Status of State Community Solar Program Caps

Jenny Heeter,[1] Kaifeng Xu,[1] Matthew Grimley,[2] Gabriel Chan,[2] and Emily Dalecki[1]

1 National Renewable Energy Laboratory
2 University of Minnesota

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

Contract No. DE-AC36-08GO28308

Technical Report
NREL/TP-6A20-84077
December 2022

Status of State Community Solar Program Caps

Jenny Heeter,[1] Kaifeng Xu,[1] Matthew Grimley,[2] Gabriel Chan,[2] and Emily Dalecki[1]

1 National Renewable Energy Laboratory
2 University of Minnesota

Suggested Citation
Heeter, Jenny, Kaifeng Xu, Matthew Grimley, Gabriel Chan, and Emily Dalecki. 2022. *Status of State Community Solar Program Caps*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-84077. https://www.nrel.gov/docs/fy23osti/84077.pdf

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

Contract No. DE-AC36-08GO28308

Technical Report
NREL/TP-6A20-84077
December 2022

National Renewable Energy Laboratory
15013 Denver West Parkway
Golden, CO 80401
303-275-3000 • www.nrel.gov

NOTICE

This work was authored in part by the National Renewable Energy Laboratory, operated by Alliance for Sustainable Energy, LLC, for the U.S. Department of Energy (DOE) under Contract No. DE-AC36-08GO28308. Funding provided by the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy Solar Energy Technologies Office. The views expressed herein do not necessarily represent the views of the DOE or the U.S. Government.

Acknowledgments

The authors would like to acknowledge the insights provided by solar developers, clean energy advocates, community solar program managers, and public utility commission staff. The authors are also grateful for the feedback that each of our reviewers provided on the draft report:

- Anna Balzer (U.S. Department of Energy [DOE])
- Ariel Drehobl (DOE)
- Harry Warren (CleanGrid Advisors)
- John Farrell (Institute for Local Self-Reliance)
- Phillip VanderHeyden (Maryland Public Service Commission)
- Robin Burton (National Renewable Energy Laboratory [NREL])
- Max Joel (New York State Energy Research and Development Authority [NYSERDA])
- Timothy DenHerder-Thomas (Cooperative Energy Futures)
- Vito Greco (Elevate Energy)
- And seven other anonymous reviewers.

List of Acronyms

ARR	applicable retail rate
CA	community adder
CC	community credit
CCSA	Coalition for Community Solar Access
CDG	community distributed generation
CEJA	Clean Energy Jobs Act
CSS	community shared solar
DER	distributed energy resource
DOE	U.S. Department of Energy
DPS	Department of Public Service
FEJA	Future Energy Jobs Act
FP&L	Florida Power and Light
IPA	Illinois Power Agency
LMI	low- and moderate-income
LMI-PPA	low-and moderate-income power purchase agreement
LTRRPP	Long-Term Renewable Resources Procurement Plan
MTC	Market Transition Credit
MEA	Maryland Energy Administration
NEM	net metering
NMWG	Net Metering Working Group
NREL	National Renewable Energy Laboratory
NY-Sun	New York-Sun
NYSERDA	New York State Energy Research and Development Authority
PSC	Public Service Commission
PUC	Public Utilities Commission
PV	photovoltaic
REC	renewable energy certificate
REV	Reforming the Energy Vision
RPS	renewable portfolio standard
SFA	Solar for All
SMART	Solar Massachusetts Renewable Target
VDER	Value or Distributed Energy Resources
VNEM	virtual net energy metering
VOST	Value of Solar Tariff

Executive Summary

As of May 2022, 22 states and Washington, D.C., had enacted enabling legislation for community solar. As with other rapidly growing renewable energy programs, some state-level policies have placed limits on the total capacity of community solar that can be installed—also known as program caps. Program caps limit the amount of community solar capacity that can be installed in a particular utility service territory or throughout the state.

As of May 2022, at least 19 states and Washington, D.C., included caps on their community solar programs. Most of these program caps are capacity-based, meaning that they limit the program size by capacity (i.e., the number of megawatts of energy produced by participating projects). In general, these programs are at the state level and are developed based on legislative mandates.

Community solar deployment is currently concentrated in a limited number of states. Of the ten states with the most community solar deployment, five have program caps, and five are uncapped (Figure ES-1). In states with program caps, installed community solar capacity ranges from 10% to 40% of the program cap. However, it should be noted that the program caps in New York and Massachusetts are for all solar generation, not just community solar.

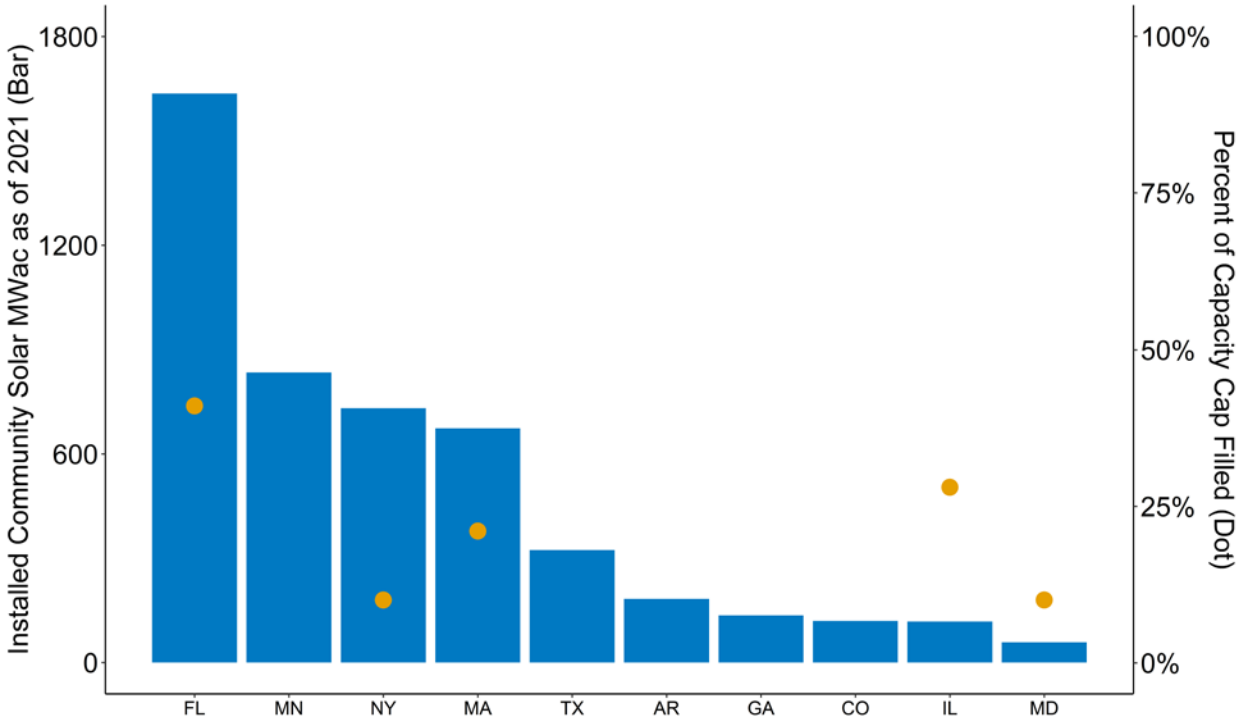

Figure ES-1. Installed community solar capacity compared to program caps in top 10 community solar states (by installed capacity).

Note: Minnesota, Texas, Arkansas, Georgia, and Colorado do not have community solar program caps.

This paper includes key considerations and questions that states can explore to determine the effectiveness of community solar program caps for their state's landscape. The following key considerations for program caps are explored in this report:

- Interactions with state renewable or clean energy goals
- Equitable access to solar options
- Creation of viable community solar markets
- Market stability
- Other community solar limiting factors ("de facto" caps), such as interconnection policies, physical grid limits, and land limits
- Appropriate state agency authority.

Table of Contents

List of Figures

List of Tables

1 Introduction

According to the U.S. Department of Energy (DOE), community solar refers to any solar project or program within a geographic area in which the benefits of the project flow to multiple subscribers (DOE n.d.). The community solar market is growing fast. Total capacity reached 5.7 GWac in mid-2022—up from 3.4 GWac in 2020 and 0.8 GWac in 2015. This market growth is concentrated in a small number of states, with 74% of installed capacity located in just four states: Florida (1,636 MWac, 30%), Minnesota (841 MWac, 16%), Massachusetts (731 MWac, 15%), and New York (731 MWac, 14%) (Figure 1).

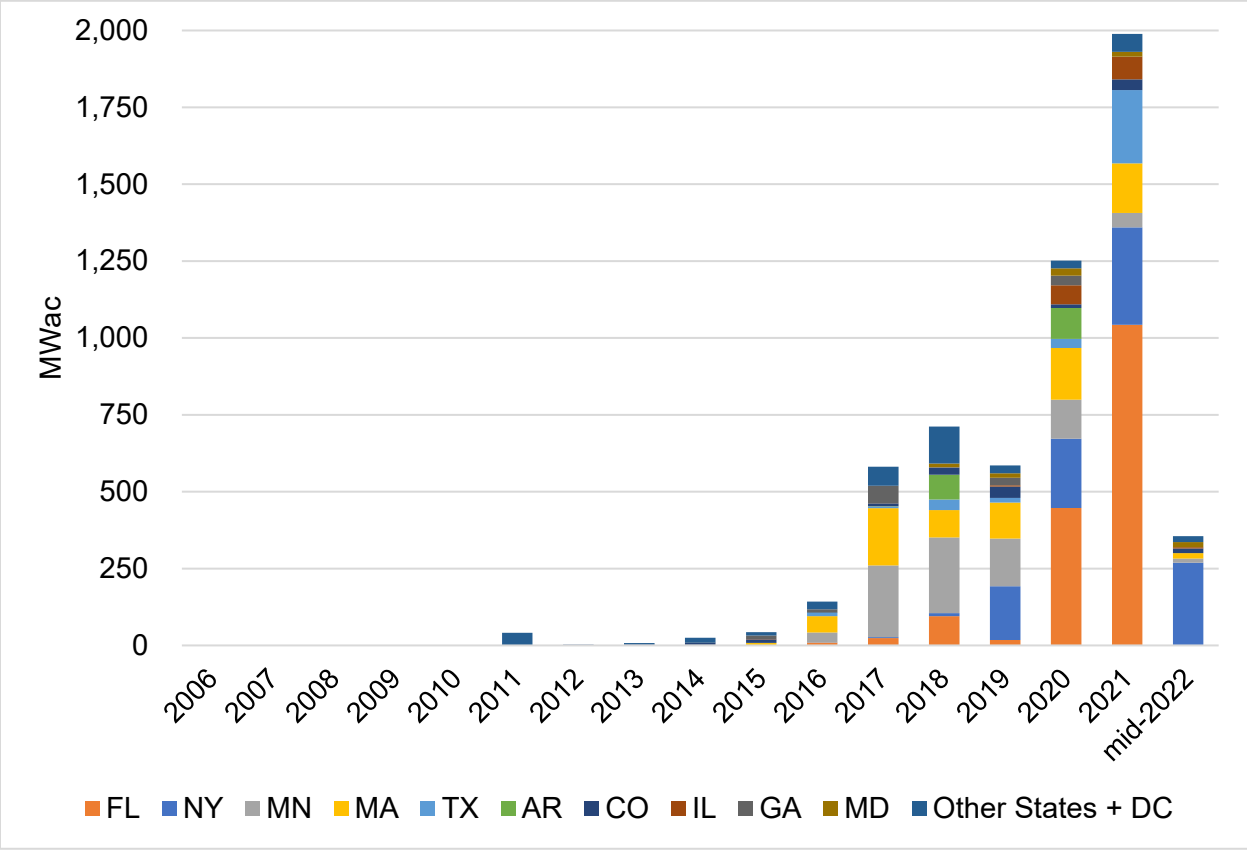

Figure 1. Annual community solar installed capacity additions (2006–mid 2022).

From: National Renewable Energy Laboratory (NREL 2022)

Community solar is also driving increases in the nonresidential solar market (projects that are not residential or utility-serving). According to Wood Mackenzie and SEIA (2022), community solar accounted for 40% of nonresidential solar capacity additions in 2021, up from 38% in 2020 and only 13% in 2016 (Davis 2022).

In addition to seeing growth in installed capacity, states are actively pursuing newer and larger community solar programs. Twenty-two states and Washington, D.C., had enabling legislation for community solar as of May 2022. Meanwhile, seven states introduced bills that would enable or incentivize community solar in some capacity (Figure 2). These states, which represent a

quarter of states without enabling legislation, include Mississippi, Missouri, Michigan, Ohio, Pennsylvania, West Virginia, and Wisconsin.

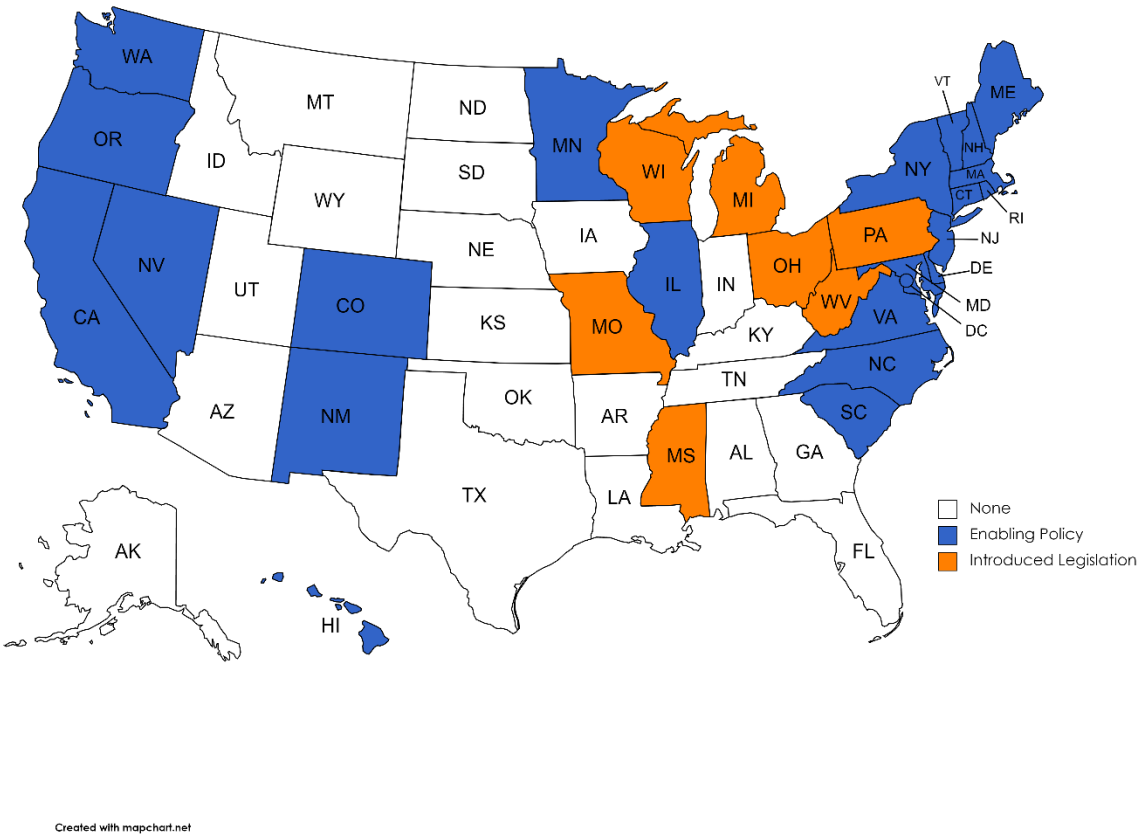

Figure 2. Community solar state policy activity.

From: National Renewable Energy Laboratory (2022), de la Mora (2022)

As with other rapidly growing renewable energy programs, some state-level policies have placed limits on the total capacity of community solar that can be installed—also known as program caps. Program caps limit the amount of community solar capacity that can be installed in a particular utility service territory or throughout the state.[1]

In some cases, states have predefined pathways for expanding program caps, such as setting regular public utility commission reviews of and updates to the community solar program. For example, in some states (e.g., Maryland, Oregon, Washington, Illinois, Colorado, and New Mexico), the utility regulator is tasked with evaluating the state's community solar program.[2]

[1] In comparison, *project caps* limit the capacity of individual community solar arrays. States may choose to set initial caps on community solar programs and make updates later on based on lessons learned, or expand programs based on rising demand. In this paper we address program caps, not project caps.

[2] In Maryland, the Public Service Commission was tasked by legislation with responding to specific issues related to the state's pilot community solar program and making recommendations about establishing a permanent program.

Alternatively, other states may use a third party or other agency to manage and evaluate their community solar programs, following rules set by the public service commission or equivalent state entity.

Program caps have previously been used by state policymakers to pilot policy mechanisms. For example, in the mid-2010s, state policymakers were focused on piloting net metering approaches; many states started with caps on net metering, then increased these caps as distributed photovoltaic (PV) penetrations increased (Heeter et al. 2014).

As states consider modifying their existing community solar programs or adopting new programs, this analysis of community solar program caps and key considerations can help states make educated decisions about how a program cap could influence the outcomes and overall impact of their community solar program. This report reviews the status of these program caps, including caps specific to low- and moderate-income (LMI) community solar initiatives. We then compare the status of those program caps to existing community solar deployment. Finally, we discuss the design and implementation challenges states may face when including program caps.

2 Methods

This analysis was conducted through a review of existing state-level programs and policies. This review included interviews with various subject matter experts, including state employees, clean energy advocates, and solar developers.

We collected community solar data from a database developed by the National Renewable Energy Laboratory (NREL 2022) as well as collecting national solar deployment data from Wood Mackenzie (Wood Mackenzie 2022). We then collected community solar program cap data from state-level community solar legislation and regulatory documents. Lastly, we interviewed 14 representatives from four states to help us identify the key concerns associated with developing community solar caps.

In this study, we explored the following main research questions:

- Does the state have a community solar cap? If so, is it a capacity-based cap, a funding-based cap, or another type of program cap?
- Does the state have a community solar cap that limits the number of LMI households' participation in community solar programs?
- What are the key concerns that the state explored when setting program caps, and what questions might state ask when considering a new or expanded program cap?
- What are the challenges and lessons learned that can be considered for future state policymaking around community solar program caps?

3 State of Community Solar Program Caps

States have limited their community solar programs in various ways. Most commonly by using a capacity of funding cap. As of May 2022, at least 19 states and Washington, D.C., included caps on their community solar programs (Figure 3, Table 1). 17 states and Washington, D.C., of them have enable legislations on community solar. The remaining five states (Colorado, Delaware, Minnesota, New Hampshire, and Vermont) with community solar policies have uncapped markets, which means that community solar deployment is not limited.

Of the states that cap programs, most are capacity-based, meaning that they limit the program size by capacity (i.e., the number of megawatts of energy produced by participating projects) (Figure 3). In general, these programs are at the state level and are developed based on legislative mandates. For example, the New Jersey Community Solar Energy Pilot Program set a minimum program cap of 150 MW, meaning that at least 150 MW of projects had to be approved.[3] On the other hand, the Maryland Community Solar Pilot Program set a maximum program cap of 190 MW, which was later increased to 418 MW, and then to 583 MW.[4]

Some program caps limit program funding rather than program capacity. For example, Illinois' Solar for All (SFA) program allocated 37.5% to 40% of the state's annual budget to the development of low-income community solar, resulting in $12.5 million to $26.6 million in annual funding (Illinois Power Agency 2018).

Some states have program caps that are not specific to community solar, but rather encompass all solar development. For example, the New York-Sun (NY-Sun) program and the Solar Massachusetts Renewable Target (SMART) program cap total statewide solar capacity at 10 GWdc (7.7 GWac) and 3.2 GWac, respectively.[5]

In states without legislative mandates, some utilities develop community solar programs voluntarily, and in some cases, these programs are limited by the capacity approved by regulatory commissions. For example, in Florida, the Florida Public Service Commission has approved Florida Power and Light (FP&L) to develop 3.2 GW of community solar projects.

Finally, states can have multiple community solar programs, which may have different types of program caps. For example, in addition to the Illinois SFA program funding cap, the Illinois Shines program has set a 400-MW capacity-based cap to be deployed by 2030 (Illinois Solar Energy Association n.d.).

[3] The New Jersey Community Solar Energy Pilot Program approved 78 MW of projects in phase 1 and 165 MW in phase 2.
[4] The 418-MW cap was associated with an initial 3-year pilot. The legislature extended the pilot to 7 years, and the cap was increased by the Public Service Commission.
[5] New York uses DC-rated capacity when discussing solar deployment. We assume the average DC/AC ratio at 1.3.

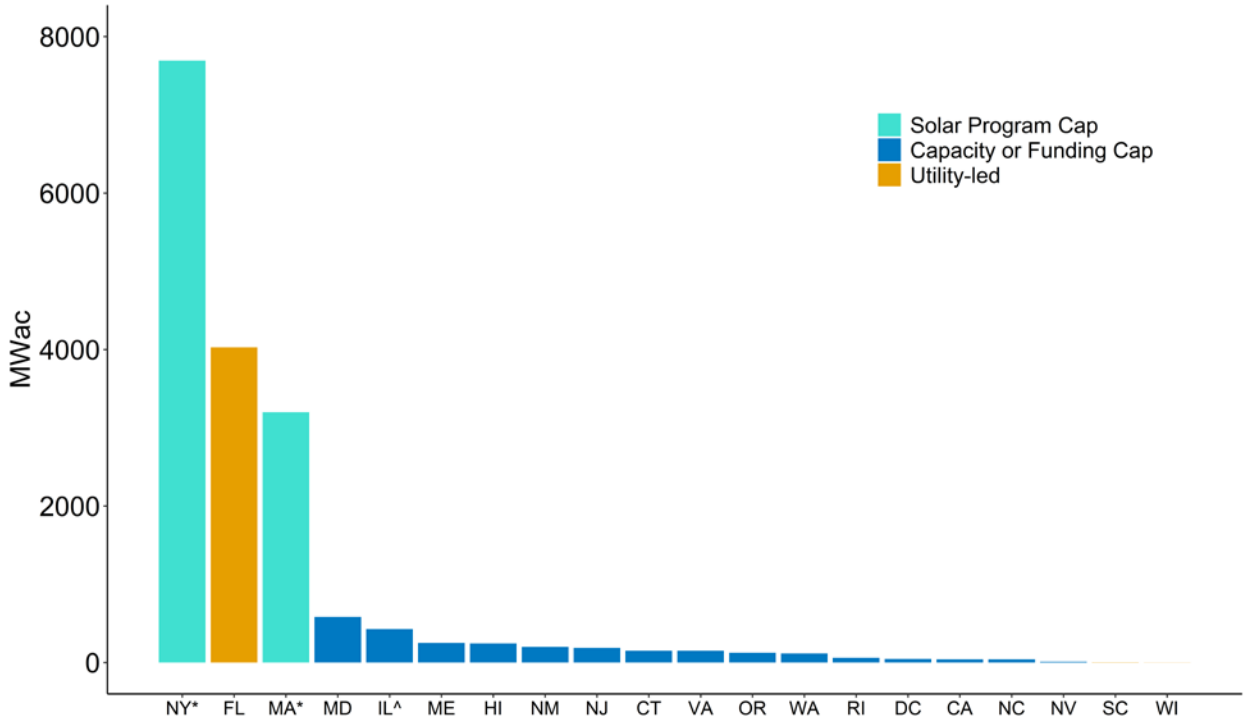

Figure 3. Community solar program caps by state.

Notes: *New York and Massachusetts have caps for solar programs but do not specify the maximum community solar capacity. ^The Illinois Adjustable Block Program cap refers to the initial capacity allocation for the 2022–2023 and 2023–2024 program years. Florida has multiple utility-led community solar programs; the caps represent the total number. Solar DC output capacity has been converted to AC-rated output based on a 1.3 DC/AC ratio.

Table 1. Community Solar Program Caps by State

State	Community Solar Cap
CA	41 MW (Community Solar Green Tariff Program only)
CO	Uncapped
CT	150 MWac
DC	30–60 MW (phase 1)
FL*	4,028 MWac: 1490 MW (FP&L phase 1), 1788 MW (FP&L phase 2), 750 MW (Duke Energy)
HI	8 MWac (phase 1) 235 MWac (phase 2)
IL	426 MWac (delivery year 2022–2024)
MA	3200 MWac for the SMART program, which includes residential and commercial solar
ME	250 MW

State	Community Solar Cap
MD	192 MW (phase 1) 583 MW (phase 2)
MN	Uncapped
NC	40 MW
NJ	78 MWdc (year 1) 165 MWdc (year 2)
NM	200 MWac
NV	10 MW
NY	10 GWdc for the Solar for All program, which includes distributed solar and community solar
OR	160 MWdc
RI	60 MW
SC	3 MW (Duke Energy Carolinas), 1 MW (Duke Energy Progress)
VA	150 MWac (Dominion)
WA	115 MW
WI*	1 MW

Note: Capacities do not specify whether they are DC or AC rated except where indicated.
*This table only includes state- or utility-imposed caps; it does not include projects or programs developed by utilities outside of state programs or regulatory structures (i.e., cooperative utility community solar programs).

3.1 Solar and Community Solar Deployment

By H1 2022, the United States had installed over 99 GWac of solar, and community solar represented 6% (5.7 GWac) of total solar installation.[6] Figure 4 illustrates the percentage of total solar deployment in each state that is community solar. As illustrated, there is no significant relationship between solar deployment and community solar deployment by state. For example, California leads solar development, with over 27 GWac installed cumulatively, yet the portion of community solar in California is less than 50 MWac. In comparison, Minnesota ranks third in community solar installation nationally, with community solar constituting over 65% of the state's solar deployment, yet Minnesota ranks fifteenth in terms of total installed solar. These differences in deployment patterns illustrate the importance of state policy context in the development of community solar projects.

[6] National installation capacity came from Wood Mac (2022), and we converted the DC-rated capacity to AC-rated assuming the average DC/AC ration is 1.3.

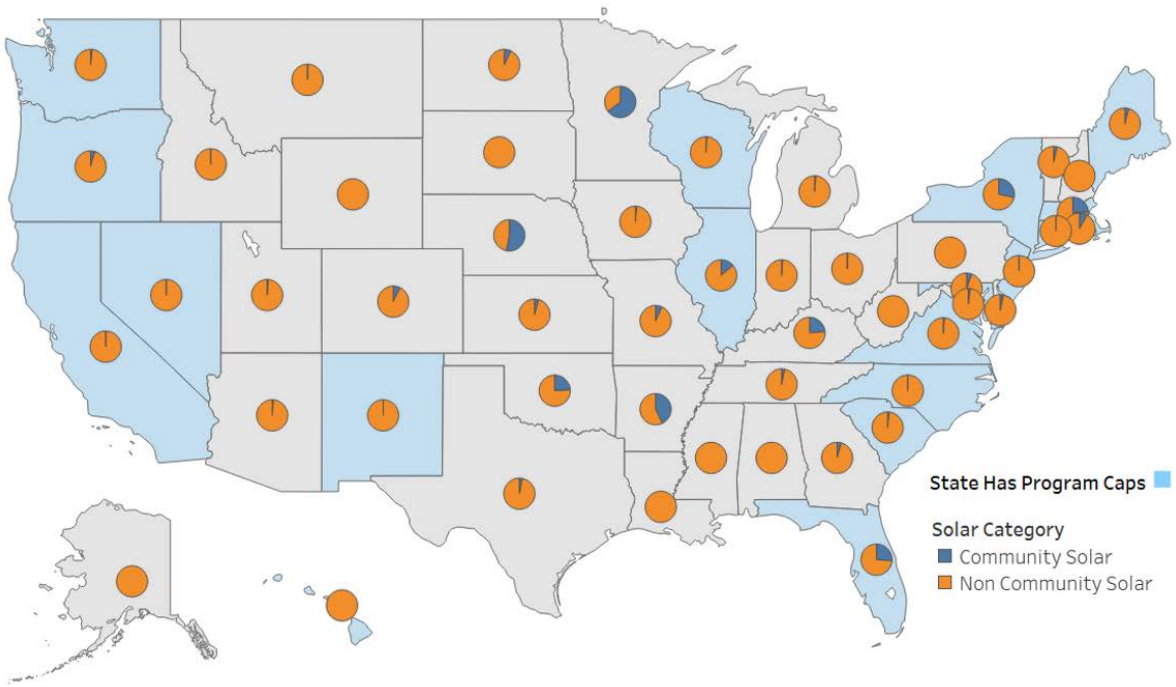

Figure 4. Solar and community solar deployment by state in H1 2022.

From: NREL (2022), Wood Mackenzie (2022)

Figure 5 presents a matrix of states' solar, community solar, and program cap statuses. States marked with blue triangles have no community solar caps. States represented by red circles do have community solar caps. The figure illustrates that states with low solar installations are less likely to have community solar program caps.[7] For example, the 12 states with the lowest solar installation have no community solar caps. In contrast, states with higher levels of solar installed capacity overall, such as North Carolina, Nevada, New Mexico, and Hawaii, have developed community solar program caps, even though their current community solar deployments are not high compared to other states.

[7] There are other drivers of states' implementation of community solar caps, such as subsides in both transmission and distribution, program budget, and interconnection status.

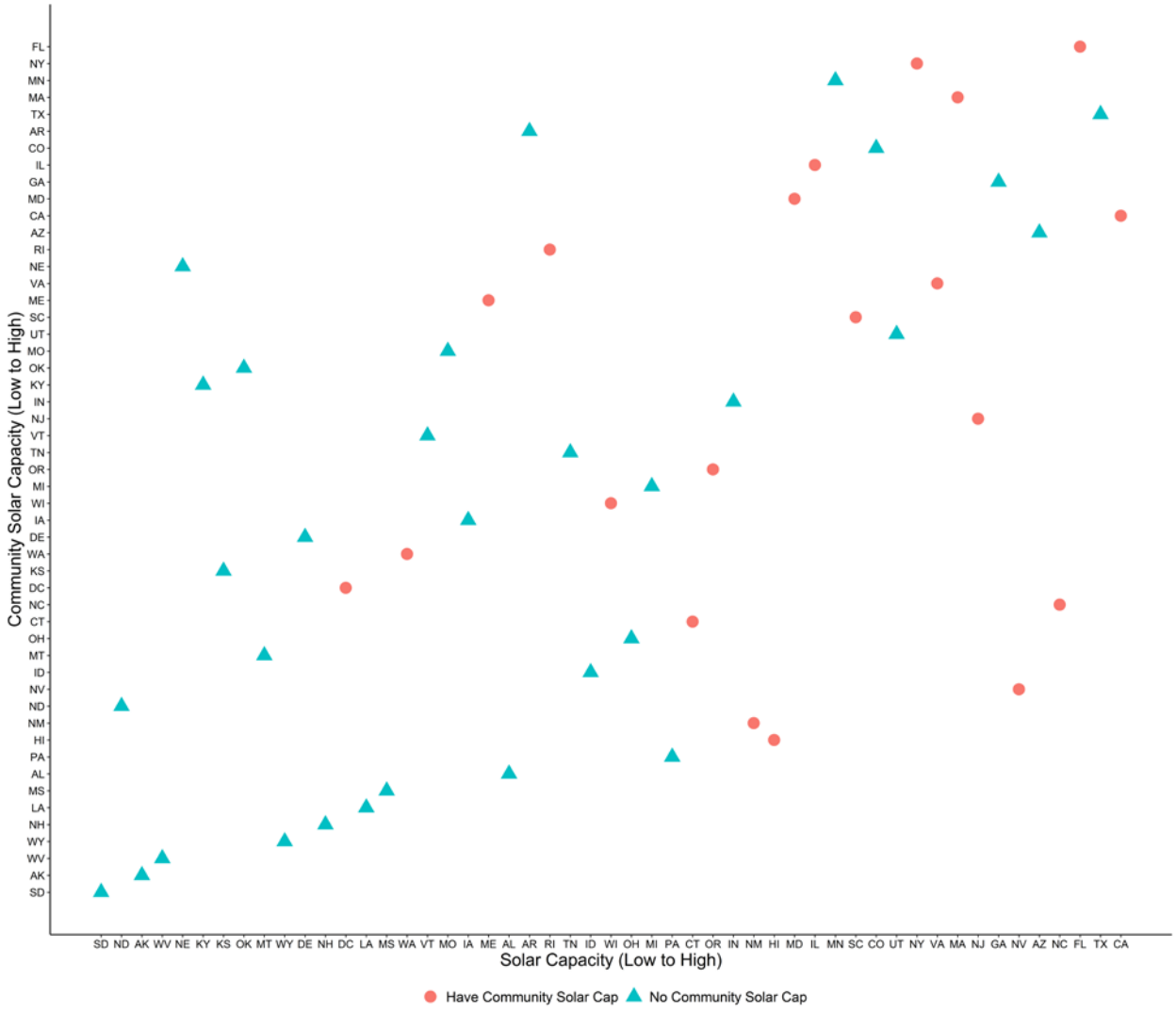

Figure 5. Solar and community solar state rank and program caps matrix.

3.2 LMI Minimums

A subset of community solar programs and policies require projects to serve LMI households. Subscriber organizations can subscribe more LMI households than required, but in practice, the LMI minimums can act as an upper limit, as subscriber organizations may not see a financial benefit to subscribing additional LMI households.

States like Colorado, for example, have no community solar caps. However, they have a certain amount of capacity dedicated to LMI customers (Table 2).

Table 2. State LMI Community Solar Minimums

State	LMI Minimums	LMI Capacity (If Carve-Out)
CO	5% capacity	Unsure
CT	50% of output (10% of output to low-income customers; 40% to a combination of LMI customers, affordable housing facilities, and/or customers who qualify as low-income service organizations)	75 MWac
DC	100,000 customers; all solar projects are dedicated to low-income customers	30–60 MW
DE	15% of subscribers for each project	Unsure
FL	Florida Power and Light (FP&L) specified the dedicated LMI capacity	37.5 MWac (FP&L phase 1)
HI	Require developing carve-out for phase 2	Unsure
IL	There are specific funds applied to LMI community solar, but not capacity-based	Unsure
MA	N/A	1120 MWac for offtaker-based solar, including LMI community solar
ME	10% capacity	25 MW
MD	30% capacity	52 MWac[8]
NJ	40% year 1 projects for LMI	31 MWdc (year 1)
	51% year 2 projects for LMI	84 MWdc (year 2)
NM	30% of each project	60 MWac
NV	25% of customers	Unsure
NY	The old Solar for All (SFA) program set 20% of customers (10,000 SFA subscriptions); the new proposed 10-GW SFA does not have detailed info regarding LMI	Unsure
OR	10% of total capacity	16 MWac for first tier
RI	No	N/A
SC*	400 kW of each program	0.8 MW
VA	30% Dominion; 50% of all programs	45 MWac (Dominion)

Note: Capacities do not specify whether they are DC or AC rated except where indicated.
*South Carolina only has two pilot projects and is not included in the following analysis.

Ten states with community solar program caps have also set minimum carve-outs for LMI subscribers. These states typically require a certain percentage of capacity to be dedicated to LMI subscribers; Figure 6 includes states that have LMI carve-outs for their community solar programs. For example, Oregon requires 10% of their total community solar capacity to be

[8] Maryland has allocated 30% of community solar capacity to LMI projects, and each LMI project must have a minimum of 30% LMI subscriber volume. This refers to the minimum LMI capacity.

dedicated to LMI households, and New Jersey requires 51% of their stage 2 pilot program to be set aside for LMI households. Massachusetts, as mentioned previously, has a cap for all qualified solar generators. In addition, a cap dedicated to LMI qualified solar systems also exists.

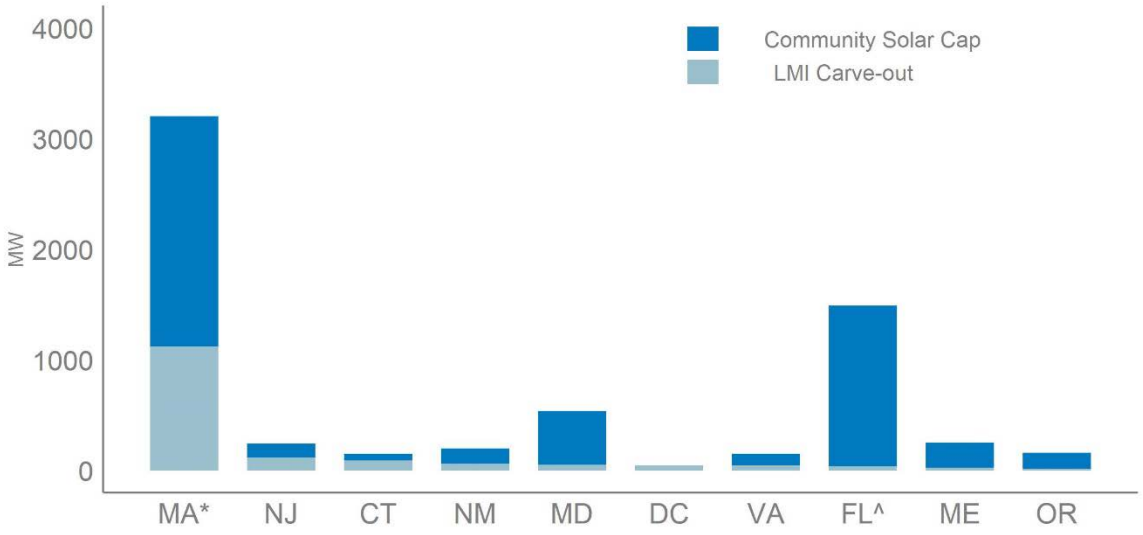

Figure 6. Community solar LMI carve-outs and community solar caps.

*Note: Massachusetts has a 1120-MWac cap for projects that receive offtake-based solar incentives, which includes LMI community solar. All capacities are DC rated except Massachusetts.

^Florida has multiple utility-led community solar programs. The community solar cap and LMI capacity represent the FP&L phase 1 carve-out only.

Figure 7 depicts the penetration of LMI capacity, or the percentage of dedicated LMI capacity that is set aside through community solar programs. The share of LMI community solar as a percentage of total capacity varies by state and program design, from less than 5% in Florida (utility-led program) to 100% in Washington, D.C. (Solar for All program).

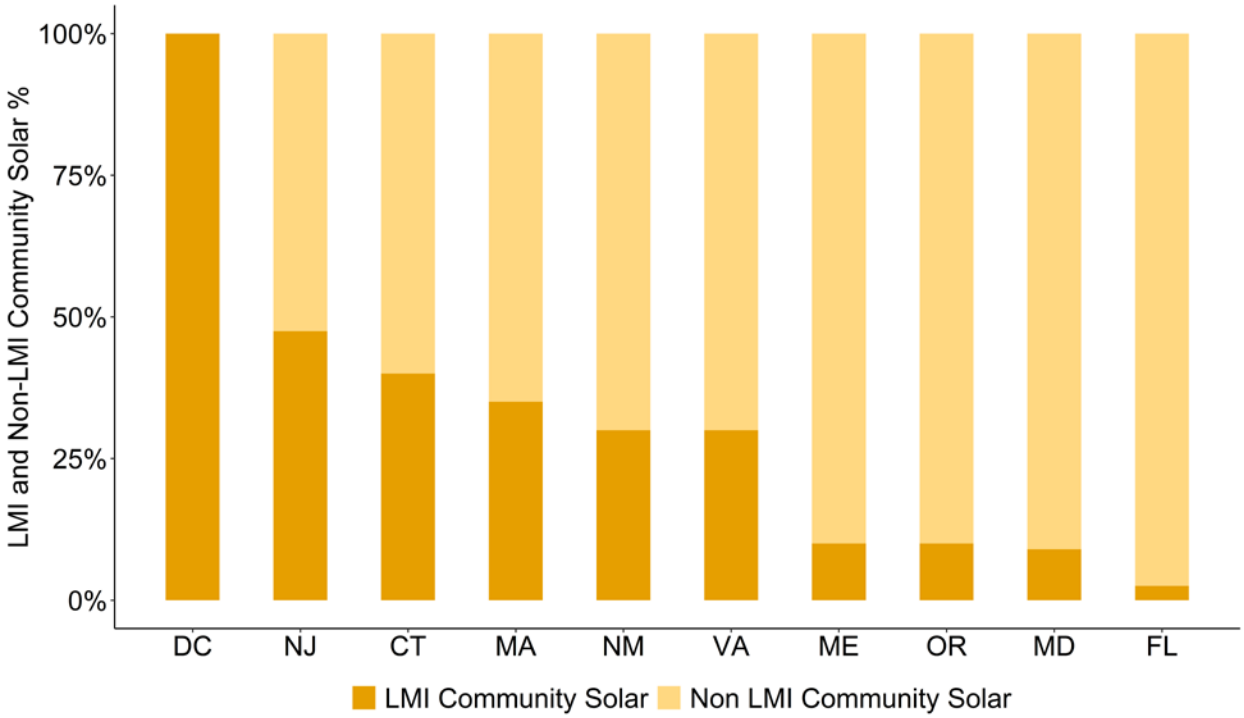

Figure 7. LMI community solar carve-out rates by state program.

4 State Program Cap Evolution

We conducted a literature review and interviews with 14 stakeholders—including three state employees, nine clean energy advocates, and two solar developers—from Minnesota, Maryland, New York, and Illinois. These states represent four different community solar cap design options. In this section, we describe how the different states have considered community solar program caps. Interviewees are anonymous, except where explicitly cited.

4.1 Minnesota

Type of Program Cap	None
Changes to Program Cap	Legislative proposal for a program cap as of June 2022
Pressures To Add a Program Cap	De facto caps like interconnection limits, long queues, lack of land, lack of subscribers in contiguous counties, and utility's desire for certainty
Method of Change	Potential legislation
Lessons for Other States	Uncapped markets can see limits to deployment based on other factors (e.g., interconnection limits) Program caps may evolve over time

Creating the Cap

In 2013, with only 14 MW of solar in the state, stakeholders in Minnesota began negotiating a new legislative energy package (Bierschbach 2017). Building on a U.S. Department of Energy (DOE)-funded community solar study and other proposals to change net metering and add a state solar standard, the Minnesota clean energy advocacy group Fresh Energy noted the opportunity to reduce the costs of solar through learning-by-doing. Learning-by-doing could be accomplished through implementing a community solar program and a feed-in tariff-like incentive known as the Value of Solar Tariff (VOST) (Abbey and Ross 2013).

Fresh Energy had three priorities as the state enabled community solar legislation: (1) anybody could sign up, (2) anybody could develop, and (3) no community solar program cap. The decision to make the program uncapped was seen as a natural extension of the state's existing net metering policy, which had no overall program cap. The community solar legislation was also used as a middle ground between the large-scale solar to be developed under the new solar energy standard and the small-scale solar encouraged by production incentives (Minnesota Department of Commerce 2019).

Managing the Cap

Stakeholders found that developing the program without a cap was not contentious. Other statutory requirements, such as capping individual projects at 1 MWac and limiting eligibility to subscribers located in the same county as or a contiguous county to the project ("contiguous county restriction"), were seen as sufficient checks on the program size. According to one clean energy advocate, many saw that the legislation, in its spirit, was meant to spur community-led

community solar, such as community-owned solar arrays on local bike shops. Many, including the utility Xcel Energy, foresaw it filling a small, niche role in the state's solar ecosystem.

However, due in part to an interim reimbursement rate known as the applicable retail rate (ARR), which functioned similarly to virtual net energy metering (VNEM), and unclear rules that allowed unlimited co-location of community solar projects, the program queue grew to more than 1 GW during the first few months (Trabish 2015). The initial project influx came largely from out-of-state solar developers, such as Sunrise and SunEdison, who had scouted subscribers, land, and interconnection points during the Public Utilities Commission (PUC) rulemaking process. Because of a PUC settlement that lowered project sizes and created new limits on co-located projects (Trabish 2015a), in 2015, Xcel Energy started to work through the backlog of applications to its Solar*Rewards Community Program, with the first projects beginning operation in late 2016 (Figure 8).

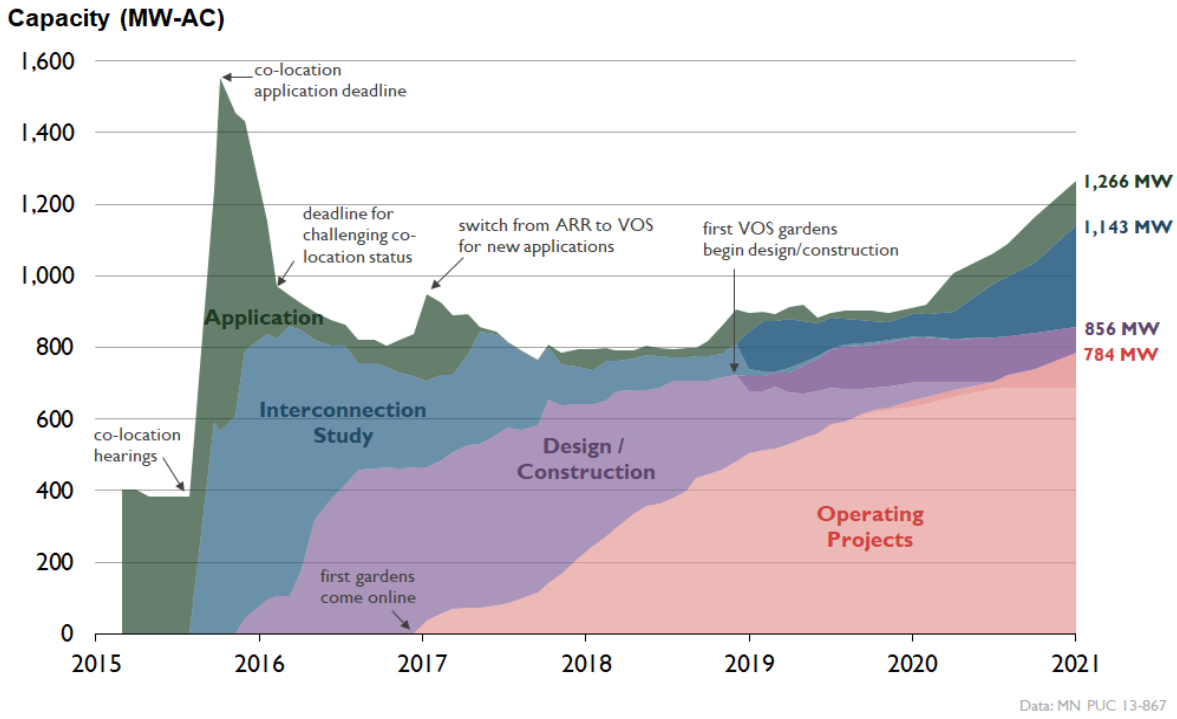

Figure 8. The development timeline for community solar under Xcel Energy's Solar*Rewards Community Program.

Note: This graph shows the capacity of operating projects, projects in the design or construction phase, projects being studied for interconnection, and project applications since the inception of the community solar program. Key events in the development history are noted. Projects under the VOST are shaded darker within each respective category. New applications slowed when the program transitioned to the VOST in 2017, just as the first community solar project was coming online. Data sourced from compliance filings in Minnesota PUC (2022).

Changing the Cap

Community solar development slowed in 2022. Since the program began, Xcel Energy has faced challenges in managing the application and interconnection queues (Trabish 2016, Jossi 2021). Other conditions have also resulted in more limited deployment. Requirements that subscribers reside in counties contiguous to the community solar projects, available distribution capacity, a growing lack of large anchor subscribers, and a somewhat unpredictable VOST incentive (due to

changing calculations and market prices) are all among current barriers to development. In addition, the program has lost policy support among many key organizations and agencies due to increasing perceptions of cross-subsidization and a lack of community-owned or -based projects.

To create changes to program rules regarding subscribers in noncontiguous counties, and to create a reliable reimbursement rate, some clean energy advocates have supported adding an annual or aggregate program cap. A legislative proposal in a recent session would have divided the community solar program into two programs, one of which would be capacity limited. The first would be a capped program that allows larger community solar projects and subscribers from beyond contiguous counties. Projects under this structure would receive a lower reimbursement rate. The second program would be an uncapped program that incentivizes residential and low-income customer participation (Minnesota House of Representatives 2022). As of August 2022, there was no movement on this proposal.

4.2 Maryland

Type of Program Cap	Capacity
Changes to Program Cap	3 year, 196 MW (2017) to 7 year, 418 MW (2020) to 7 year, 583 MW (2021)
Pressures To Increase the Program Cap	Zoning decisions, clean energy advocates, clean energy legislation
Method of Change	Regulation
Lessons for Other States	State policies can require the public service commission or another entity to review community solar programs to inform changes to the program cap

Creating the Cap

Passed in 2015, Maryland's enabling legislation for community solar was originally uncapped, subject only to the state's net metering (NEM) cap of 1,500 MW (Office of People's Counsel 2015), which had been set in 2007 legislation (Vote Solar and the Network for New Energy Choices 2011). Subsequent legislative amendments in 2015 established a program cap, filled over a 3-year pilot period, and left it up to the Maryland Public Service Commission (PSC) to determine the size of the program cap. The PSC's technical staff, working through the Net Metering Working Group (NMWG), brought together advocates to determine the program cap. After great deliberation and many revisions (some felt the pilot was too large, taking up too much of the statewide NEM cap), the program cap was set at 1.5% of the state's total peak demand, or about 196 MW over 3 years. The rules were adopted in June 2016 (Maryland Public Service Commission 2016).

Harry Warren, President of CleanGrid Advisors, recalled that leadership in the Maryland legislature was firm on its stance that community solar in Maryland should start as a pilot program. The legislators had reason for caution: The boom in community solar applications in

Minnesota had led to long application queues. Warren also indicated that Maryland had a successful experience with launching new programs as pilots during its natural gas and electricity restructuring years.

Managing the Cap

When the program first opened, applications were slow, due to several factors, including land use and siting of projects, program incentives, and interconnection processes. A number of counties quickly became opposed to perceived uncapped solar development (Pichaske 2021), which led to bottlenecks in zoning and permitting. To help create more equitable outcomes, the Maryland Energy Administration (MEA) developed a handful of grant programs, including the Community Solar LMI-Power Purchase Agreement (LMI-PPA) Grant Program (Governor's Task Force on Renewable Energy Development and Siting 2020). Although the grant programs had uneven success, the MEA advocated for other LMI measures, such as providing clearer criteria for LMI income verification. Finally, in the program, community solar developers had to submit and be preapproved for interconnection before applying for program capacity (Solar United Neighbors n.d.). Utilities authorized capacity in the community solar pilot program only after the developer had agreed to the interconnection costs provided by the utility. Therefore, the speed at which a project completed its interconnection study effectively defined which projects received a capacity allocation in a given year, thereby creating a bottleneck for community solar development.

Changing the Cap

In 2019, due to delays in getting projects operational, it became apparent that the community solar pilot program needed more time to generate sufficient data to analyze the program. Maryland passed a bill to extend the pilot program from 3 years to 7 years. In addition, legislators directed that the program's capacity should increase every year.

Working through the NMWG, advocates, PSC staff, and others argued for different program cap increases. Eventually, the PSC increased the community solar cap to 4.55%, or about 583 MW. The Coalition for Community Solar Access (CCSA) noted that the increase came alongside legislation to increase the statewide NEM cap to 3,000 MW (Coalition for Community Solar Access 2021). The working group structure, according to Phillip VanderHeyden of the Maryland Public Service Commission, worked well for technical decisions. For policy decisions, like income qualifications for LMI subscribers, the PSC staff sometimes found it challenging to address all stakeholder interests and perspectives.

The PSC finalized new community solar pilot program rules for the program cap (and other program aspects) in early 2022. In 2022, the PSC will finalize their program evaluation report, which is intended to inform potential future state community solar legislation.

4.3 New York

Type of Cap	Cost
Change	Multiple changes to tranches of adders through the Market Transition Credit (2017) and the Community Credit and Community Adder (2019), along with several other adders (2020 and 2022)
Pressures To Increase the Program Cap	Climate legislation, resiliency, solar industry pressure
Method of Change	Regulation, legislation
Lessons for Other States	States may use existing solar policy and incentive frameworks to directly or indirectly cap community solar deployment

Creating the Cap

The precursor of today's community solar program in New York was NY-Sun, an incentive program for solar projects created in 2012. Regulated by the state PSC and implemented by the New York State Energy Research and Development Authority (NYSERDA), this initial program had a goal of 3 GW of distributed solar by 2023. The other driver of today's program was the impact of Hurricane Sandy in 2012. In response to the hurricane, the Governor Cuomo administration established the Reforming the Energy Vision (REV) plan to modernize the electric grid through deliberations with state stakeholders and regulatory agencies.

In 2014, then-Governor Cuomo called for the creation of a community solar initiative (New York Power Authority 2014). This led to the PSC ordering (out of a docket redefining NEM capacity limits in the state) that the state Department of Public Service (DPS) and NYSERDA should work with stakeholders to craft initial rules for a community solar program. DPS staff, who support the PSC as technical experts, convened a stakeholder process to define the community solar program in 2015 (Baker et al. 2019). By July 2015, the PSC had finalized the program. They kept the overall community solar program cap within the state's NEM cap, but reminded utilities that they were to accept community solar applications even if they were above the NEM cap.

Managing and Changing the Cap

With the PSC's reminder to utilities, the 2015 community solar program did not have a community solar capacity cap. Instead, the program was limited by cost, as it was designed to fall under a declining block incentive structure, which had been used for solar generally in the NY-Sun program since 2012. The declining block structure gave higher incentives to the first capacity "blocks" of solar, then declining incentives as capacity increased by utility. As the community solar program opened and continued, ensuing bursts of project development raised concerns that the overall cost of the program to ratepayers was too high. Under initial reimbursement for the program under the NEM rate, solar developers rushed to submit applications and faced long interconnection queues.

As the state transitioned to reimbursement under the Value Stack (also called the "Value of Distributed Energy Resources" or "VDER"), the reduction in effective reimbursement for distributed energy resource (DER) generation like community solar raised concerns. To ease the impact of the change on community solar and other solar developers, the PSC ordered what was the first of declining blocks of incentives: the Market Transition Credit (MTC). In 2019, with the expiration of the MTC, the PSC ordered a second round of incentives called the Community Credit (CC). The CC was open to small and large subscribers alike. Utilities still under their 2% revenue cap would continue to collect incentive funds for the CC from their pools of customers. For utilities already beyond their caps, an upfront incentive called the Community Adder (CA) was created that would instead draw from statewide funds administered by NYSERDA. For each of the MTC, CC, and CA, tranches were calculated through unique combinations of forecasted hurdle rates, cost estimates for developing solar projects, and local values for solar projects. On average, the incentives have fallen over time (Figure 9).

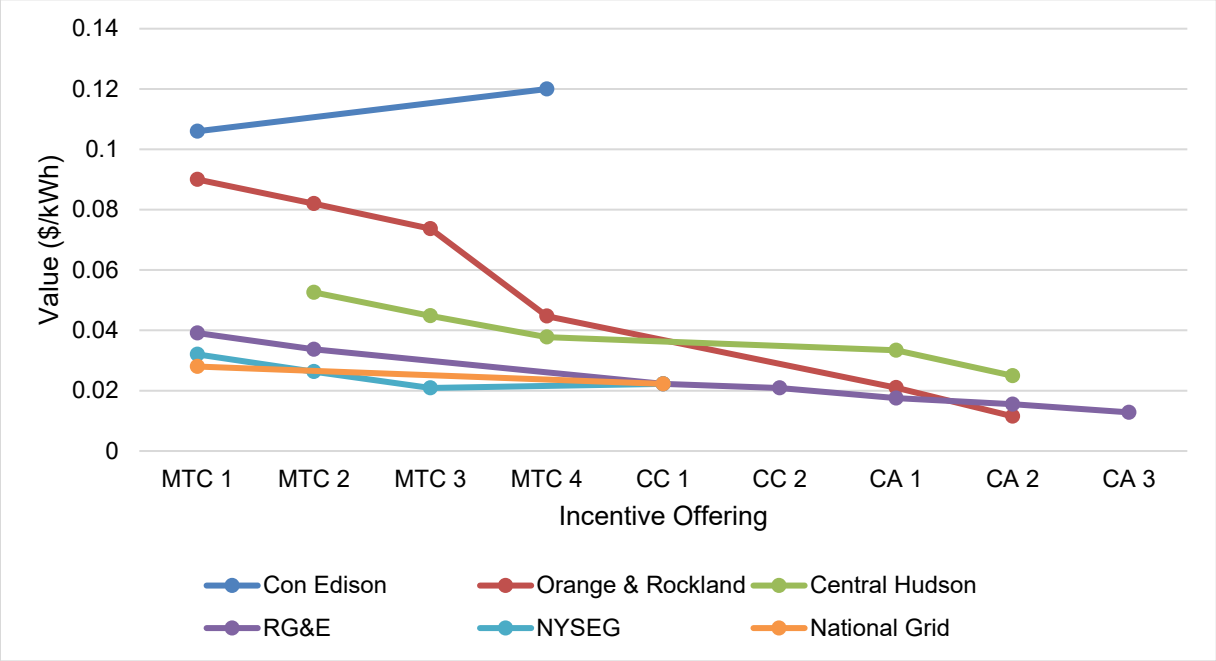

Figure 9. Market transition credit, community credit, and community adder rates spread over tranches of development.

From: NYSERDA (2021)

In 2019, the New York legislature passed the Climate Act, increasing NY-Sun's target to 6 GW by 2025. Meanwhile, in 2019, the PSC authorized consolidated billing for community solar projects, allowing community solar charges and credits to be collected on a subscriber's utility bill. Then, in 2020, newly empowered by the legislature, the PSC issued an order for an additional $573 million in state funding to support the new goal, also adopting the Solar Energy Equity Framework, which directed $200 million toward equitable solar projects. In adopting these funding commitments, the PSC also created specific adders for community solar projects on brownfields and those serving affordable housing, and LMI subscribers.

In 2021, Governor Hochul expanded NY-Sun's target again—to 10 GW by 2030. By this point, four years of different community distributed generation (CDG) adders had been exhausted, but these adders had led to 1,600 MW of solar development overall, including more than 1 GW of CDG (Peters 2021). Despite the fact that New York is the nation's leading community solar market, the state still saw the emergence of several barriers to continued development, including community resistance to mostly rural-sited projects and long interconnection queues (Mehta et al. 2021). In 2022, the PSC formally expanded the NY-Sun initiative once more, including expanded incentives for LMI customers as well as opt-out community solar for community choice aggregators (New York Public Service Commission 2022).

4.4 Illinois

Type of Program Cap	Capacity based on cost (Illinois Shines) and cost alone (Solar for All)
Changes to Program Caps	Incentives for Illinois Shines community solar changed as a result of general renewable portfolio standard funding, from 2.015% of all customers' rates in 2007 (2016 legislation) to 4.25% of all customers' rates in 2009 (2021 legislation). For Solar for All, the budget for the rate cap rose from $30 million (2016 legislation) to $50 million (2021 legislation). The total fund jumped to $66.5 million based on allocations of ratepayer funds, in addition to alternative compliance funds.
Pressures To Increase the Program Cap	Long waitlist for the program; growing community solar developer presence; environmental and energy justice concerns; and larger landscape issues in Illinois, like nuclear incentives, corruption scandals, and labor
Method of Change	Legislation
Lessons for Other States	Community solar program caps may be established through limits to funding Community solar program caps may be negotiated between stakeholders as part of the establishment of broader state energy legislation

Creating the Cap

In 2007, Illinois created the Illinois Power Agency (IPA) to manage funds available for the renewable portfolio standard (RPS). The RPS was to be funded based on a fixed bill impact cap percentage: 2.015% of 2007 rates of eligible retail customer loads (Illinois Power Agency 2022). The original RPS was "broken," according to the IPA, making it difficult to foresee a fix without a massive legislative overhaul. The RPS overhaul took years to pass in its entirety (Shepard n.d.). The passage occurred as the electric utility Exelon was seeking nuclear subsidies to stabilize its revenue in 2014 (Goldberg and McKibbin 2018). Realizing the policy window, a coalition of stakeholders, advocates, and businesses called the Illinois Clean Jobs Coalition was created. The Future Energy Jobs Act (FEJA) was passed as part of a broad package of energy legislation related to jobs, efficiency, nuclear energy, climate, and justice.

FEJA didn't change the rate cap of the RPS, but instead applied it to *all* retail sales in Illinois. Among the items in FEJA was community solar, which had been studied by Elevate Energy and

Cook County, among other organizations, under a DOE grant (Cook County Department of Environmental Control 2015). In FEJA, two new programs were created that featured dedicated carve-outs for community shared solar (CSS) projects: the Adjustable Block Program (called Illinois Shines) and the equity-focused Solar For All (SFA) program. Through Illinois Shines, FEJA established renewable energy certificate (REC) incentives based on first-come, first-served blocks of declining incentives. At least 25% of those incentives were to be spent on community solar, the others being set aside for large and small distributed solar projects. Unlike Illinois Shines, SFA had no specific REC targets. Instead, annual budgets (derived from the Illinois Shines RPS funds and the Renewable Energy Resources Fund) limited the amount of community solar developed under SFA.

Through a series of spreadsheet models, the IPA set the REC prices for Illinois Shines and SFA by calculating the revenue and incentive levels required for a typical distributed solar or community solar project to meet its threshold investment requirements as well as the associated price in $/REC ("the REC price"). The calculated REC price was representative of a price that would be sufficient to allow a developer of a typical system to meet a project's expenses and debt service obligations as well as the equity investors' minimum required after-tax rate of return. The IPA conducted this process as part of the Long-Term Renewable Resources Procurement Plan (LTRRPP) with the Illinois Commerce Commission (Figure 10).

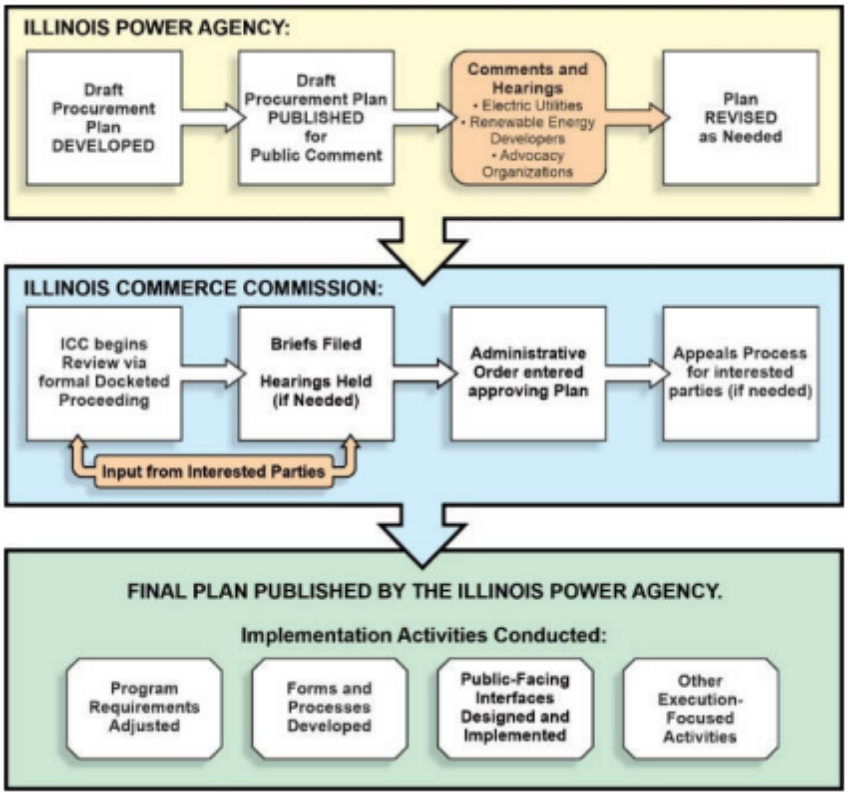

Figure 10. Development of the Long-Term Renewable Resources Procurement Plan.

From: Mautino (2021)

Note: The LTRRPP provides the rationale and backbone for how REC incentives and quantity allocations for community solar are created in Illinois. The LTRRPP is required to be updated through the same process every two years.

Managing the Cap

Illinois Shines launched to great interest in January 2019. More than 1.8 GW of CSS project applications poured in (Roselund 2019)—more than 10 times the amount allocated by the IPA—following what one developer foresaw at the time as "not only market confusion, but market failure" (Merchant 2018). However, ultimately over 90% of projects awarded have been successfully developed.

To award capacity, the IPA had planned a lottery. Sensing competition for both lines, some developers contended that other developers had submitted applications for underdeveloped projects to create more chances to win the lottery (Lydersen 2018). When it came time, the IPA awarded 112 REC delivery contracts out of the 919 applications (Illinois Power Agency 2020). The rest were left on a waitlist without a timeline. The random sort awarded some developers while leaving others without a project slot.

Meanwhile, because SFA required an application, with a complex rubric approval and selection process based on factors including ownership, size, siting, and anchor subscriber ownership, there was considerably less interest in SFA than in Illinois Shines. Even so, SFA was still competitive. Only four of 45 projects were selected for the initial year's community solar program, mostly in rural areas.

In both segments of the community solar program, interconnection processes and securing land tended to create long queues on rural feeders. With high upgrade costs, many projects fell by the wayside.

Changing the Cap

As a restructured state, Illinois often requires broad energy legislation to create changes in its energy system. For years, knowing the flaws in FEJA, advocates from the Clean Jobs Coalition and other coalitions tried to advance legislation to properly amend the program (Lydersen 2019). In late 2021, all parties finally helped pass the Clean Energy Jobs Act (CEJA). Like FEJA, CEJA was a comprehensive energy policy makeover for Illinois; it included the retirement of coal plants, more clean energy jobs, and more clean energy incentives.

The cost cap for community solar was a product of the bill's overall RPS cost cap. Increasing that cap was the result of legislators arguing that average electricity bills should only increase by $2 per month under the new legislation. Provisions that protected low-income ratepayers from the rate increase, through programs like weatherization and rate plans, were essential to passing the legislation. Working back from the $2 bill increase, lobbyists, advocates, and staffers ultimately said that the cost cap could increase from 2.015% to 4.25% of retail energy bills in Illinois.

The community solar provisions in CEJA built on lessons from FEJA. Due to the added political presence of community solar developers in the state since FEJA, the new legislation also proposed that solar and community solar should have a larger share of RECs than in FEJA. Labor unions negotiated a prevailing wage for larger community solar projects. Equity provisions in the bill, in the form of community-driven community solar in Illinois Shines and increased funding for Solar for All, as well as minimum equity standards applicable to the

project workforce for projects supported by Illinois Shines, helped smooth over concerns that community solar had been less community-based in FEJA.

The IPA redeveloped its LTRRPP in early 2022 and finalized it in March 2022; that plan was then filed with the Illinois Commerce Commission for approval and approved in July 2022 (Illinois Power Agency n.d.). The IPA shifted from a procurement-only agency to a procurement-and-planning agency after FEJA, and then, after CEJA, it became more focused on equity and qualitative results. The IPA will continue to revise the LTRRPP every 2 years, allowing for new build targets for community solar and community-driven community solar.

5 Design and Implementation Issues for States

State regulators often use program caps or pilot programs to balance costs while gaining knowledge about best practices (Michigan Public Service Commission 2020). Program caps are often heavily negotiated between stakeholders as part of the process of establishing enabling legislation for community solar. In some cases, utilities without a clear business incentive to support community solar may be resistant to an uncapped community solar program that uses third-party solar developers. On the other hand, solar developers eager to work in a new state typically support uncapped community solar programs that allow unlimited participation. Every state makes its own decision about community solar program caps in response to its market and goals, with no two states taking the same approach.

States have evolved their decision-making around community solar program caps in a variety of contexts. In Minnesota, the decision to have an uncapped community solar market was born from the state's existing NEM policy, which was also uncapped. In contrast, in Maryland, the state legislature preferred a program cap after seeing the booming markets in other states, which were leading to long application queues. In addition, Maryland had previously used pilots when it restructured the state's natural gas and electricity markets. In New York, the state used its NEM program cap to cap community solar, along with a funding cap on the incentives available to community solar via the NY-Sun program. In Illinois, the state has used a funding-based cap as well as a capacity-based cap.

Community solar deployment has been concentrated in a limited number of states. Of the top 10 states with community solar deployment, five have program caps and five are uncapped (Figure 11). In states with program caps, installed community solar capacity ranges from 10% to 40% of the program cap. However, it should be noted that New York's and Massachusetts' program caps are for all solar generation, not just community solar.

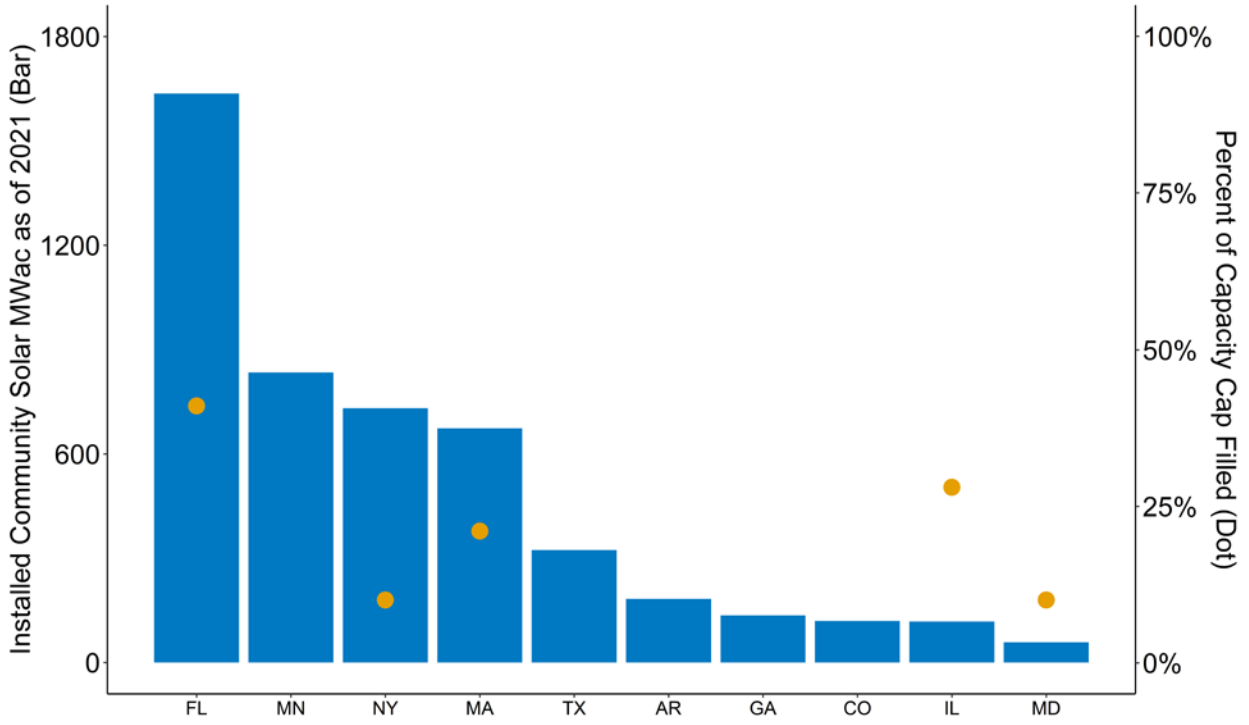

Figure 11. Installed community solar capacity compared to program caps in top 10 community solar states (by installed capacity).

Note: Minnesota, Texas, Arkansas, and Colorado do not have community solar program caps. The Illinois program refers to the program capacity allocated as of 2024.

As states consider expanding or removing their community solar program caps, they can evaluate the following key considerations and questions to determine the best path forward.

Interacting With State Renewable or Clean Energy Goals

Community solar deployment can be used to support broader state energy or social objectives, for example, achieving state renewable portfolio standards or reducing low-income household energy burden. Some states are seeing rapid growth in community solar projects as part of their overall renewable energy mix. For example, in New York, community solar contributes to the state's target of 10 GW of distributed solar PV. If a state sets a community solar program cap, it might not be able to meet its broader renewable or clean energy goals. In relation to their other renewable or clean energy goals, states could consider:

- How would the inclusion of a community solar program cap impact the state's ability to meet its renewable energy or climate goals?
- If there is a current community solar program cap, when would it need to be expanded in order for community solar to continue to contribute to the state's renewable or clean energy goals?

Providing Equity in Access to Solar Options

States with existing solar deployment policies may have an interest in ensuring that all consumer types have access to community solar. For example, if a state has no NEM cap, they might also decide not to have a community solar program cap. Similarly, if a state has a financial cap on solar incentives, it might also cap community solar program funding. These parallel structures may be the result of the state's policy and administrative environment, but may also result from a desire to ensure that all consumer types have similar levels of access to solar products that meet their needs. For example, if a state has limited NEM deployment, the state may also limit community solar deployment so that both net metered projects and community solar projects are deployed at similar levels. In relation to equity in access to solar options, states could consider:

- Does the state have limitations on solar development (e.g., a NEM cap or funding cap on solar incentives)?
- If so, does the state want to cap community solar to allow similar levels of deployment for community solar and net metered solar projects?

Creating Viable Community Solar Markets

Creating a community solar program cap that is too small can lead to a lack of interest by project developers. Without sufficient developer interest, the program may be slow to develop and may be perceived as unsuccessful. The Coalition for Community Solar Access, the trade association for community solar developers, argues that at minimum, a community solar program should be able to grow to the size of the state's on-site PV market within 2 years (Coalition for Community Solar Access 2019). In relation to establishing viable community solar markets, states could consider:

- How active are solar developers in the state currently?
- How much added capacity would incentivize new developers to come to the state?

Ensuring Market Stability

Having an uncapped market, or a market with a cap and a known timeline and process for expanding the cap, can provide more stability to project developers and subscriber organizations. Project developers and subscriber organizations benefit from knowing that they can work in a single market for multiple years to make sufficient investments in developing projects and a subscriber base.

To avoid a "boom and bust" cycle of project development, states considering uncapping their markets or raising their caps may want to consider enough time to ensure that final regulations are in place before existing program caps are reached. In Maryland, community solar program caps were revised over time, through a working group process that included different parties with multiple objectives. The process was not without challenges; in particular, having the PSC staff act as facilitators as well as participants was challenging, because they were tasked with both gathering input and providing input at the same time. In relation to ensuring market stability, states could consider:

- Does the state have an established review cycle for their community solar policy?

- Can the state provide enough time when reviewing their policy to ensure that market participants have enough time to adjust?

Investigating Other Community Solar Limiting Factors ("De Facto" Caps)

Some policies and regulations can also create "de facto" caps that hinder community solar development. For example, interconnection barriers, a low number of large subscribers, and subscribers outside of contiguous counties were all cited as factors hindering community solar deployment in Minnesota, which does not have a program cap in place. Larger issues such as solar renewable energy certificate prices and NEM program caps can limit community solar deployment, as was evidenced in Maryland. Even if a state does not implement a community solar program cap, it may be inherently limiting project development in other ways.

In uncapped community solar programs, interconnection barriers can serve as caps on deployment. For example, in Minnesota, the utility's interpretation of hosting capacity limits has limited the amount of community solar that can be installed.

Limitations on the physical grid and siting considerations can also limit community solar development. For example, as New York became a leading state for community solar development, it did so through mostly rural development that relied on aging electric grid infrastructure, thereby possibly limiting future capacity development. In addition, customer perceptions of community solar have created conflict between solar developers and local agricultural and environmental needs. This inherent limit to community solar deployment is important for states to consider as they develop community solar policies.

In relation to other factors that can limit community solar deployment, states could consider:

- Does the state have interconnection policies that limit the amount of community solar that can be installed by location or other factors?
- Is community solar limited by siting concerns, such as the use of agricultural land for community solar? Will these concerns add a "de facto" cap on the community solar program?

Using State Agencies to Develop Policies, Support Working Groups, and Design Programs

Many state agencies can have the authority to establish and revise community solar programs. The executive branch of New York—embodied by the PSC, DPS, and NYSERDA—shows how broad discretion among state agencies can enable successful community solar development. New York's executive branch has shepherded community solar policies, including the VDER tariff, that have led to more than 1 GW of deployed community solar.

Decisions around how to recover the costs of community solar programs are often left to the state utility regulatory commissions. States considering new or expanded community solar caps could consider:

- What state agencies should be involved with community solar? Do those agencies have legislative support to be involved?

- What authority does the utility regulator have to determine how costs of community solar programs are allocated to ratepayers?

6 Summary

Twenty-two states and Washington, D.C., have active community solar enabling legislation, and additional states are pursuing new enabling legislation. A key piece of existing community solar policies has been how states cap their community solar programs, typically through a capacity cap (MW) or a funding cap. To date, 18 states and Washington, D.C., have implemented program caps. In addition, 10 states with LMI-specific community solar provisions have set *minimum* requirements for those programs, which in turn tend to act as de facto caps, as subscriber organizations may not see the value in targeting additional LMI customers.

The paper highlights different approaches that states have taken when examining program caps:

- In Minnesota, no community solar program cap is in place. However, deployment is limited by other policy factors, such as interconnection limits. The state is considering implementing a program cap.
- In Maryland, the state set a program capacity cap, which has been revised multiple times. The state relies on working groups to develop proposals to revise the cap; the PSC was also tasked with providing a program evaluation in 2022.
- In New York, the state uses a cost cap approach. The program, as established in 2015, did not have a program cap, but because it falls under the state's incentive framework, it is limited by the caps on funding dedicated to community solar projects. Illinois also uses a cost cap approach, using a lottery system to award projects for funding.
- In Illinois, the state has multiple community solar related programs. The Illinois Shines program aims to deploy 400 MW of community solar projects by 2030. On the other hand, the Solar for All program provides grants for building solar.

As states consider expanding or modifying their community solar program caps, the following key considerations can help guide their decision-making:

- Interacting with state renewable or clean energy goals
- Providing equity in access to solar options
- Creating viable community solar markets
- Ensuring market stability
- Investigating other community solar limiting factors ("de facto" caps)
- Considering the interaction with interconnection policies
- Understanding physical grid and land limits
- Using state agencies to develop policies, support working groups, and design programs
- Allocating the costs of program credits to ratepayers.

States may want to review a series of key questions as they expand or modify their community solar program caps; these questions can be found in Table 3.

Table 3. Summary of State Considerations for Expanding or Modifying Community Solar Program Caps

Interacting with state renewable or clean energy goals	How would the inclusion of a community solar program cap impact the state's ability to meet its renewable energy or climate goals? If there is a current community solar program cap, when would it need to be expanded in order for community solar to continue to contribute to the state's renewable or clean energy goals?
Providing equity in access to solar options	Does the state have limitations on solar development (e.g., a NEM cap or funding cap on solar incentives)? If so, does the state want to cap community solar to allow similar levels of deployment for community solar and net metered solar projects?
Creating viable community solar markets	How active are solar developers in the state currently? How much added capacity would incentivize new developers to come to the state?
Ensuring market stability	Does the state have an established review cycle for their community solar policy? Can the state provide enough time when reviewing their policy to ensure that market participants have enough time to adjust?
Investigating other community solar limiting factors ("de facto" caps)	Does the state have interconnection policies that limit the amount of community solar that can be installed by location or other factors? Is community solar limited by siting concerns, such as the use of agricultural land for community solar? Will these concerns add a "de facto" cap on the community solar program?
Using state agencies to develop policies, support working groups, and design programs	What state agencies should be involved with community solar? Do those agencies have legislative support to be involved?

References

Abbey, Ross, and Ross, Brian. 2013. *Market Transformation Pathways for Grid-Connected Rooftop Solar PV in Minnesota*. Fresh Energy. https://doi.org/10.2172/1225367.

Baker, S., S. DeVar, and S. Prakash. 2019. *The Energy Justice Workbook*. Initiative for Energy Justice. https://iejusa.org/section-3-case-studies-of-california-and-new-york-community-energy-programs/.

Bierschbach, Briana. 2017. "Everything You Need To Know About Omnibus Bills, and Why They're So Popular at the Minnesota Legislature." *MinnPost*. March 31, 2017. https://www.minnpost.com/politics-policy/2017/03/everything-you-need-know-about-omnibus-bills-and-why-theyre-so-popular-minne/.

Coalition for Community Solar Access. 2019. *Community Solar Policy Decision Matrix: Guidance for Designing Community Solar Programs*. Coalition for Community Solar Access. http://www.communitysolaraccess.org/wp-content/uploads/2019/04/2019CommunitySolarPolicyMatrix-2.pdf.

Coalition for Community Solar Access. 2021. Comments. Administrative Docket RM 56. Maryland Public Service Commission. March 15, 2021.

Cook County Department of Environmental Control. 2015. "State of Community Solar in Cook County." Presentation. SunShot Initiative. https://dev.elevatenp.org/wp-content/uploads/Cook-County-Community-Solar-Opportunity-Assessment-Part-1-6.29.15.pdf.

Davis, Michelle. 2022. *US Commercial Solar Competitive Landscape 2022.* Wood Mackenzie. https://nrellibrary.nrel.gov/store/WoodMackenzie/2022/WM_USCSCL_2022.pdf.

de la Mora, Rebekah, Brian Lips, Vincent Potter, Autumn Proudlove, and David Sarkisian. 2022. *The 50 States of Solar: Q1 2022 Quarterly Report.* Raleigh, North Carolina: North Carolina Clean Energy Technology Center. https://nrellibrary.nrel.gov/store/NCSU/2022/NCSU_50StatesofSolar_Q12022.pdf.

DOE. n.d. "National Community Solar Partnership." Accessed November 28, 2022. https://www.energy.gov/communitysolar/community-solar.

Goldberg, L., and A. McKibbin. 2018. "Breakthroughs in Equity and Energy in Illinois." ACEEE Summer Study on Energy Efficiency in Buildings. https://www.elevatenp.org/wp-content/uploads/Breakthroughs-in-Equity-and-Energy-in-Illinois.pdf.

Governor's Task Force on Renewable Energy Development and Siting. 2020. *Governor's Task Force on Renewable Energy Development and Siting: Final Report*. Prepared for Governor Larry Hogan. https://governor.maryland.gov/wp-content/uploads/2020/09/REDS-Final-Report.pdf.

Illinois Power Agency. n.d. "Renewable Resources." Illinois Power Agency. https://www2.illinois.gov/sites/ipa/Pages/Renewable_Resources.aspx.

Illinois Power Agency. 2018. *Long-Term Renewable Resources Procurement Plan.* Illinois Power Agency. https://ipa.illinois.gov/content/dam/soi/en/web/ipa/documents/2019procurementplan/long-term-renewable-resources-procurement-plan-(8-6-18).pdf#page=172.

Illinois Power Agency. 2020. *Project Selection for Future ABP Community Solar Blocks: Request for Stakeholder Feedback*. Illinois Power Agency. https://illinoisabp.com/wp-content/uploads/2020/11/Community-solar-project-selection-stakeholder-feedback-request-23-Nov-2020-1.pdf.

Illinois Power Agency. 2022. *2022 Long-Term Renewable Resources Procurement Plan: Filed for Illinois Commerce Commission Approval*. Illinois Power Agency. https://ipa.illinois.gov/content/dam/soi/en/web/ipa/documents/2022-long-term-renewable-resources-procurement-plan-(21-mar-2022).pdf

Illinois Solar Energy Association. n.d. "Illinois Opens Doors to Community Solar." Illinois Solar Energy Association. Accessed August 23, 2022. https://illinoissolar.org/Community-Solar-RPS.

Heeter, J., R. Gelman, and L. Bird. 2014. *Status of Net Metering: Assessing the Potential to Reach Program Caps.* Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-61858. https://www.nrel.gov/docs/fy14osti/61858.pdf.

Jossi, F. 2021. "Long Waits To Connect to Xcel's Grid Are Stalling Minnesota Solar Projects." *Energy New Network*. September 20, 2021. https://energynews.us/2021/09/20/long-waits-to-connect-to-xcels-grid-are-stalling-minnesota-solar-projects/.

Lydersen, K. 2018. "'Lottery Ticket' Comment Highlights Potential Pitfall of Illinois Solar Program." *Energy News Network*. November 20, 2018. https://energynews.us/2018/11/20/solar-lottery-comment-highlights-potential-pitfall-of-illinois-program/.

Lydersen, K. 2019. "Yet Another Illinois Energy Bill Seeks To Avoid 'Cliff' in Renewable Development." *Energy News Network*. March 20, 2019. https://energynews.us/2019/03/20/yet-another-illinois-energy-bill-seeks-to-avoid-cliff-in-renewable-development/.

Maryland Public Service Commission. 2016. "Maryland PSC Adopts Regulations for Community Solar Pilot Program." Maryland Public Service Commission. Press Release. June 15, 2016. https://www.psc.state.md.us/wp-content/uploads/Maryland-PSC-Adopts-Community-Solar-Regulations_06152016.pdf.

Mautino, F. 2021. *Performance Audit of the Illinois Power Agency – Future Energy Jobs Act*. State of Illinois Office of the Auditor General. https://www.auditor.illinois.gov/Audit-Reports/Performance-Special-Multi/Performance-Audits/2021_Releases/21-IPA-Future-Energy-Jobs-Act-Perf-Full.pdf.

Mehta, S., E. O'Neil, and D. Schultz. 2021. *Realizing the Potential for Community Solar in New York State: Benefits, Barriers, and Solutions*. New York Solar Energy Industries Association. https://www.ysgsolar.com/sites/default/files/nyseia_-_realizing_the_potential_for_community_solar_in_new_york_state_1.pdf.

Merchant, E.F. 2018. "Inside the 'Chaos' Enveloping Illinois' Distributed Solar Market." *Greentech Media*. October 16, 2018. https://www.greentechmedia.com/articles/read/inside-the-chaos-enveloping-illinoiss-distributed-solar-market.

Michigan Public Service Commission. 2020. *Utility Pilot Best Practices and Future Pilot Areas: Michigan Public Service Commission Staff Report.* Michigan Public Service Commission. https://www.michigan.gov/documents/mpsc_old/MPG_Pilots_Report093020_703895_7.pdf.

Minnesota Department of Commerce. 2019. *Minnesota Renewable Energy Standard: Utility Compliance.* https://www.leg.mn.gov/docs/2019/mandated/190330.pdf.

Minnesota PUC. 2022. *Docket# E002/M-13-867.* Minnesota Public Utilities Commission. https://efiling.web.commerce.state.mn.us/verification/viewServedDocument.do?method=showSubmissionInfo&reqFrom=viewServedDocuments&selectedId=125836&docketNumber=E002/M-13-867&showList=true

Minnesota House of Representatives, 92nd Legislature. HF 1397. Office of the Revisor of Statutes. January 31, 2022. https://www.revisor.mn.gov/bills/text.php?number=HF1397&session=ls92&version=list&session_number=0&session_year=2021&keyword_type=exact&keyword=community+solar.

New York Power Authority. 2014. "Governor Cuomo Launches New Effort to Boost Solar Implementation in Communities Across New York State." New York Power Authority. Press Release. December 5, 2014. https://www.nypa.gov/news/press-releases/2014/20141205-cuomo-solar-communities.

New York Public Service Commission. 2022. *Order Expanding NY-Sun Program*. New York Public Service Commission. April 14, 2022. https://documents.dps.ny.gov/search/Home/ViewDoc/Find?id=%7B298420FB-55C2-4879-ADFC-6660D2CF144B%7D&ext=pdf.

NREL. 2022. "Sharing the Sun Community Solar Project Data." National Renewable Energy Laboratory. Accessed December 5, 2022. https://data.nrel.gov/submissions/203.

NYSERDA. 2021. "New York's 10 GW Distributed Solar Roadmap: Policy Options for Continued Growth in Distributed Solar. NEW York State Energy Research and Development Authority. December 17, 2021. https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B4C42AAFF-0EB9-4890-AA0D-21C70B088F4B%7D

Office of People's Counsel. 2015. Comments. Administrative Docket RM 56. Maryland Public Service Commission. December 4, 2015.

Peters, K. 2021. "New York Redefines the Future of Community Solar." *Solar Power World*. May 13, 2021. https://www.solarpowerworldonline.com/2021/05/new-york-redefines-the-future-of-community-solar/.

Pichaske, P. 2021. "Maryland Counties Grapple With Controlling Growth of Solar Farms." *Maryland Daily Record*. July 23, 2021. https://thedailyrecord.com/2021/07/23/maryland-counties-grapple-with-controlling-growth-of-solar-farms/.

Roselund, C. 2019. "Illinois Community Solar Block Grants 10x Over-Subscribed." *PV Magazine*. February 14, 2019. https://pv-magazine-usa.com/2019/02/14/illinois-community-solar-block-grants-10x-over-subscribed/.

Shepard, C. n.d. "Future Energy Jobs Act." Presentation. Illinois Environmental Council. https://www.istc.illinois.edu/UserFiles/Servers/Server_427403/File/Shepherd_FEJA.pdf.

Solar United Neighbors. n.d. *Community Solar in Maryland: Year 2*. Washington, D.C.: Solar United Neighbors. https://www.solarunitedneighbors.org/wp-content/uploads/2019/01/Solar-United-Neighbors-Community-Solar-in-Maryland-Year-Two-Report.pdf.

Trabish, H. 2015. "Why Community Solar is Exploding in Minnesota." *Utility Dive.* February 5, 2015. https://www.utilitydive.com/news/why-community-solar-is-exploding-in-minnesota/360241/.

Trabish, H. 2015a. "Inside Minnesota's Disputed Community Solar Deal." *Utility Dive*. July 9, 2015. https://www.utilitydive.com/news/inside-minnesotas-disputed-community-solar-deal/401804/.

Trabish, H. 2016. "Minnesota Report Points to Flaws in Xcel's Community Solar Installations." *Utility Dive*. April 12, 2016. https://www.utilitydive.com/news/minnesota-report-points-to-flaws-in-xcels-community-solar-installations/417231/.

Vote Solar and the Network for New Energy Choices. 2011. *Freeing the Grid: Best Practices in State Net Metering Policies and Interconnection Procedures.* Vote Solar and the Network for New Energy Choices. https://www.pjm.com/-/media/committees-groups/task-forces/nemstf/20120130/20120130-freeing-the-grid-2011.ashx.

Wood Mackenzie. 2022. *U.S. Solar Market Insight Full Report Q3 2022.*

List of Interviewees

Sources – Minnesota Case Study

Anonymous solar developer. Video interview with University of Minnesota. February 11, 2022.

Anonymous clean energy advocate. Video interview with University of Minnesota. February 17, 2022.

Anonymous clean energy advocate. Video interview with University of Minnesota. February 17, 2022.

Anonymous solar developer. Video interview with University of Minnesota. February 18, 2022.

Anonymous clean energy advocate. In-person interview with University of Minnesota. March 1, 2022.

Sources – Maryland Case Study

Anonymous state employee. Video interview with University of Minnesota. March 4, 2022.

Harry Warren, CleanGrid Advisors. Phone interview with University of Minnesota. March 7, 2022.

Maryland PSC staff. Video interview with University of Minnesota. March 10, 2022.

Sources – New York Case Study

Max Joel, Assistant Director of NY-Sun, NYSERDA. Video interview with University of Minnesota. April 5, 2022.

Sources – Illinois Case Study

Anonymous clean energy advocate. Video interview with University of Minnesota. February 7, 2022.

Anonymous clean energy advocate. Video interview with University of Minnesota. February 15, 2022.

Vito Greco, Elevate Energy. Video Interview with University of Minnesota. March 4, 2022.

Anonymous state employee. Video interview with University of Minnesota. March 4, 2022.

Anonymous clean energy advocate. Video interview with University of Minnesota. March 9, 2022.