering policy or rate design changes – a trend which has continued over the past several years and is likely to continue through 2020 and beyond. Table 1 provides a summary of state actions related to DG compensation, rate design, and solar ownership during 2019. Of the 265 actions catalogued, the most common were related to DG compensation policies (91), residential fixed charge and minimum bill increases (58), and community solar policies (49). The actions occurred across 46 states plus DC in 2019 (Figure 1). The states that saw the most solar policy action, or the most impactful actions, during 2019 are highlighted below.

Table 1. 2019 Summary of Policy Actions

Policy Type	# of Actions	% by Type	# of States
DG Compensation Policies	91	34%	37 +DC
Residential fixed charge or minimum bill increase	58	22%	30 + DC
Community solar	49	18%	23 + DC
DG valuation or net metering study	28	11%	22 + DC
Third-party ownership of solar	19	7%	10
Residential demand or solar charge	14	5%	10
Utility-led rooftop PV programs	6	2%	6
Total	265	100%	46 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 2019

While nearly every state in the country took some type of action on distributed solar policy or rate design during 2019, some states were particularly active, taking many different actions or especially impactful actions. The following states stood out in 2019 for their solar policy activity:

1. Arkansas

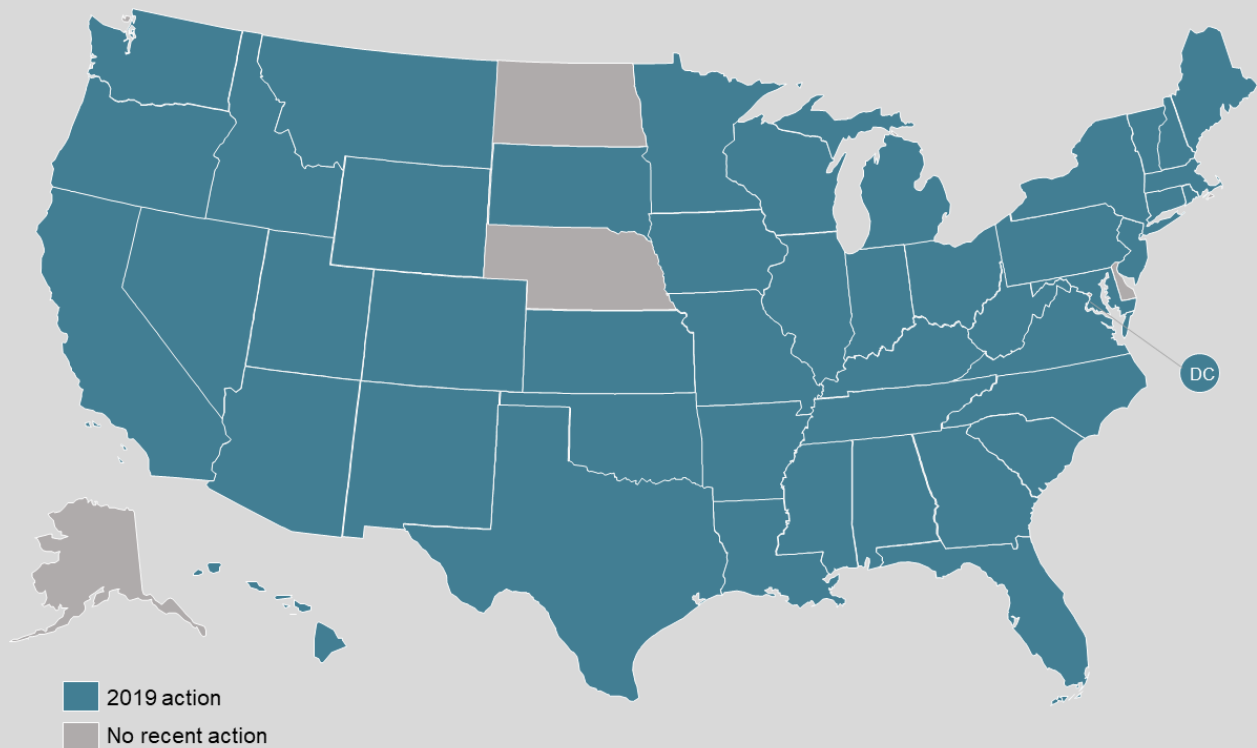
Arkansas lawmakers enacted S.B. 145 in March 2019, establishing certain requirements for net metering successor tariff development and legalizing solar leasing. The Public Service Commission worked toward implementing the legislation during the remainder of 2019, with the Commission Staff releasing a straw proposal in September. Meanwhile, an investigatory

proceeding addressing distributed energy resource and grid modernization issues has been ongoing, with workshops held during 2019.

2. South Carolina

The South Carolina General Assembly enacted H.B. 3659 in 2019, initiating a study of the costs and benefits of net metering and the development of a net metering successor tariff to take effect in June 2021. The bill also encourages utilities to consider offering community solar programs. Regulators issued decisions on Duke Energy Carolinas' and Duke Energy Progress' general rate cases during the year, rejecting the majority of the proposed residential fixed charge increases.

Figure 1. 2019 Action on Net Metering, Rate Design, & Solar Ownership Policies



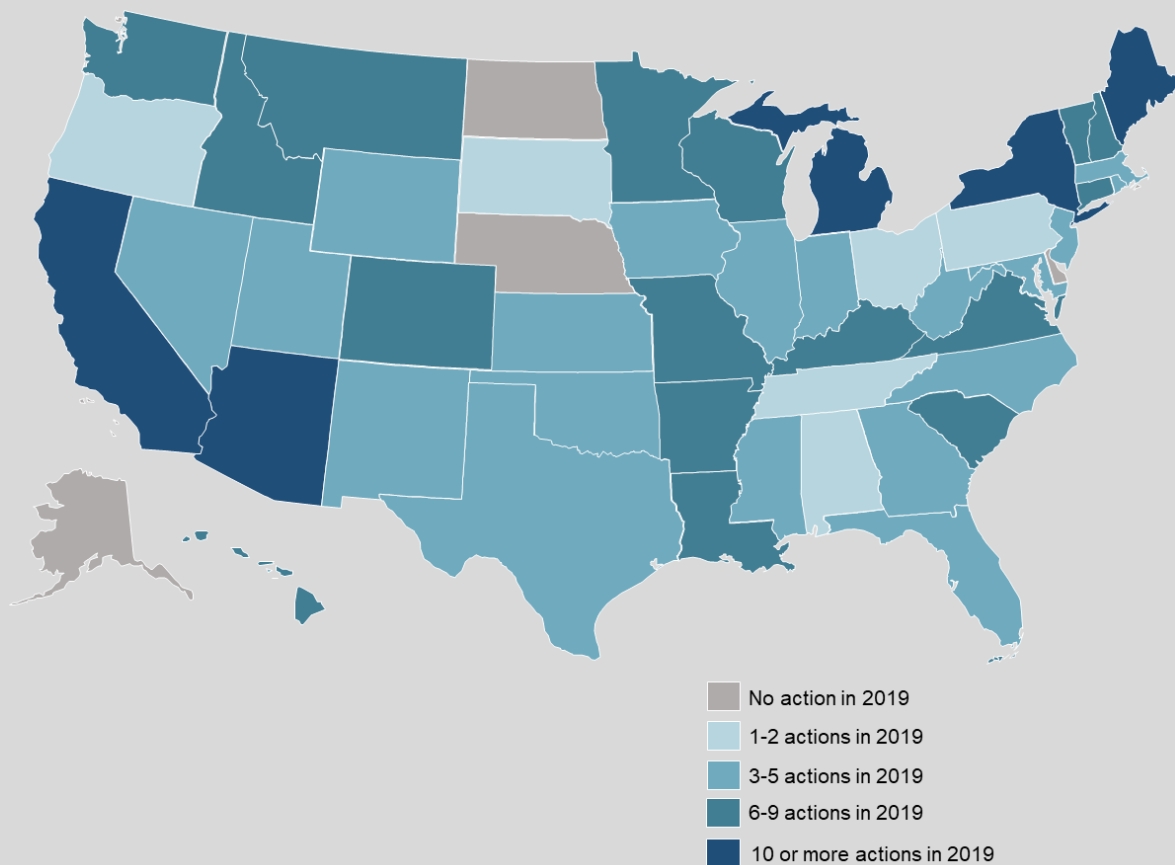
3. Connecticut

Connecticut legislators enacted H.B. 5002 in May 2019, which delays the transition to a net metering successor tariff and directs the Public Utilities Regulatory Authority to conduct a value of distributed energy resources study. The study will be used in developing the state's net metering successor tariff. The Public Utilities Regulatory Authority also approved shared clean energy facility program rules.

4. Idaho

The Public Utilities Commission rejected a settlement agreement that would have established a net metering successor tariff for Idaho Power, requiring a comprehensive net metering cost-benefit study to be conducted instead. Idaho Power also filed a request to undertake a collaborative process to develop a new compensation program for commercial and industrial DG customers, while PacifiCorp requested approval to establish a new net billing tariff for new customer-generators.

Figure 2. 2019 Solar Policy & Rate Design Action, by Number of Actions



5. Maine

The Maine Legislature enacted L.D. 91 in April 2019, which restored traditional retail rate net metering in the state. The Legislature also enacted L.D. 1711 during 2019, increasing the net metering system size limit, lifting the limit on the number of customers that may share a financial interest in a net-metered facility, and establishing requirements for the procurement of shared DG resources.

6. New York

The New York Public Service Commission approved significant changes to value stack compensation during 2019 and later extended mass market net metering for one year. The Commission Staff filed a proposal for a net metering bridge tariff to be adopted until more sophisticated rate designs can be implemented. Regulators also approved the use of consolidated billing for community solar projects and considered multiple residential fixed charge increases.

7. Michigan

The Michigan Public Service Commission issued decisions on general rate cases for DTE Electric and Upper Peninsula Power Company, approving new DG compensation tariffs for the utilities and rejecting the utilities' proposed system access charges. Indiana Michigan Power also filed its request to implement a new DG compensation tariff, and a community solar working group met throughout the year.

8. Vermont

Vermont lawmakers enacted multiple bills related to net metering during 2019, including those related to net metering limits for schools and the use of net metering systems for supplying electricity to electric vehicle charging stations. The Public Utility Commission opened a rulemaking proceeding to consider a wide range of changes to the state's net metering rules, and the Commission approved a new upfront charge for DG systems being installed on certain circuits within Green Mountain Power's system.

9. Louisiana

The Louisiana Public Service Commission issued a decision adopting a net metering successor tariff during 2019. The new tariff uses a net billing structure, crediting grid exports at the utility's avoided cost rate. The decision also authorized community net metering. Louisiana regulators considered residential fixed charge increases as well, while the New Orleans City Council worked to implement community solar program rules for Entergy New Orleans.

10. New Hampshire

New Hampshire lawmakers considered several distributed solar policy bills during 2019, enacting one bill approving community solar changes. The Governor vetoed another bill that would have increased the net metering system size limit, but other bills including this change remain under active consideration. Meanwhile, the Public Utilities Commission approved the scope for the value of distributed energy resources study that will inform future net metering changes.

TOP SOLAR POLICY TRENDS OF 2019

Policy Decisions Encouraging Distributed Solar Development

In 2019, policymakers and regulators in many states enacted legislation or issued decisions promoting distributed solar. In Maine, lawmakers restored retail rate net metering, while Arkansas legislators enabled third-party ownership in the state. In Idaho and Montana, regulators rejected proposals that would have ended net metering or adopted additional charges in favor of maintaining the current net metering rate structure. Other states with 2019 decisions favoring distributed solar development include Connecticut, Georgia, South Carolina, and Washington.

Regulators Focusing on Netting Period for Net Metering Successor Tariffs

Many states evaluating net metering successor tariff options are giving particular attention to the period over which production and consumption are netted. A traditional net metering policy uses a monthly netting period, while net billing structures utilize a netting period that is less than monthly, often 60-minute or 15-minute. In Connecticut, lawmakers enacted a bill allowing the state's successor tariff to utilize a netting period of up to monthly. Other states examining netting period in 2019 include Arkansas, Georgia, and Idaho.

Utilities Proposing Fewer and Smaller Residential Fixed Charge Increases

In 2019, utilities proposed significantly fewer residential fixed charge increases than in the last several years. Only 31 utilities proposed residential fixed charge increases of 10% or more in 2019, compared with 34 in 2018, 41 in 2017, and 47 in 2016. The increases being proposed are also less than in past years. The median increase proposed in 2019 was \$3.00, compared to \$3.87 in 2018, \$4.00 in 2017, and \$4.07 in 2016.

Attention Shifting From Demand Charges to System Capacity-Based Charges

No investor-owned utilities proposed mandatory residential demand charges during 2019, and only one new charge was under consideration during the year. However, five proposals to adopt new fees based on the capacity of a customer's solar system were considered in 2019. Two of these proposals were withdrawn and another two were rejected by regulators. One capacity-based charge was approved, but is a one-time, upfront fee only applicable to certain projects.

Policymakers Increasing Net Metering System Size Limits

Policymakers in several states increased net metering system size limits during 2019. Net Metering system size limits were increased from 100 kW to 300 kW in Oklahoma, from 30 kW to 45 kW in Kentucky, and from 300 kW to 1 MW in Arkansas. Maine lawmakers also authorized net metering for systems up to 5 MW, and legislation increasing the system size limit from 1 MW to 5 MW is pending in New Hampshire.

State Rules Encouraging Low-Income Participation in Community Solar Programs

Encouraging low and moderate income customer participation in community solar programs continued to be a focus for states and utilities in 2019. Connecticut regulators approved shared solar program rules requiring 20% of project capacity to be allocated to low-income customers. Proposed rule changes in Colorado include multiple strategies to encourage low-income participation, and legislation enacted in New Hampshire adopts a credit adder for low to moderate income community solar projects.

Conducting Extensive Value of Solar Studies to Inform Net Metering Successors

Some states are electing to conduct extensive value of solar studies to inform the development of net metering successor tariffs. Connecticut and South Carolina lawmakers enacted bills in 2019 initiating value of distributed energy resources (DER) or net metering cost-benefit studies, while New Hampshire regulators approved the scope for a value of DER study. A study is also underway in Utah to inform the export credit rate for the state's net metering successor.

States Refining Existing Community Solar Program Rules

A number of states with existing community solar programs worked to refine program rules during 2019. Both legislators and regulators in Colorado considered program changes, including increasing the project size limit. Maine lawmakers lifted the limit on the number of accounts that may receive credits from a project, while Minnesota regulators adjusted the credit rate methodology and New York regulators approved the use of consolidated billing.

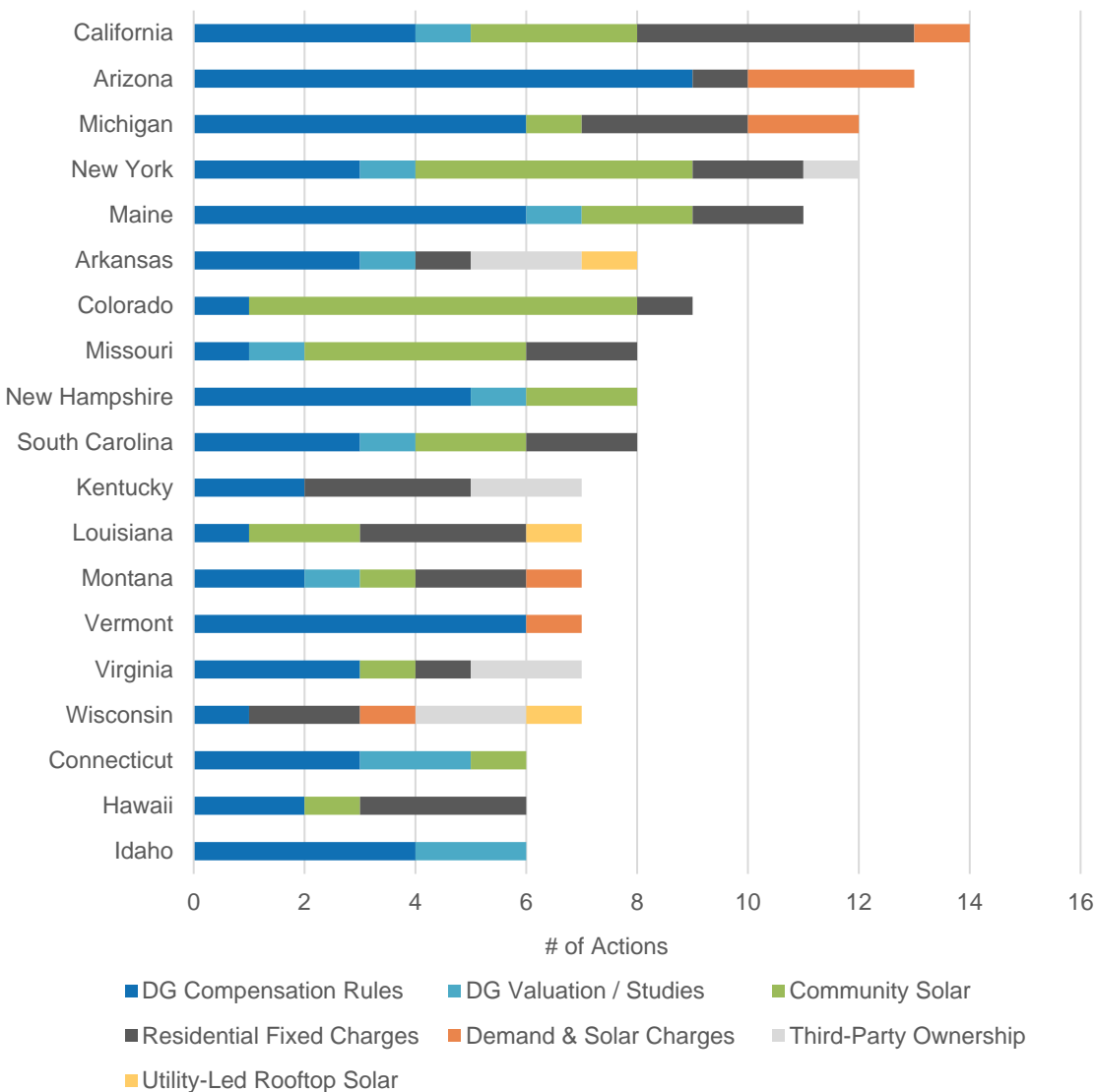
Establishing Separate Net Metering Rules for Different Project or Customer Types

Some states are establishing separate net metering provisions for smaller and larger projects, or for residential and commercial projects. Legislation enacted in Arkansas in 2019 includes different provisions for customers on rates including a demand component, while Maine legislation established a new net billing program for commercial and industrial customers. The New York Public Service Commission is also developing separate rules for projects under 750 kW that exclusively serve a host load.

States Considering Net Metering for Solar-Plus-Storage Facilities

Another trend continuing through 2019 was states considering the net metering eligibility of solar facilities paired with battery storage. Lawmakers in Arkansas and South Carolina enacted bills authorizing net metering for solar-plus-storage projects, while Montana regulators issued a decision requiring NorthWestern Energy to permit net metering for projects paired with battery storage. The Rhode Island Public Utilities Commission also opened a proceeding to consider this issue.

Figure 3. Most Active States of 2019, by Type of Action



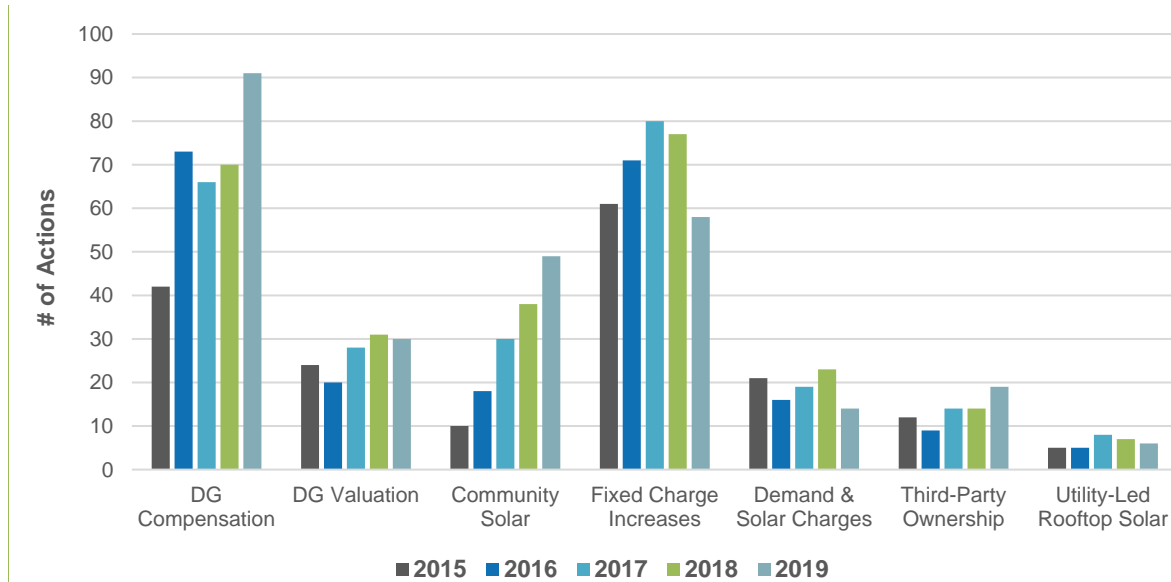
LOOKING BACK: 2015 - 2019

Distributed solar policy action has increased over the past few years, but at a slowing rate, with states and utilities taking approximately 175 actions in 2015, 212 actions in 2016, 249 actions in 2017, 264 actions in 2018, and 265 actions in 2019. 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 2019, distributed generation (DG) compensation, community solar, and third-party ownership activity increased, while actions related to DG valuation, residential fixed charge increases, demand and solar charges, and utility-led rooftop solar declined. The most dramatic changes

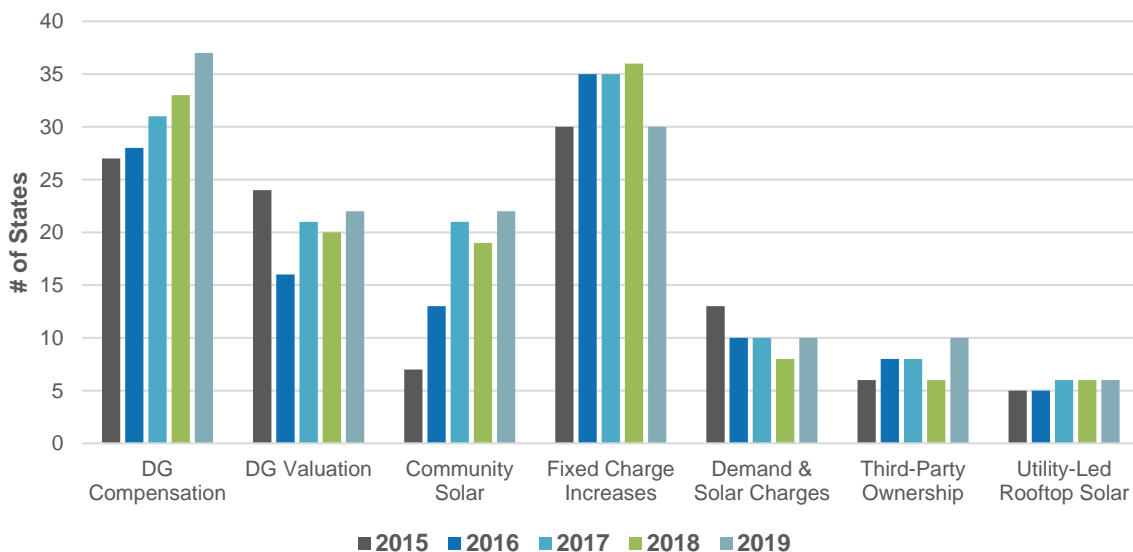
were in DG compensation actions, increasing by 30% over 2018 and in residential fixed charge increases, with action decreasing by 25% over 2018.

Figure 4. Number of Solar Policy Actions 2015-2019



The number of states taking solar policy actions increased or held constant in every category except residential fixed charge increases during 2019. DG compensation is the only category showing a consistent increase in the number of states taking action from 2015 to 2019, increasing from 27 states to 37 states during this period.

Figure 5. Number of States Taking Solar Policy Action 2015-2019



OVERVIEW OF Q4 2019 POLICY CHANGES

In the fourth quarter of 2019, 43 states plus DC took a total of 144 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 2019. Of the 144 actions catalogued, the most common were related to DG compensation rules (43), followed by residential fixed charge and minimum bill increases (38), and community solar (34).

Table 2. Q4 2019 Summary of Policy Actions

Policy Type	# of Actions	% by Type	# of States
DG compensation rules	43	30%	28 + DC
Residential fixed charge or minimum bill increase	38	26%	25 + DC
Community solar	34	24%	16 + DC
DG valuation or net metering study	19	13%	16 + DC
Third-party ownership of solar	5	3%	4
Residential demand or solar charge	3	2%	2
Utility-led rooftop PV programs	2	1%	2
Total	144	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 2019

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

Georgia Regulators Approve Net Metering for up to 5,000 Customers

As part of a December 2019 decision in Georgia Power's general rate case, the Public Service Commission directed Georgia Power to offer net metering, using a monthly netting period, for 5,000 rooftop solar customers of 32 MW, whichever is reached first. After this cap is reached, new customer-generators will be compensated through the previous instantaneous netting structure.

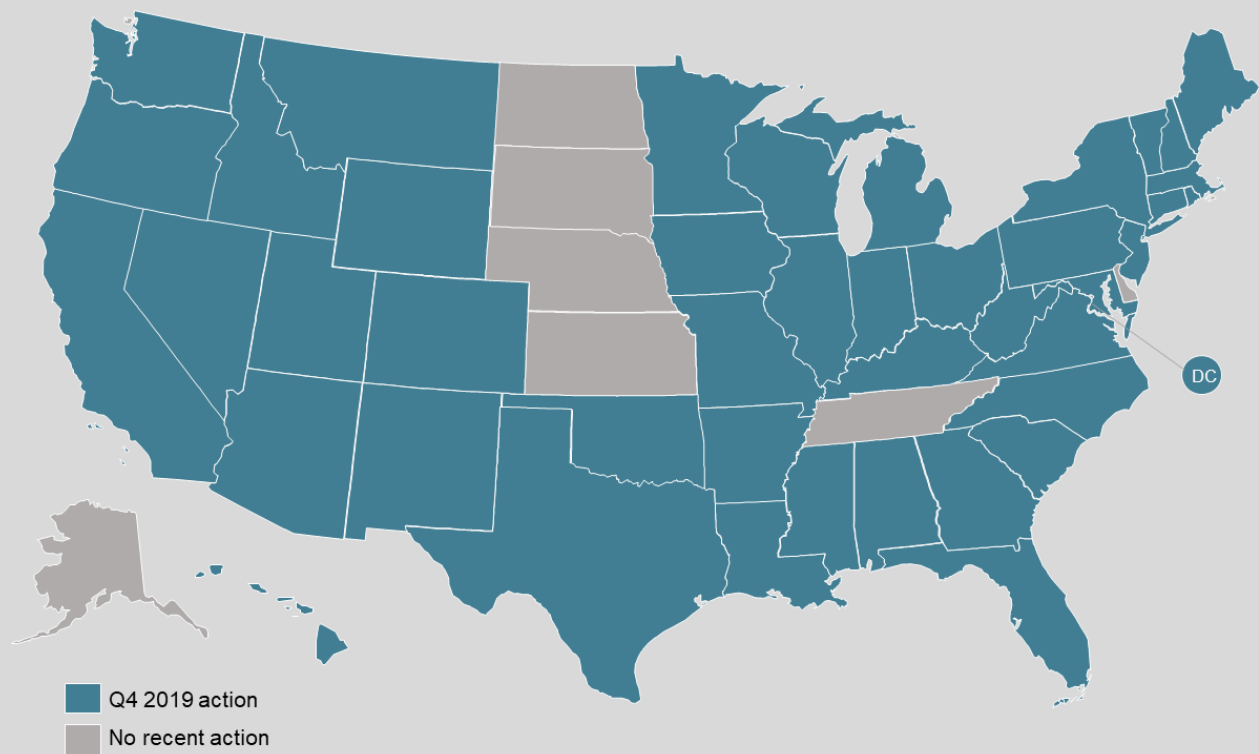
Idaho Public Utilities Commission Continues Traditional Net Metering

Idaho regulators issued an order in December 2019, rejecting a proposed settlement that would have replaced net metering with a net billing regime for Idaho Power, crediting hourly exports at a rate including avoided energy value, avoided capacity value, avoided transmission and distribution capacity and line losses, integration costs, and environmental benefits. Instead, Idaho Power is to conduct a comprehensive net metering cost-benefit study.

Montana Regulators Reject Proposed NorthWestern Energy Demand Charge

In December 2019, the Montana Public Service Commission issued an order in NorthWestern Energy's general rate case, rejecting the utility's proposal to adopt a non-coincident peak demand charge of \$8.64 per kW for residential net metering customers. The decision also denies the utility's request to separate residential net metering customers into a unique customer class.

Figure 6. Q4 2019 Action on DG Compensation, Rate Design, & Solar Ownership Policies



Connecticut PURA Approves Shared Clean Energy Program Rules

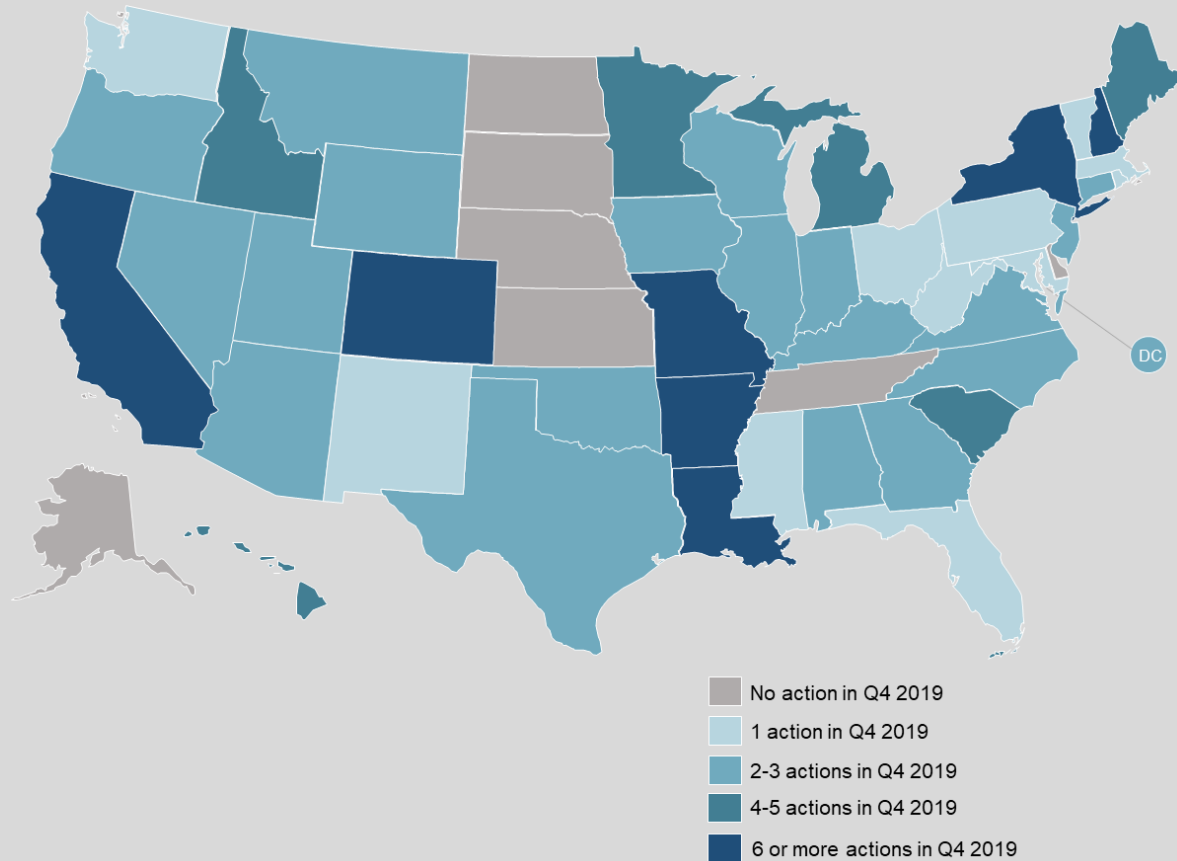
The Connecticut Public Utilities Regulatory Authority (PURA) approved final shared clean energy program rules in December 2019. The rules include an opt-out model for 80% of project output, with utilities directly enrolling customers and a quarter of this reserved for low-income customers. The remaining 20% of output will be available for voluntary enrollment.

Mass Market Net Metering Extended and Bridge Tariff Proposed in New York

In December 2019, the New York Public Service Commission issued an order extending mass market net metering (available for projects under 750 kW) until 2021. The Commission Staff

also filed a white paper recommending the adoption of a net metering successor bridge tariff until more sophisticated rate designs can be implemented, since advanced metering infrastructure and customer interval data are not available in all parts of the state.

Figure 7. Q4 2019 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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- Stay on top of state policy developments relevant to your business
- Give your own team a head start in tracking legislative and regulatory proceedings

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- Stay on top of relevant state policy developments
- Utilize an objective source of information in legislative and regulatory proceedings

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- 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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