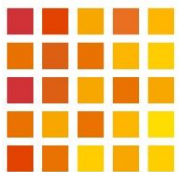


Staff Subcommittee on Energy Resources and the Environment

Sharpening Your 2020 Vision for Community-Based Clean Energy

Emerging Community Solar Market

Innovations in Program Design



**Smart Electric
Power Alliance**

What's Driving Community Solar?



Customer Benefits

- Access to solar
- Hedge costs
- Catalyzes green energy
- Transferable
- Economies of scale
- Low O&M concerns
- Stand-alone pricing

Utility Benefits

- Engage customers
- Support local industry
- Understand your solar resource
- T&D deferral

Developer Benefits

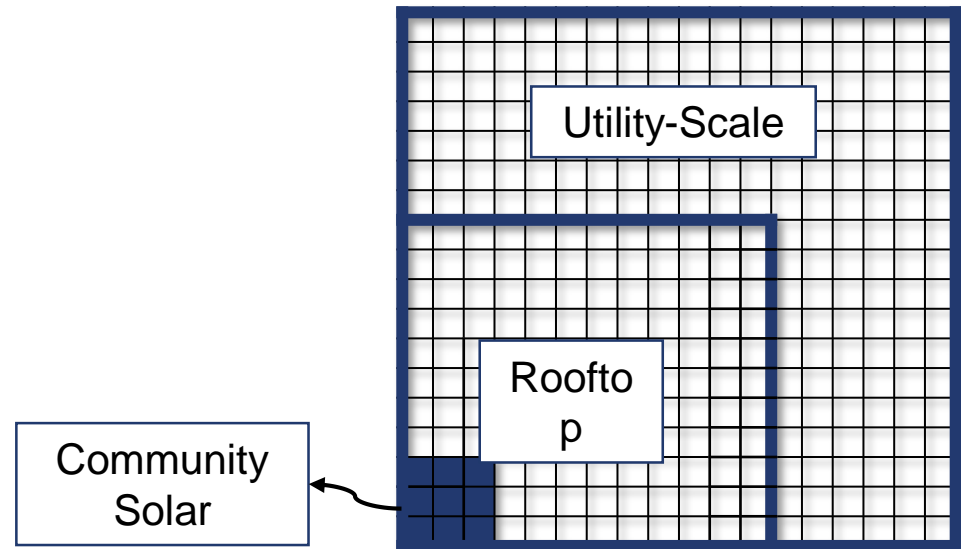
- Secure multiple off-takers
- Diversify portfolio
- Customer acquisition
- Development in new markets

Community Solar Market To Date



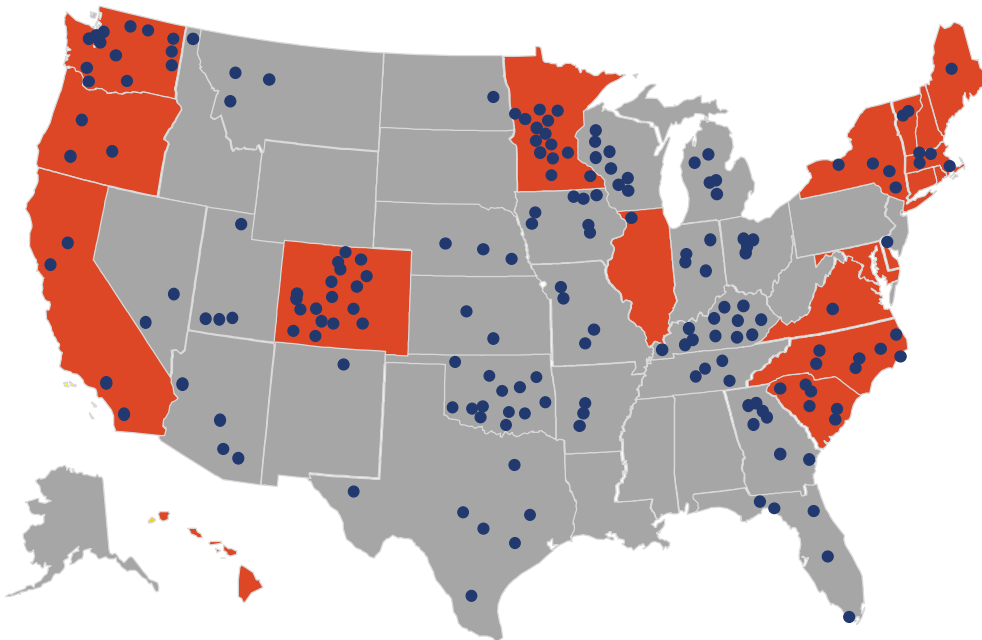
Still Emerging but Growth is Expected

- In 2017 Community Solar was ~4% of installed solar capacity
 - Total installed capacity 734 MW
- Strong growth forecasted
 - Declining solar costs
 - Customer demand
 - New enabling policies



Source: SEPA Community Solar Database and NREL (Q3/Q4 2017 Solar Industry Update)

U.S. Community Solar Map



Source: SEPA Survey Data

- State with Enabling Policy
- State without Enabling Policy
- Utility with Community Solar in its Service Territory

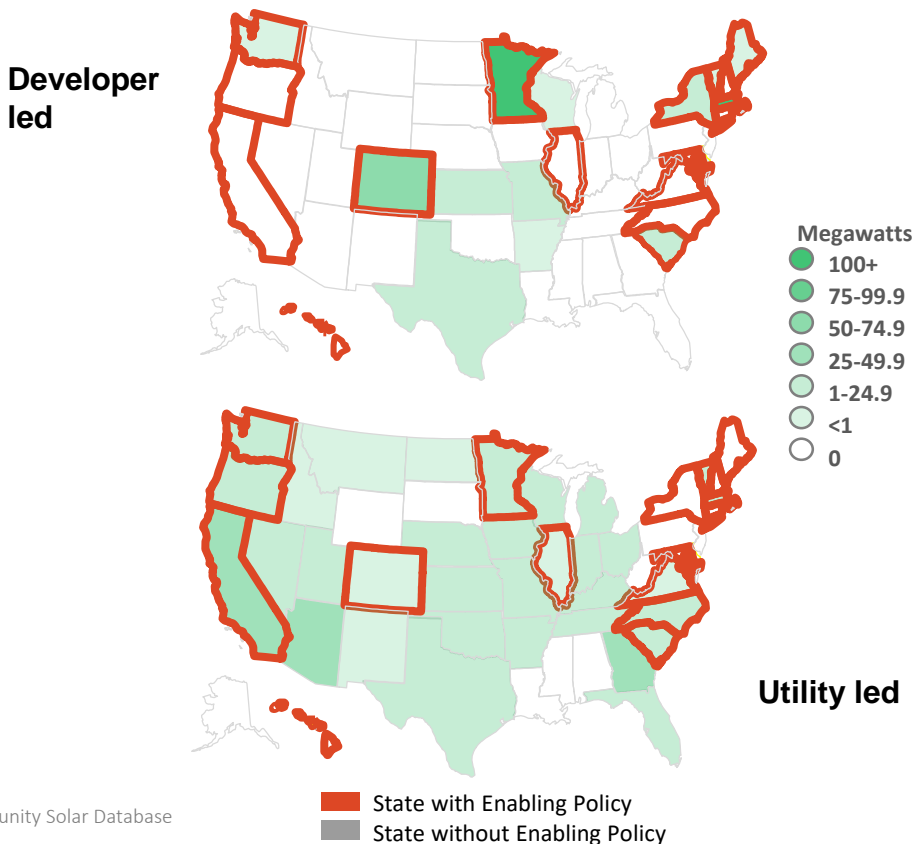
- 228 Utilities in 36 states
 - 160 cooperative utility programs
 - 31 investor-owned utility programs
 - 37 public power utility programs
- Enabling policies in 17 states

Developer v. Utility Implementation



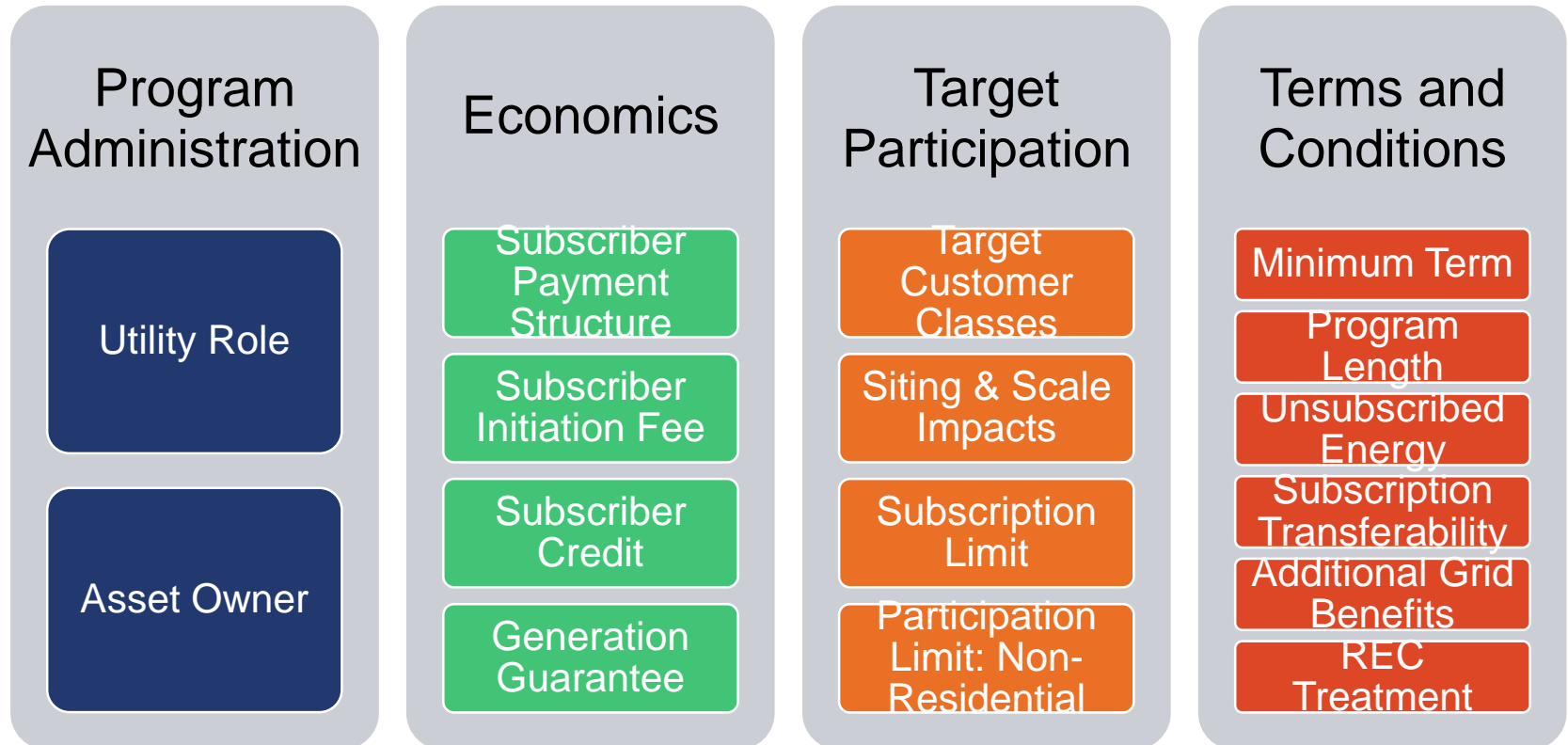
- 14 states with developer led programs
 - 90% of capacity is located in CO, MN and MA
 - 95% of developer led programs are in states with Enabling Policy
- 33 states with utility led programs
 - 54% of utility led programs are in states without Enabling Policy

Source: SEPA Community Solar Database



Source: SEPA Database thru 12/31/2017

Community Solar Decision Tree



Community Solar Resources



- SEPA Research and Reports available online at www.sepapower.org

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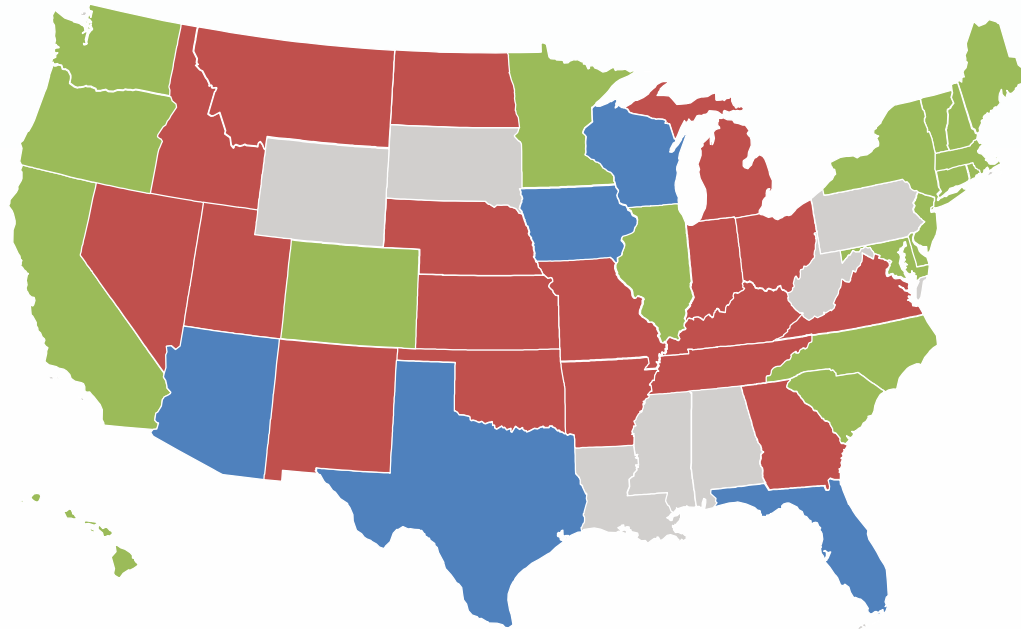
NARUC Winter Policy Summit

Staff Subcommittee on Energy Resources and the Environment

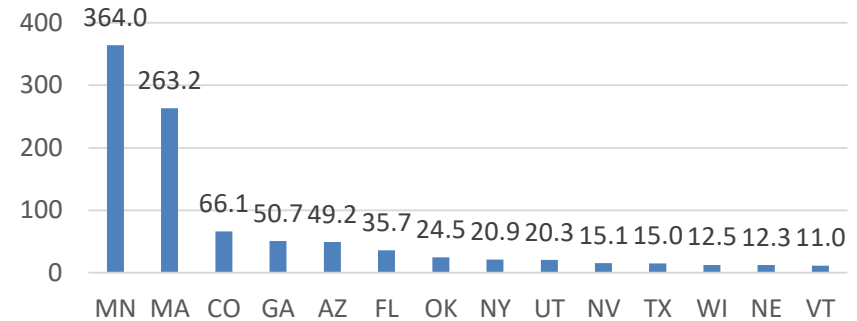
February 10th, 2019



Where is Community Solar?



Community Solar Capacity by State
(Q2 2018)



Policy-Enabled
Market

One-Off Programs (1-5)

One-Off Programs (5+)



Where is Community Solar Going?



<https://votesolar.org/policy/policy-guides/shared-renewables-policy/csvisionstudy/>



Community Solar Vision Study: Looking from 2020 to 2030

U.S. Community Solar Market Potential by 2030

Total Community Solar Capacity Operating: **57 GW to 84 GW**

Annual Electricity Generated: **72 TWh to 107 TWh**

- Share of National Electricity Consumption: **1.6%-2.6%**

Subscribers Served: **6.4 million to 8.8 million**

- Low- and Moderate-Income Households Supported: **3.5 million to 4.0 million**

Cumulative Capital Invested*: **\$81 billion to \$121 billion**

*Cumulative capital invested represents total initial costs to build community solar plants, including all installation materials, labor, upfront supply chain, development and financing costs. Does not include ongoing operating costs



Community Solar Evolution 2020 to 2030

PHASE I: Market Emergence

The business model for community solar is being proven out and tailored to fit local regulations and risk-averse investor sentiment.

Costs have a strong premium for interconnection upgrades, subscription acquisition and subscription management.

LMI adoption is limited to programs that pair carve-out requirements with sufficient incentive funding.

PHASE II: Market Transition

Community solar begins to flourish as policymakers and regulators see its economic and societal values. Programs are uncapped and solar is compensated based on negotiated or studied value.

Community solar costs fall rapidly through programmatic, policy and industry innovations, as well as specific improvements to subscription acquisition and management.

LMI adoption improves as regulators implement incentives and other support programs to exceed carve-out requirements.

PHASE III: Market Maturity

Community solar is an attractive default option as customers and policymakers recognize the broad grid, environmental and even socioeconomic values of solar.

Community solar costs have leveled but deliver cost-competitive energy with an accounting of environmental, societal and grid benefits.

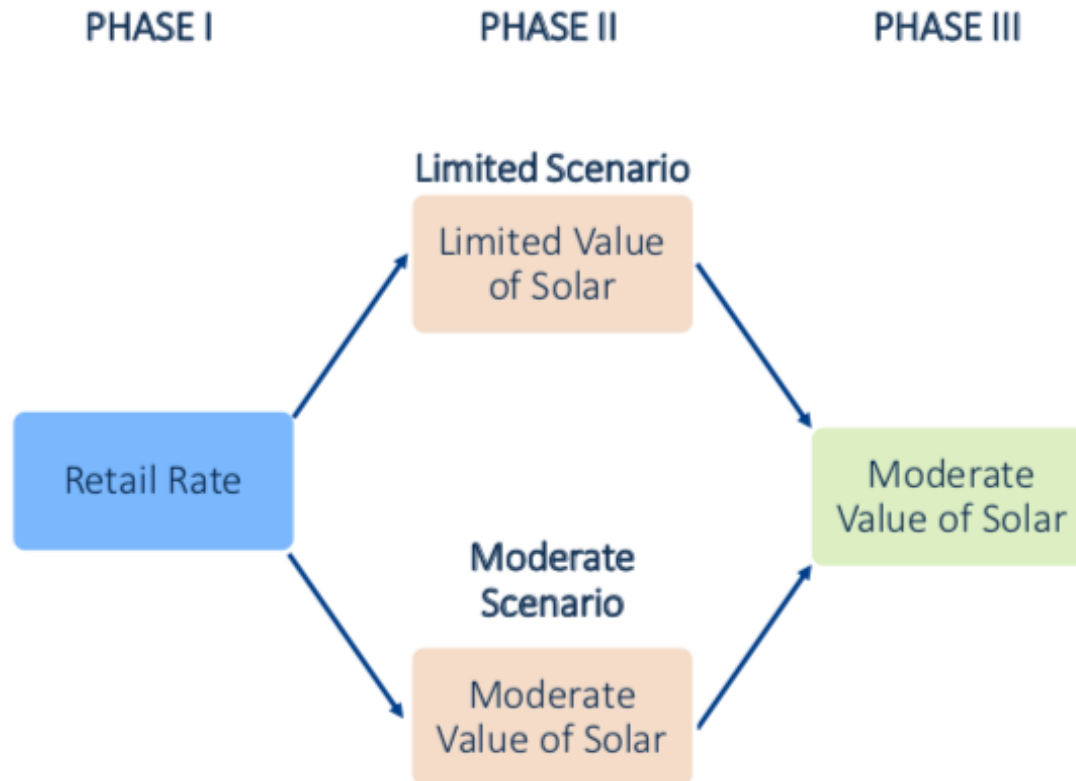
Strong LMI support programs and improved subscriber retention models result in LMI customers being viewed similarly to medium- and high-income subscribers.



Community Solar Evolution 2020 to 2030

Compensation

Value of Community Solar Compensation Mechanism for Each Market Phase



Community Solar Evolution: 2020 to 2030

Low and Moderate Income

Current State of Program Design

Today's LMI program designs primarily include carve-outs and incentives that at best result in community solar providers meeting, not exceeding, LMI subscription requirements.

Current State of Subscriber Acquisition

Community solar providers often lack internal capabilities and resources to scale up LMI-oriented sales channels, while offering standard subscriptions with rigid contract terms that may not align with LMI customer preferences and savings expectations.

Current State of Project Finance

Most LMI subscribers lack sufficient capital and/or adequate credit scores for community solar providers to raise capital at the same cost of financing as projects backed by residential subscribers with high credit scores and investment-grade C&I subscribers.

Program Design Evolutions

Programs offer sufficient financial support and other resources for community solar providers to exceed program-level LMI carve-outs:

Community solar programs pair carve-outs with sufficient incentive funding that varies by customer type within the LMI segment, integrate with other energy assistance programs, support creative solutions that address LMI customer default risk for community solar providers, and include strong consumer protections for more financially vulnerable LMI subscribers.

Subscriber Acquisition Evolutions

Community solar providers design subscription offerings and invest in sales channels that are specific to LMI customers' preferences and needs:

Community solar providers tailor subscription offerings to be flexible, short term and eclipse 20% year 1 savings, while leveraging community partnerships to develop scalable LMI-oriented sales channels that lower the costs of subscriber acquisition and retention.

Project Finance Evolutions

Low-cost sources of private bank and institutional investor capital are willing to finance portfolios of projects with 20% to even up to 100% LMI subscribers:

Financing strategies, such as on-bill financing, alternative credit scoring or credit enhancement, loan loss reserves and green banks, enable community solar providers to access financing while proving out business models that erase perceived risk of higher customer default across LMI subscribers.



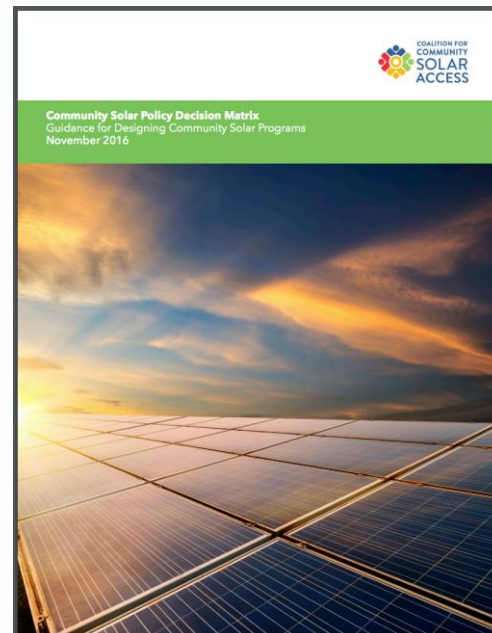


Appendix: Resources



Resources: Community Solar Policy Decision Matrix

- [Community Solar Policy Decision Matrix](#), released November 2016 and updated in December 2017
- Offer policymakers, community leaders, utilities, and stakeholders a guide to navigate key decision points and offer recommendations on how to best develop successful community solar programs state-by-state
- How to use?
 - ✓ Step 1: Establish policy goals
 - ✓ Step 2: Use the Matrix to engage local stakeholders in process to develop programs that best achieve policy goals
 - ✓ Step 3: Past two years – working with a number states to develop programs with Matrix, and updated the Matrix with input from policymakers, utilities, local stakeholders, etc.



CCSA Matrix components

- **Program Structure**

- ✓ Program size – limits vs. open ended depending on policy goals
- ✓ Project selection and approval – tariff/first come first serve preferred over RFP

- **Compensation**

- ✓ Compensation value – need for predictability, transparency, and consumer benefit
- ✓ Credit mechanism – monetary or volumetric assuming transparency or predictability
- ✓ Unsubscribed energy comp. – utility purchase at avoided cost, holding credits for unsubscribed energy
- ✓ REC treatment

- **Consumer Participation**

- ✓ Minimum subscriber threshold – more than one
- ✓ Subscription sizes – depends on credit methodology
- ✓ Customer class carve outs – yes, but dependent on policy goals and local considerations
- ✓ Standard consumer protections – Yes,

including existing state law coverage and standardized consumer checklist

- ✓ Transferability and geographic limitations – Should be transferable and located within same utility districts
- ✓ Rate schedule changes – no new charges or un-vetted changes through stakeholder process

- **Project Characteristics**

- ✓ Project size – Up to 20 mW
- ✓ Collocation – Yes
- ✓ Licenses – Same for other solar projects

- **Low-to-Moderate Income (LMI) Considerations**

- ✓ Provide differential incentives to ensure participation and cost savings
- ✓ Enhanced financing
- ✓ Leverage existing programs



Resources: model legislation

An Act Relating to the Establishment of a Community Solar Program *For Restructured States*

Whereas, solar energy is an abundant, domestic, renewable, and non-polluting energy resource.

Whereas, local solar energy generation can contribute to a more resilient grid, and defer the need for costly new transmission and distribution system build out.

Whereas, community solar can provide access to local, affordable, and clean energy options to all energy customers.

Whereas, community solar provides consumers including homeowners, renters, and businesses access to the benefits of local solar energy generation, unconstrained by the physical attributes of their home or business, like roof space, shading, or ownership status.

Whereas, community solar programs empower consumers with additional energy choices.

Whereas, community solar programs can also expand access to solar energy to low-income households.

Whereas, community solar can foster economic growth as well as opportunities for competition and innovative business models.

Whereas, the deployment of solar energy facilities including community solar can reduce the cost of energy for consumers, while lowering carbon emissions and reducing fossil fuel consumption in [State].

Whereas, it is the intent of [State] to expand the state's energy innovation and provide its residents with access to community solar, therefore,¹

Be it enacted by the [General Assembly of the State], that the Laws of [State] be amended to read:

Section 1. Definitions

The definitions in this section apply throughout this Act.

1. "Applicable Bill Credit Rate" means the dollar-per-kilowatt-hour rate as determined by the [Public Utilities Commission] used to calculate a Subscriber's Bill Credit. The

An Act Relating to the Establishment of a Community Solar Program *For Vertically-Integrated States*

Whereas, solar energy is an abundant, domestic, renewable, and non-polluting energy resource.

Whereas, local solar energy generation can contribute to a more resilient grid, and defer the need for costly new transmission and distribution system build out.

Whereas, community solar can provide access to local, affordable, and clean energy options to all energy customers.

Whereas, community solar provides consumers including homeowners, renters, and businesses access to the benefits of local solar energy generation, unconstrained by the physical attributes of their home or business, like roof space, shading, or ownership status.

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brandon@communitysolaraccess.org



Staff Subcommittee on Energy Resources and the Environment

Sharpening Your 2020 Vision for Community-Based Clean Energy

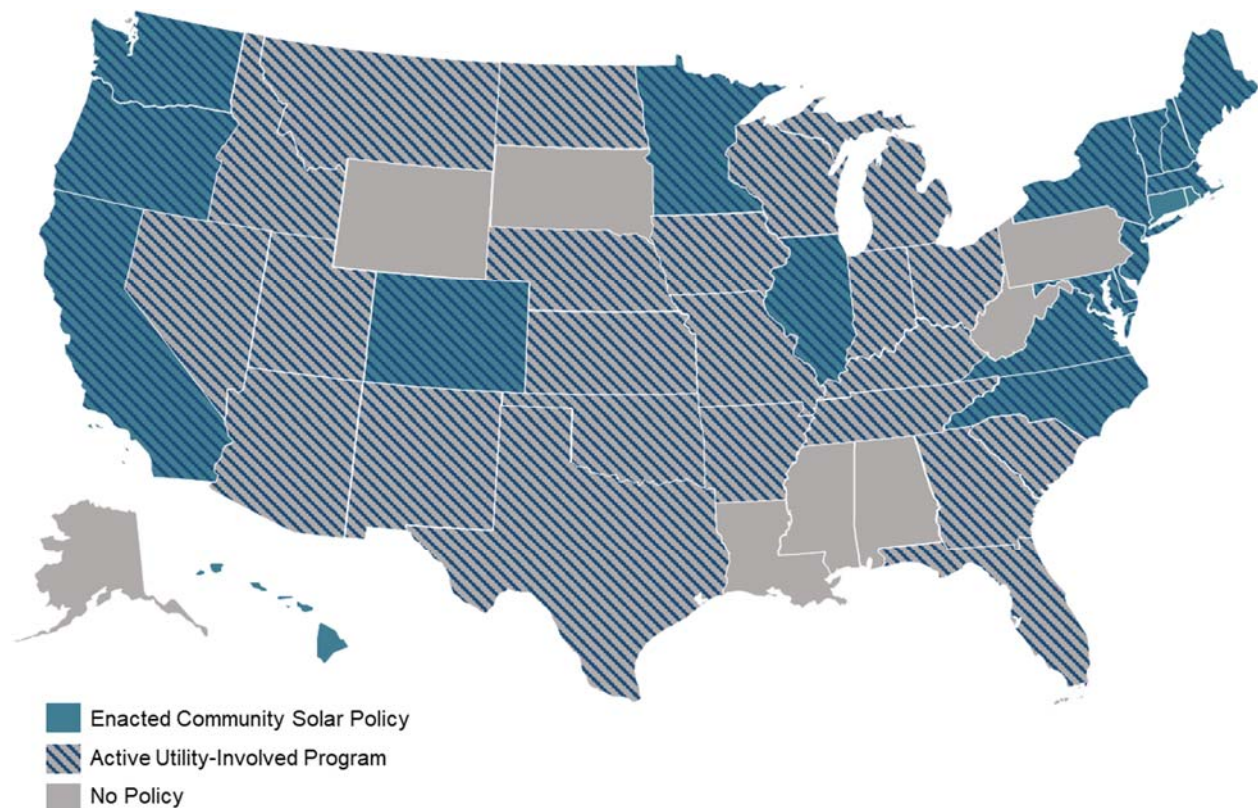
COMMUNITY SOLAR REVIEW

Key Takeaways:

- In 2018, 19 states and DC took a total of 39 actions on community solar policy and implementation of statewide community solar programs.
- New Jersey adopted a community solar policy in 2018, becoming the 19th state to do so.
- Two of the most common issues addressed by states in 2018 were participant credit rates and low income-access.

Community solar continues to grow in popularity as a way to expand solar access to larger potential target markets of individuals and businesses. The community solar model meets the needs of customers who want to utilize solar energy, but may not have the physical, financial, or situational ability to install rooftop panels on their residence or workplace. Community solar facilities also have the potential to take advantage of economies of scale to help bring the cost of these projects lower than that of rooftop solar. Furthermore, careful siting of community solar facilities can generate important locational benefits that can increase the value for both participating customers and the utility system as a whole.

Figure 13. State Community Solar Policies & Utility Community Solar Programs



Source: NC Clean Energy Technology Center; Smart Electric Power Alliance [fn omitted]

During the 2018 legislative session, lawmakers in several states, including Colorado, Connecticut, Maine, Minnesota, New Jersey, and New York, considered bills to either authorize new community solar programs or expand existing programs. Legislatures in Connecticut and New Jersey enacted bills, each creating new community solar programs, while the Minnesota Legislature enacted a bill increasing the size limit for Xcel Energy's Solar*Rewards program, which community solar projects are eligible for.

2018 action

No recent action



NC CLEAN ENERGY
TECHNOLOGY CENTER

subscribers. New York continues to revise its value of distributed energy resources rate, which is also used as the credit rate for its community solar program.

Table 6. Examples of State Community Solar Credit Rate Approaches

State	Credit Rate Description
Colorado	Total aggregate retail rate
Hawaii	Phase I: Flat credit rates, based on mid-day rates; Phase II: Time-varying credit rates
Minnesota	Value of solar rate
New Jersey	Retail rate
New York	Value-based rate plus market transition credit
North Carolina	Avoided cost rate; utilities may propose avoided cost methodology
Vermont	Blended residential retail rate; all production is subject to credit adjustors based on system size, site location, and REC ownership
Virginia	Market value of energy and capacity

One of the most significant trends in community solar action during the year was states evaluating program design options to increase low-income customer participation. Both Connecticut's and New Jersey's new programs include carve-outs for low-income customers. Connecticut's program reserves 10% of total program capacity and 10% of each project's capacity for low to moderate income customers or low-income service organizations, while New Jersey's program includes a 40% carve-out for low to moderate income customers.

Table 7. Examples of Low-Income Community Solar Provisions

State	Low-Income Provisions
California	The CPUC directed Pacific Gas & Electric and Southern California Edison to solicit Community Solar Green Tariff projects to serve disadvantaged communities in the San Joaquin Valley.
Connecticut	Connecticut's program reserves 10% of total program capacity and 10% of each community solar project's capacity for low to moderate income customers or low-income service organizations.
Illinois	The Illinois Solar for All program includes an additional 6 to 13 cents per kWh for low-income community solar projects.
Maryland	Maryland's pilot program includes a 60 MW carve-out for projects focused on low to moderate income customers.
Massachusetts	The SMART program includes an adder of 6 cents per kWh for community solar projects serving low to moderate income customers.
Minnesota	Xcel Energy's Rehabilitation and Efficiency: Neighborhood Energy Works (RENEWs) pilot program combines community solar subscriptions with energy efficiency improvements for certain low-income customers.
New Jersey	New Jersey's community solar pilot program rules include a 40% carve-out for low to moderate income customers.

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