National Community Solar Partnership

Getting to 5 Million: Current Community Solar Market Trends and Pathways to Reach 5 Million Households

March 17, 2022

Welcome: Meeting Agenda

Time (ET)	Title	Presenter
1:00 – 1:05	Welcome	Nicole Steele, DOE
1:05 – 1:10	Overview of NCSP Target & Pathway to Success	Anna Balzer, DOE
1:10 – 1:25	Community Solar Market Update	Jenny Heeter, NREL
1:25 – 1:45	Modeling the Pathway to Success	David Feldman, NREL
1:45 – 1:55	Q&A	All
1:55 – 2:00	Closing Remarks	Anna Balzer, DOE

Solar Energy Technologies Office Overview

MISSION

We accelerate the advancement and deployment of solar technology in support of an equitable transition to a decarbonized energy system by 2050, starting with a decarbonized power sector by 2035.

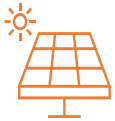
WHAT WE DO

Advance solar technology and drive soft cost reduction to make solar affordable and accessible for all Americans

Enable solar to support grid reliability and pair with storage to provide new options for community resilience

Support job growth, manufacturing, and the circular economy in a wide range of applications

National Community Solar Partnership Overview



Data Tracking

Sharing the Sun is a market trends annual report that is managed by NREL through NCSP, partner commitment are tracked to the program and its goal, and program evaluation is all done to determine success.

Collaboration

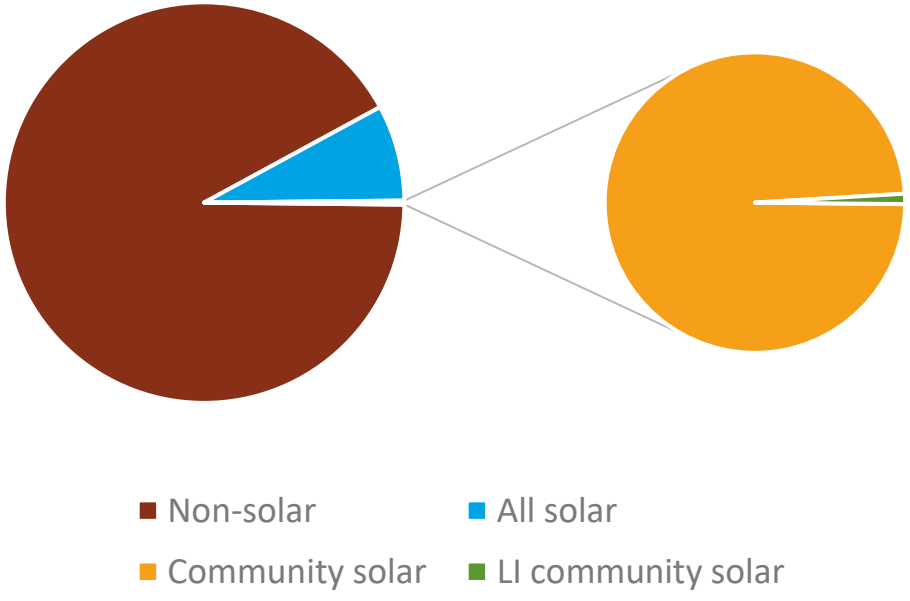
Partners can access an online community platform, virtual/in-person meetings, webinars and other tools to engage with DOE, National Labs, and each other.

Technical Assistance

Partners have access to resources and direct technical assistance from DOE, National Labs, and third-party subject-matter experts to support local challenges.

Community Solar Opportunity

- 49% of households and 48% of businesses **cannot** host a PV system of adequate size on their property because of ownership and insufficient roof space challenges
- Solar represents <10% U.S. electric generation capacity
- Community solar represents <5% of solar
- Mandated or incentivized LMI community solar represents <1% of community solar.



Sources: EIA, SEIA, NREL, NREL (unpublished)

National Community Solar Partnership Target

5 million
HOUSEHOLDS*
*EQUIVALENT

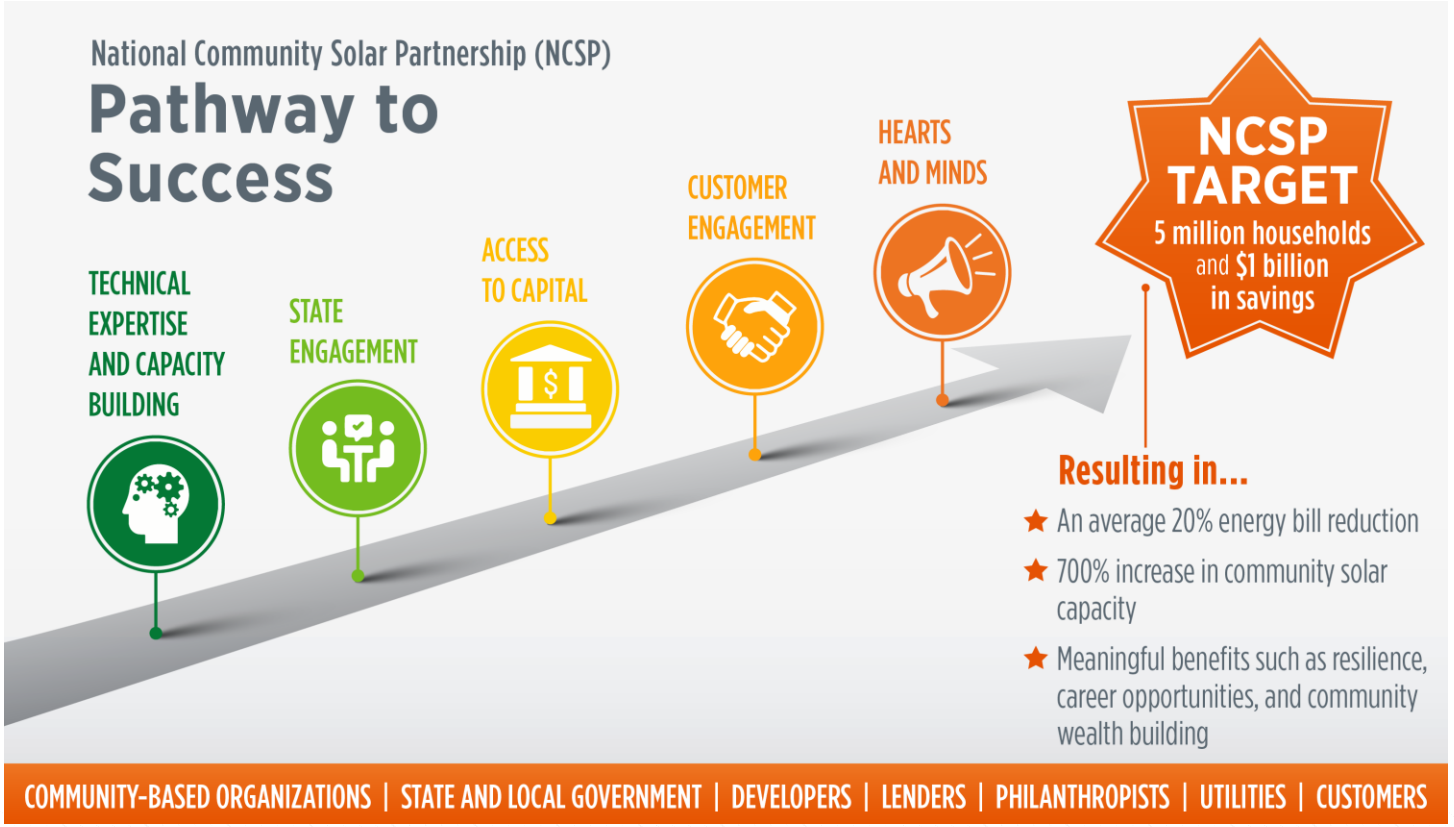
$1 billion
IN ENERGY BILL SAVINGS

BY **2025**

Represents an increase from **3 GW to 20 GW** of community solar capacity

$1 billion in savings reflects an average **bill reduction of 20%**

NCSP Pathway to Success



NCSP Core Strategies

- Access to Technical Expertise and Capacity Building
  - Technical Assistance Program: direct, on-demand technical assistance
- State Regulatory and Policy Environment Support
  - State Collaborative: best practices, peer learning, technical assistance
- Access to Credit and other Financing
  - Credit Ready Solar: provide standardization, coordination, technical assistance, Credit Ready Solar marketplace
- Low-Income Customer Acquisition and Management Support
  - Acquisition Tool: Develop tools for better management, leverage LI programming
- Messaging and Recognition
  - Hearts and Minds: Award/certification program, consumer awareness and national messaging campaign

2021 Trends in Community Solar Deployment

NCSP Webinar

March 17, 2022

Jenny Heeter

Kaifeng Xu

Contents

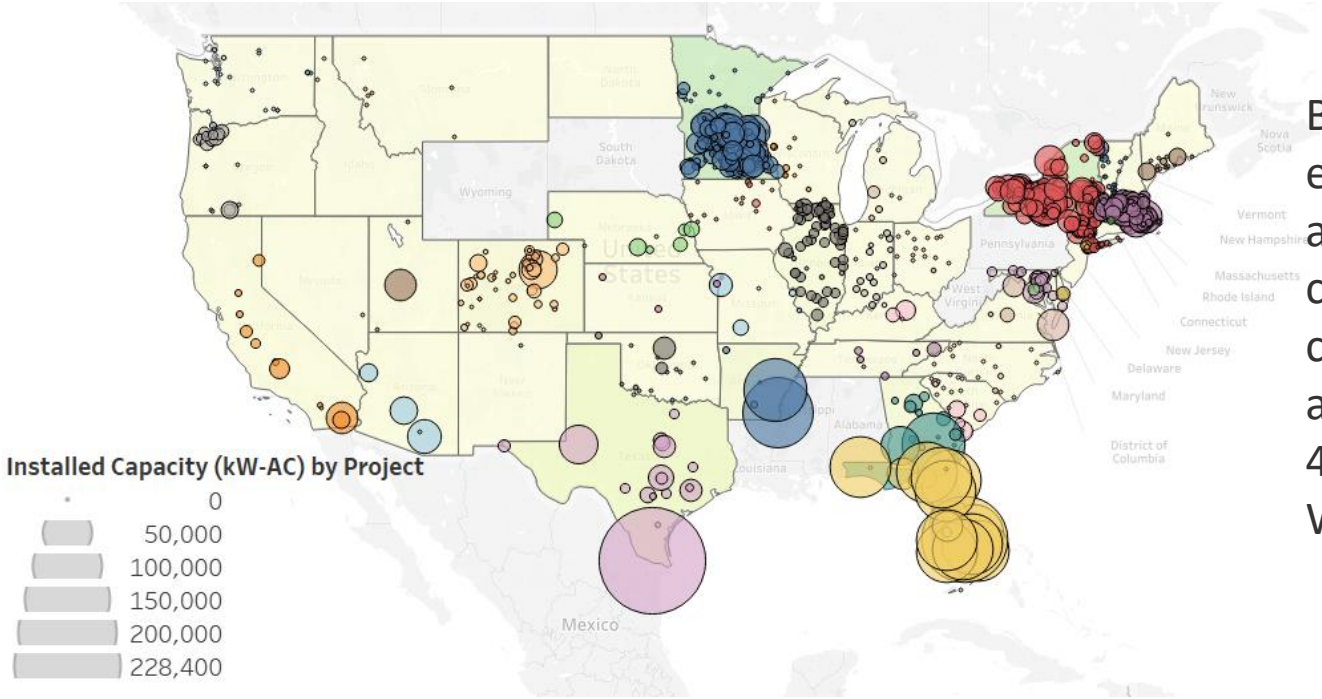
1. Market Status

This section summarizes data on community solar deployment over time, by state, and by project characteristics.

What is community solar?

The U.S. Department of Energy defines community solar as any solar project or purchasing program, within a geographic area, in which the benefits of a solar project flow to multiple customers such as individuals, businesses, nonprofits, and other groups.

Community Solar Capacity by State



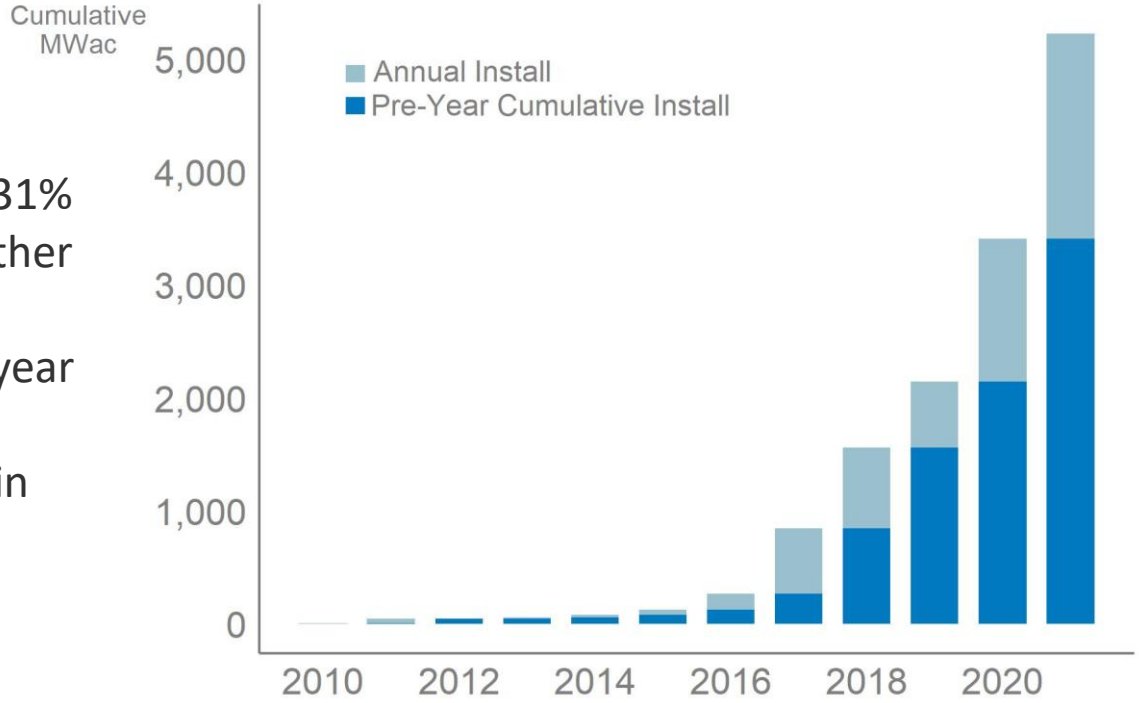
By the end of 2021, we estimate that there were at least 5,219 MW-AC of community solar capacity distributed across ~2,000 projects in 40 states and Washington, D.C.

Community solar projects in the Contiguous United States

Data Source: ***Sharing the Sun Project List 2021***

The Rapid Growth of Community Solar

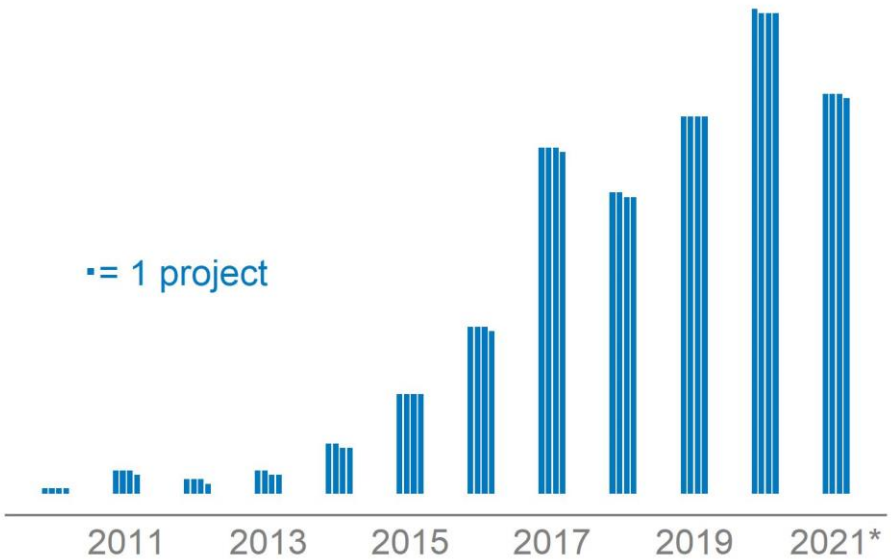
- Cumulative community solar capacity has grown by about 131% year over year since 2010, in other words, capacity has more than doubled on average year over year
- About 1,813 MW came online in 2021 alone.



Community solar capacity (MWac) by year

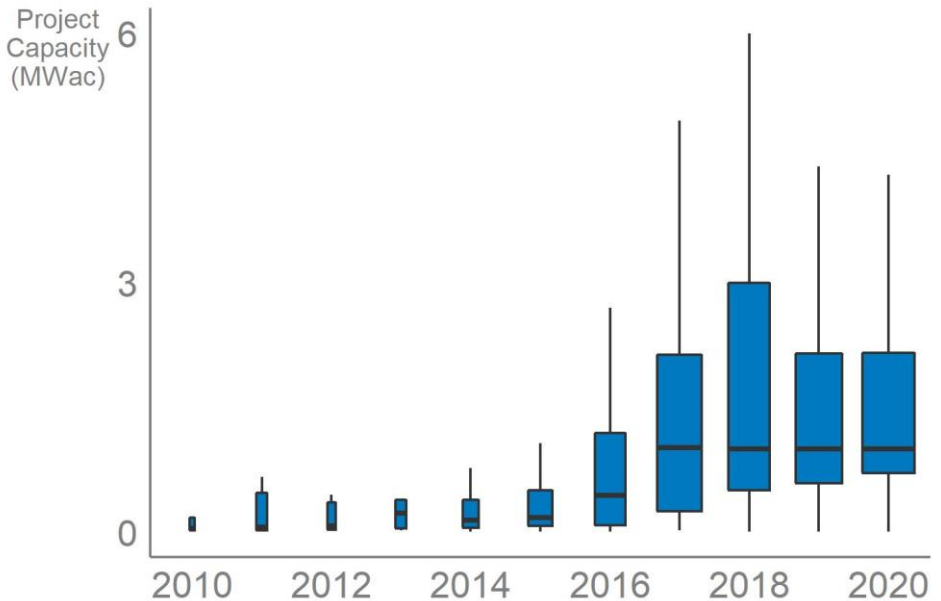
More and Larger Projects

More projects have been installed and the median project size increased through 2020.



# of Projects by Year

Note: Projects in MN and CO were aggregated in 2021, total # of projects in 2021 should be higher

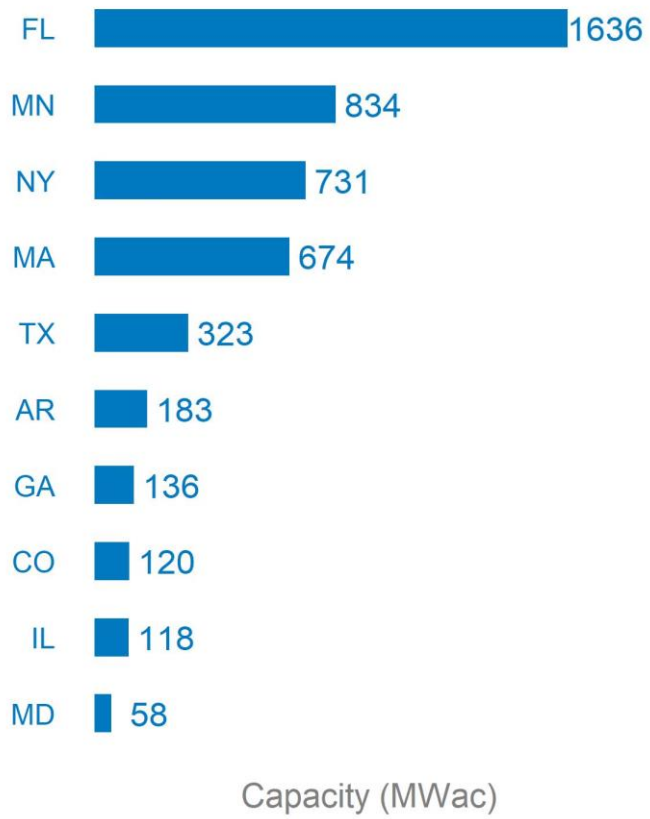


Distributions of Project Capacity by Year

Note: 2021 data not yet fully available at the project level for MN and CO

A Few Key States Lead the Community Solar Market

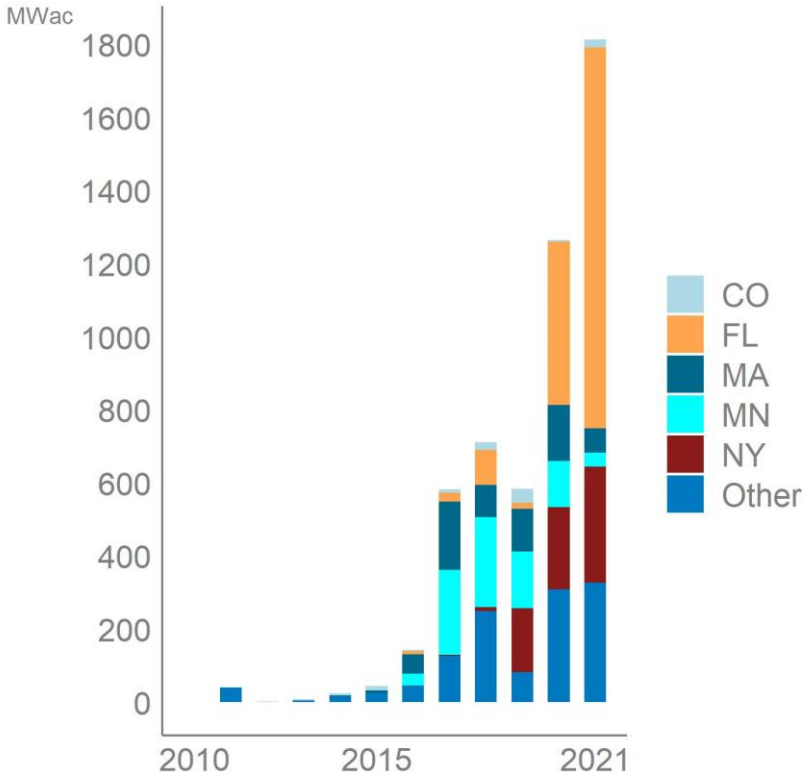
- Florida saw the most deployment in 2021, with 1 GW installed, and now has the most community solar deployed of any state.
- About 92% of cumulative community solar capacity is located in the top 10 states.
- About 74% of cumulative capacity is in just four states: Florida, Minnesota, Massachusetts, and New York.



Cumulative community solar capacity (MW) by state

Community Solar Capacity has been Installed in Waves in Different Key Markets

- Colorado was the early state leader, with significant capacity expansions from 2011 to 2015.
- Massachusetts and Minnesota expanded capacity significantly in 2016-2019.
- Florida and New York have emerged as key markets in recent years.



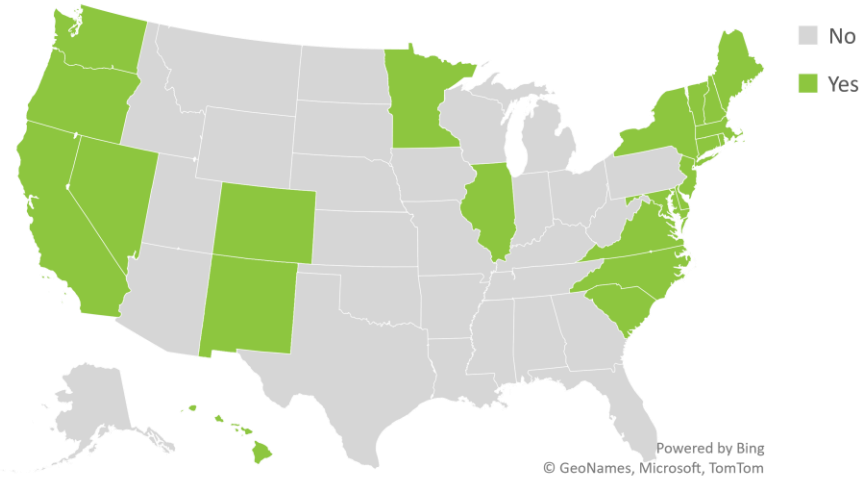
New community solar capacity (MWac) by year and state

2. Impact of Policy and Market Drivers

This section discusses how various policy and market factors have shaped community solar deployment.

Community Solar State Policies

- 22 states and Washington, DC have passed some form of legislation enabling community solar, either through state-required programs or the authorization of a limited number of pilot projects.
- These programs vary in scope, but they generally all allow for some form of virtual metering that enables subscribers to benefit from their community solar subscriptions

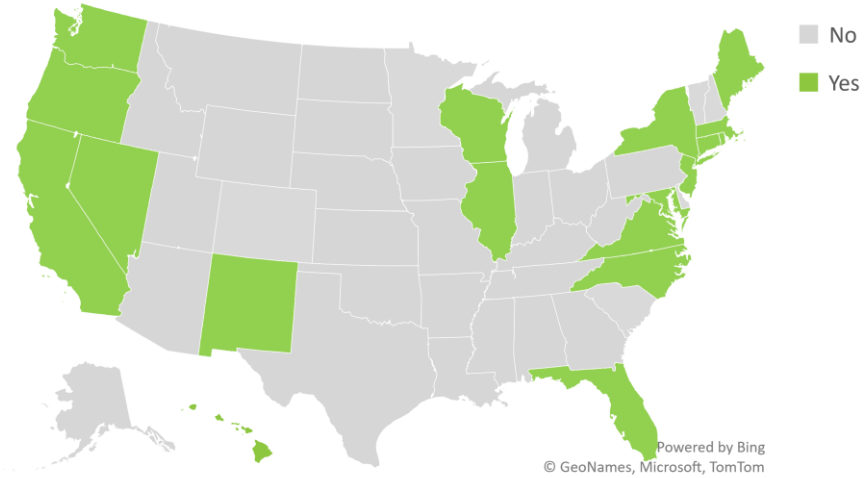


State-level community solar enabling legislation*

* Legislation applies to at least one utility in the state

Community Solar Program Caps

- At least 18 states and Washington, DC have some form of requirements on community solar program caps
  - Programs caps have primarily been though legislation and PUC regulations, but also exist through limited availability of funding or from voluntary utility-led efforts.
- These program caps vary in scope, from small caps less than 10 MW to over thousands MW.

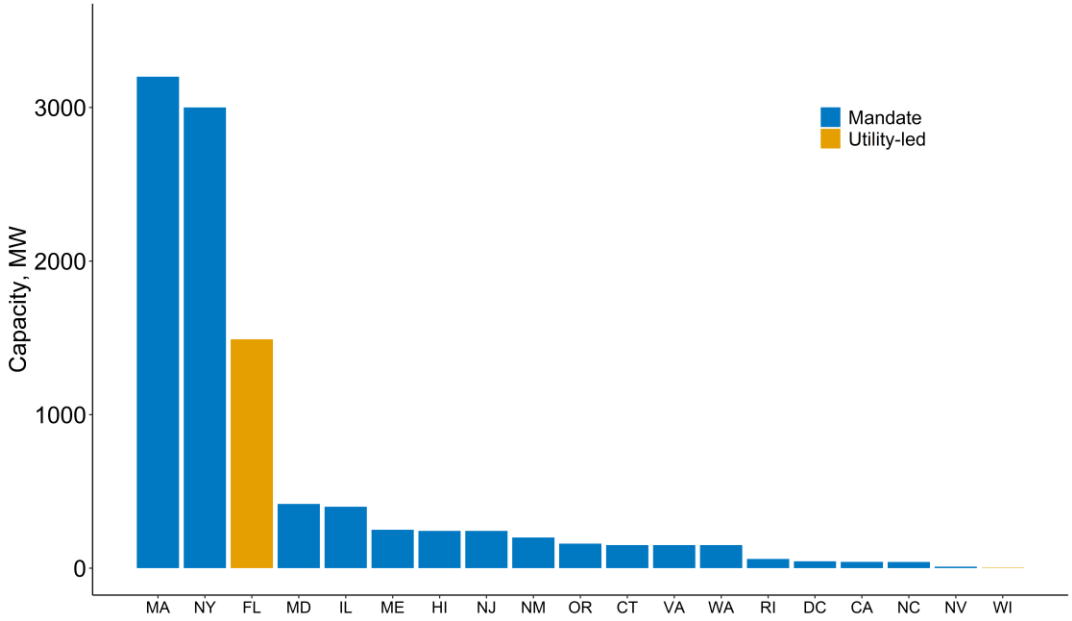


Community solar program with caps*

* Legislation applies to at least one utility in the state

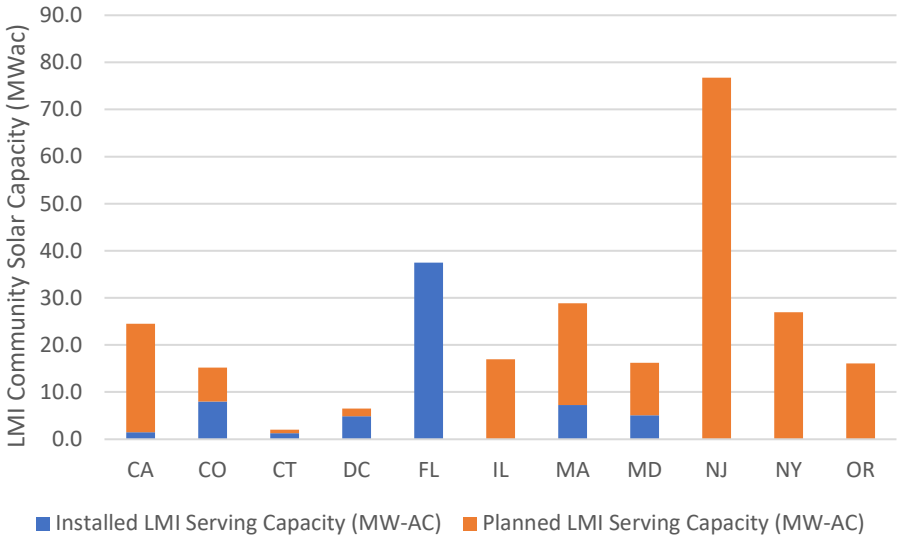
Program Caps Vary by State

Community Solar Capacity Caps by States

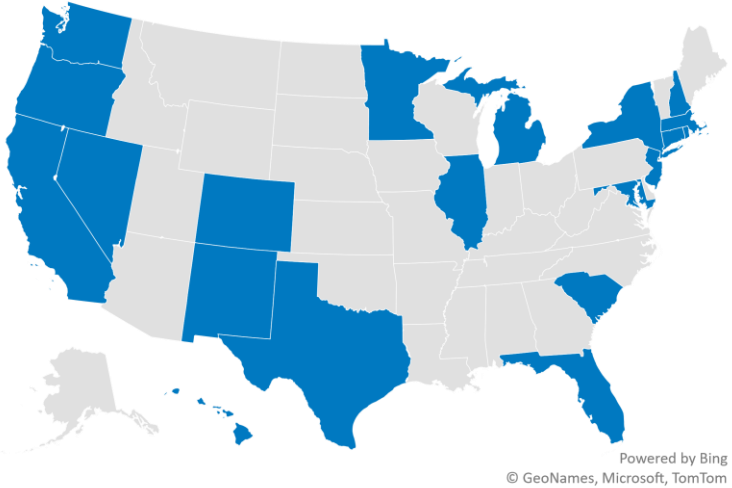


- **Massachusetts and New York have the highest program caps**
  - Over 3,000 MW, multi-year programs
- **Florida FPL led the utility-driven community solar Program**
  - 1,490 MW in total

Low- and Moderate-Income (LMI) Community Solar tops 65 MW-AC, with >200 MW-AC in Queues



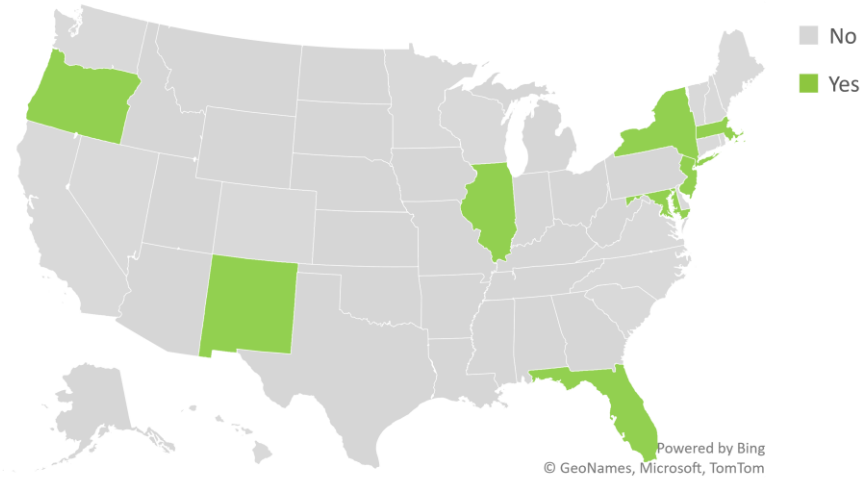
20 states and Washington, D.C. have provisions requiring or incentivizing LMI community solar.



Note: 2021 Data are as of mid-December 2021. Totals are likely an underestimate as additional projects come online at the end of the year.

Community Solar Program Caps: LMI

- 7 states and Washington, D.C with community solar program caps also have some form of LMI caps
- Most states developed LMI carve-out
- States like Illinois don't have an LMI carve-out, but the total available funding is set



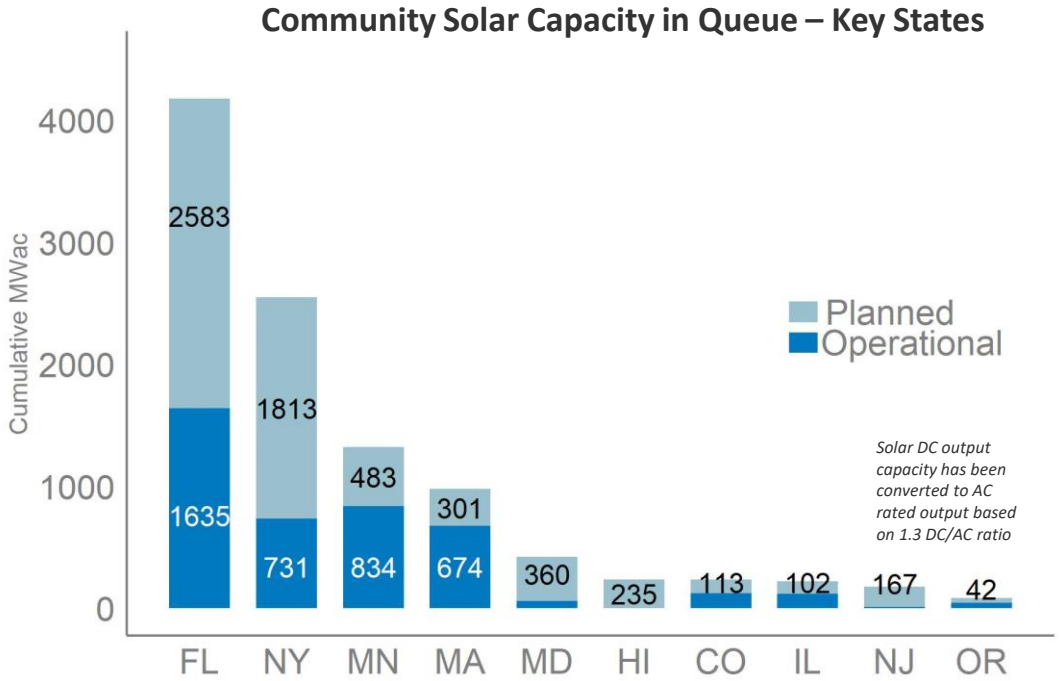
State-level community solar program with caps on LMI*

* Legislation applies to at least one utility in the state

3. Pending Community Solar Deployment

States with large amounts of projects in queue

Community Solar Capacity in Queue Top States



Operational data come from the NREL : Sharing the Sun Project List 2021. CO: Planned solar capacities include projects under Xcel program; FL: Planned capacities include FPL and Duke Energy Program; MA: Planned capacities refer to SMART program; MN: Planned capacities only include projects under Xcel program; NJ: Planned capacities include Phase 1 and Phase 2 Community Solar Pilot Program; IL: Planned capacities include Adjustable Block Program only; HI: Planned capacities include Hawaiian Electric Community based renewable energy program, assumed AC capacity. The solid blue represents the cumulative rated AC power output (MW) for community solar in operation by corresponding year in corresponding state. The semi-transparent blue represent capacity planned. The black texts represents planned capacity in MWac.

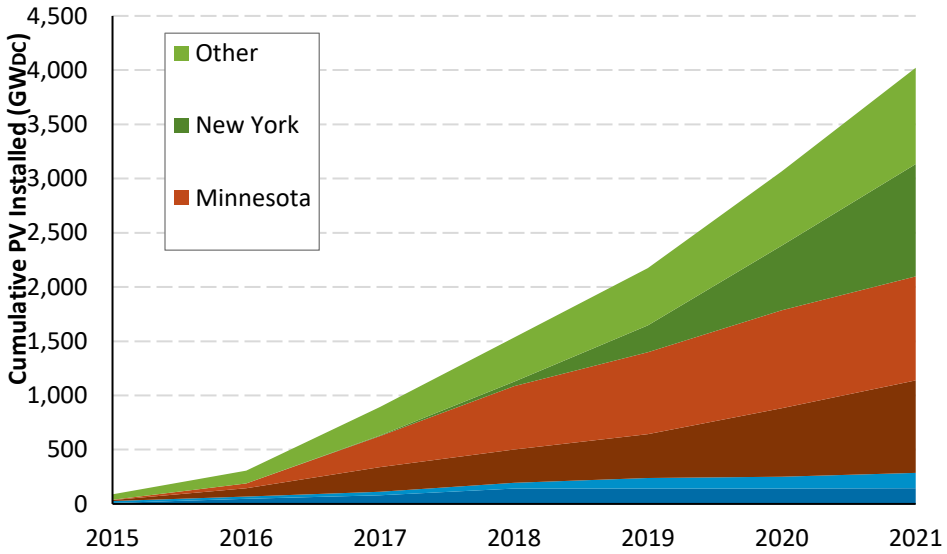
- **As of 2021, over 6 GW community solar capacity in queue.**
  - Top 4 States (FL, NY, MN, and MA) contributed to 80% of total *planned* capacity
- **MD, HI, CO, IL, NJ ,and OR are implementing state-level community solar programs to increase the markets in their states**
- **"Planned" indicates community solar projects in queue and will be installed thereafter**

Market Drivers & the Pathway to Success

Community Solar and LMI Goals

If the U.S. can accelerate solar deployment to meet its carbon goals and unlock the challenges of community solar the U.S. could get 5 million households signed up for community solar by 2025, having achieved $1B in cumulative savings.

Community Solar in the U.S.

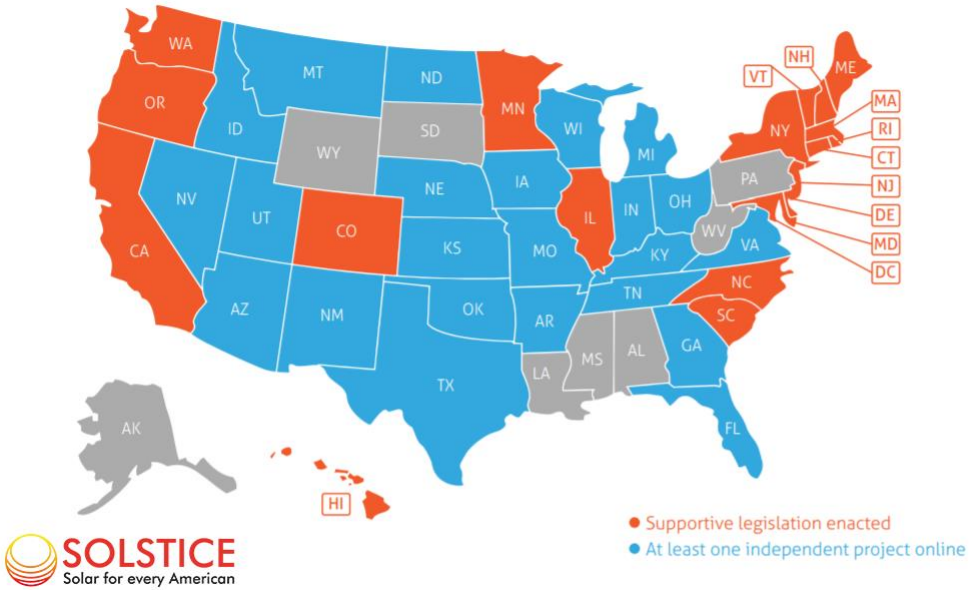


- Historically, approximately 80% of community solar energy has gone to anchor tenants, however this is changing with much higher percentages of residential subscriptions in New York and Washington, DC.
- Residential subscriptions have averaged 3 kW in size, saving approximately 10% off their utility bills though these vary.
  - NCSP has a goal of saving customers 20%.
  - The 5MM *equivalent* subscriber goal would translate to 20 GW of community solar, assuming an average subscription size of 4 kW, slightly larger than the historical average.

Note: Wood Mackenzie Power and Renewables and SEIA define "Community Solar" as projects where multiple customers can subscribe to power offtake from a PV system installed in their community and receive credits on their utility bills.

Sources: Wood Mackenzie Power and Renewables/SEIA: U.S. Solar Market Insight 2021 Year-in-Review.

Challenges to Community Solar Deployment

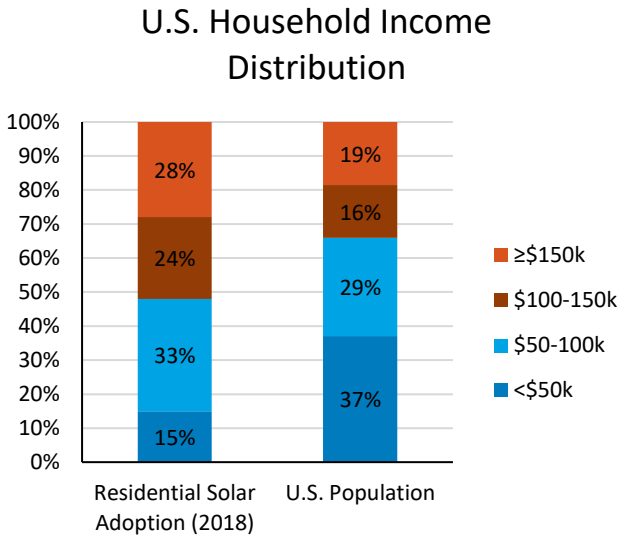


- While there are Community Solar arrays in most states, much fewer have enacted supportive legislation.
  - Additionally, many of the supportive legislation or regulations have program caps.
- Community Solar projects are also inhibited by onerous permitting standards and interconnection issues that do not usually arise for DG PV.
- Community Solar projects also face financing challenges due to uncertainty in future electricity purchases, as residential customers may leave projects.

Source: https://solstice.us/solstice-blog/map-us-community-solar/

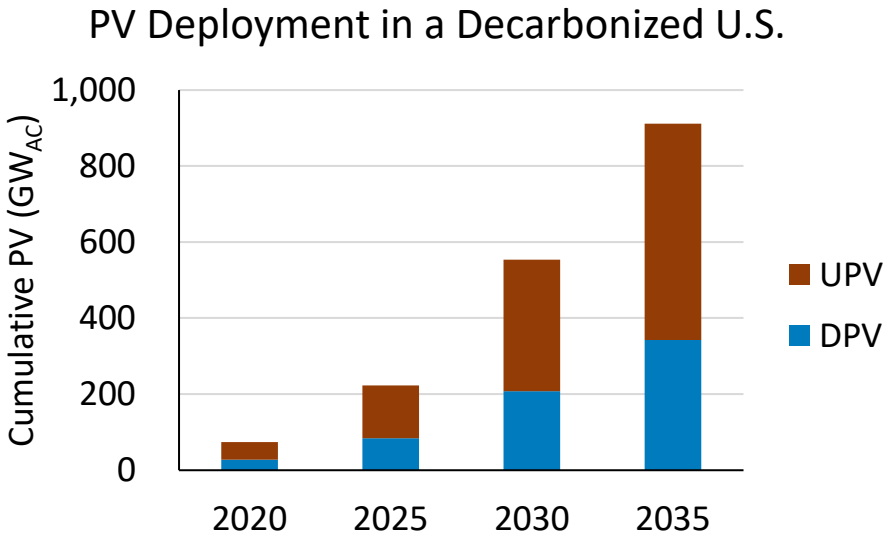
PV Equity

- Access to distributed PV is even harder for LMI households which do not represent an equitable portion of those benefitting from solar.
  - Despite households earning less than $100k representing 2/3 of all U.S. households, they adopted less than ½ of all residential solar systems in 2018.
  - The contrast is even more stark for those households earning less than $50k per year.
- Current solar financing programs targeted to LMI customers are not widespread nationally. Additionally, current solar financing mechanisms are inflexible and do not address several LMI pain points such as income fluctuations or employment or housing transitions.



Sources: U.S. Census Bureau; LBNL, Income Trends among U.S. Residential Rooftop Solar Adopters

Growth of U.S. PV As the U.S. Decarbonizes

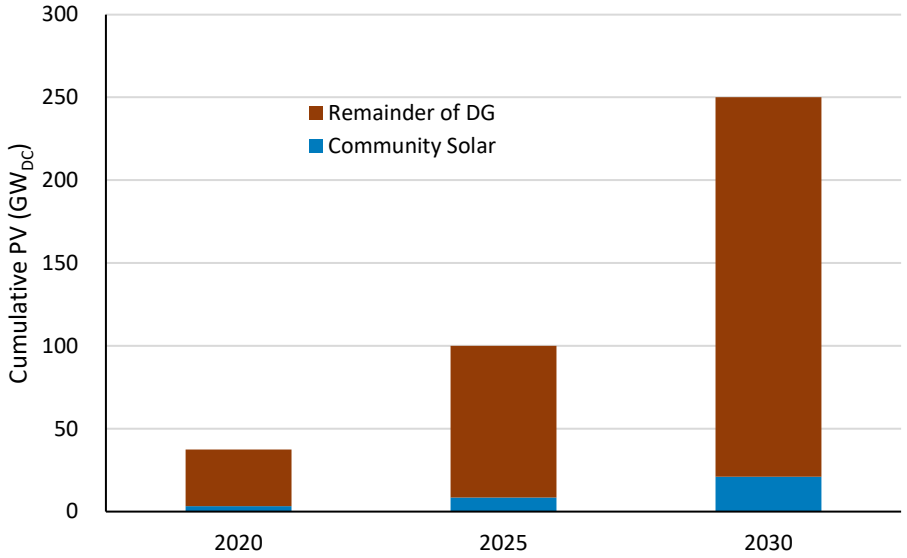


- While there was approximately 75 GW_{AC} (100 GW_{DC}) of PV installed at the end of 2020, if the U.S. decarbonizes its energy system, there will be significantly more PV capacity over the next 15 years.
  - Distributed generation is estimated to contribute approximately 100 GW_{DC} (84 GW_{AC}) by 2025 and 250 GW_{DC} (208 GW_{AC}) by 2030 – up from 36 GW_{DC} (28 GW_{AC}) in 2020.

Note: assumes the DPV percent of total PV (38%) remains constant.

Sources: Solar Futures Study, EIA.

Growth of Community Solar As the U.S. Decarbonizes



- If Community Solar grows at the same proportion as the rest of distributed PV there will be approximately 8 GW_{DC} by 2025 and 21 GW_{DC} by 2030, under a decarbonized scenario.
  - Wood Mackenzie estimates approximately 7.5 GW_{DC} of Community Solar will be installed by 2025.

Note: assumes the DPV percent of total PV (38%) remains constant

Sources: Solar Futures Study, Wood Mackenzie "US Solar Market Insight," "U.S. Community Solar Outlook H2 2021."

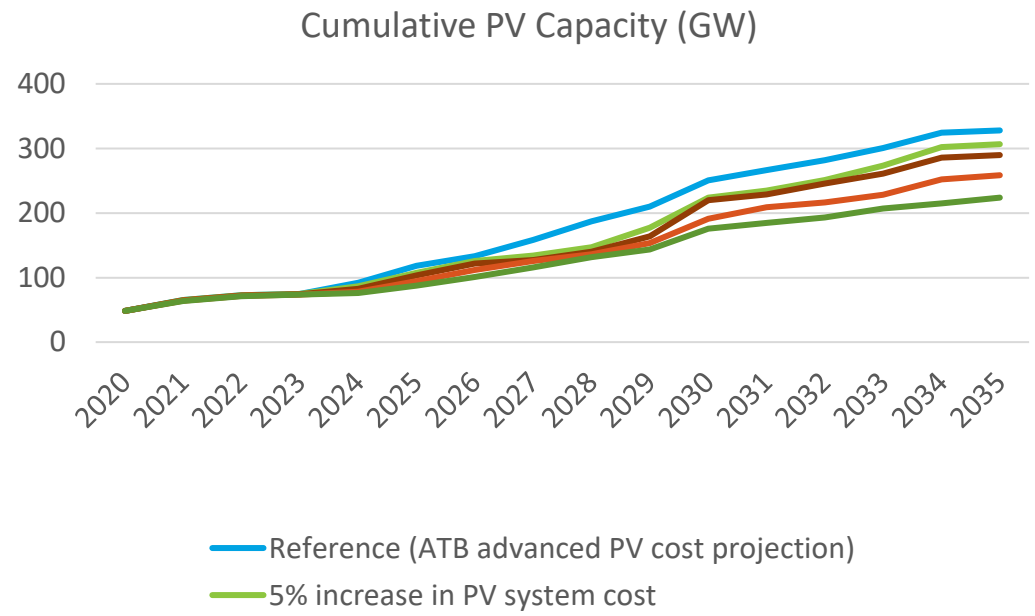
DOE Community Solar Driver Activity Evaluation

Program	Impact	Evaluation
Access to technical expertise and capacity building (On-demand TA)	on/off switch for utilities, quicker ramp-up for regulatory friendly states, lower system costs. Increased bill savings.	Estimate utility demand potential. Use WoodMac Community Solar forecast and project some capacity comes online early. Estimate price elasticity.
State regulatory and policy environments (States Collaborative)	on/off switches (ability to credit customer; credit can provide savings; caps do not limit market development)	Estimate new state demand for community solar. Estimate expansion of existing state demand for community solar.
Access to capital (Credit Ready Solar)	Quicker ramp-up for regulatory friendly states, lower system costs.	Use WoodMac Community Solar forecast and project some capacity comes online early. Estimate price elasticity.
Low-income customer acquisition and management (LIHEAP platform)	Lower system costs; increase in low-income subscribers. Increased bill savings/energy burden reduction.	Estimate price elasticity.
Hearts and minds (consumer awareness campaign, certification/recognition program)	on/off switch for utilities, quicker ramp-up for regulatory friendly states, lower system costs.	Estimate new state demand for community solar. Estimate expansion of existing state demand for community solar. Estimate utility demand potential. Use WoodMac Community Solar forecast and project some capacity comes online early (interconnection queue). Estimate price elasticity.

DOE Community Solar Drivers

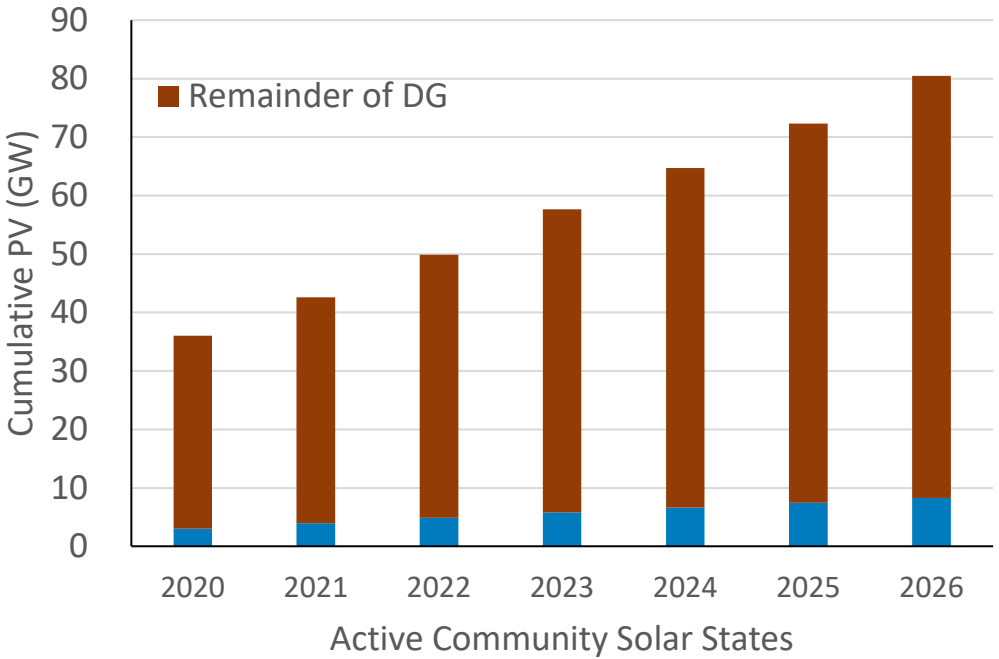
	Access to technical expertise and capacity building (On-demand TA)	State regulatory and policy environments (States Collaborative)	Access to capital (Credit Ready Solar)	Low-income customer acquisition and management (LIHEAP platform)	Hearts and minds (consumer awareness campaign, certification/recognition program)
Utility demand potential	x				x
Capacity comes online early	x		x		x
Price elasticity	x		x	x	x
New state demand for community solar		x			x
Expansion of existing state demand for community solar		x			x

Impact of Price on Demand



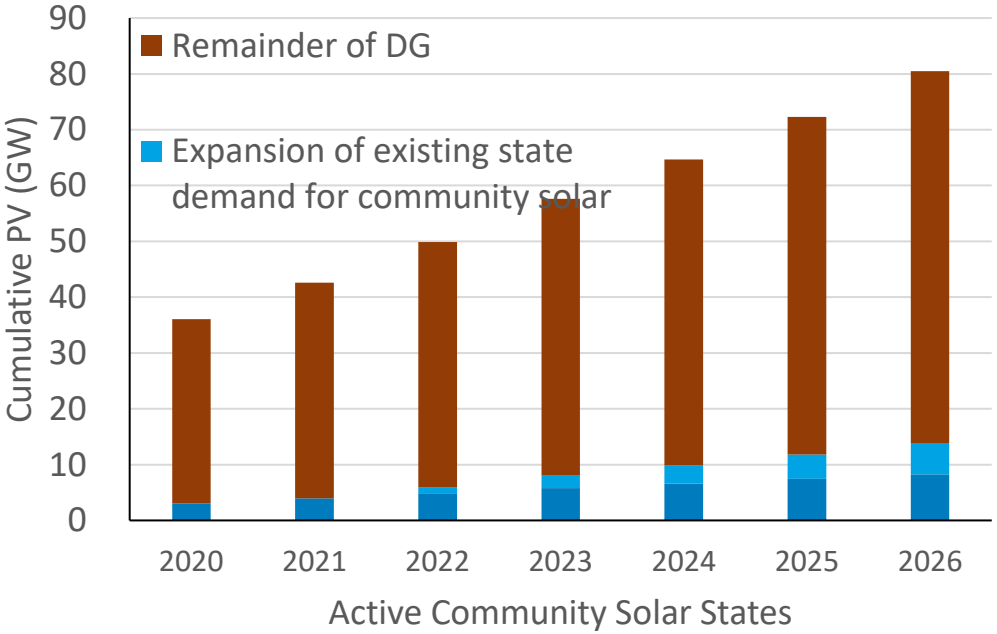
- A recent ReEDS analysis found that for every 10% decreased in price, U.S. PV demand increased by about 10%.

Wood Mackenzie DG Projections



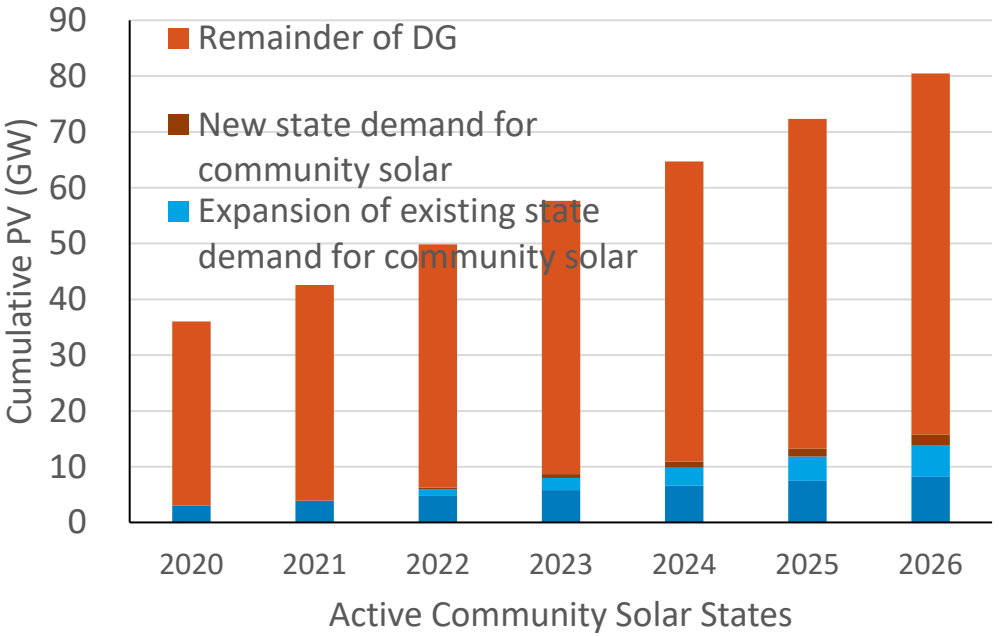
- Wood Mackenzie estimates that by 2025 there will be approximately 7.5 GW of Community Solar in the U.S. and another 65 GW of additional DG.
- Total DG is lower than in a Decarbonization scenario, but Community Solar represents a larger portion of installs.

Expanding Existing Community Solar Markets



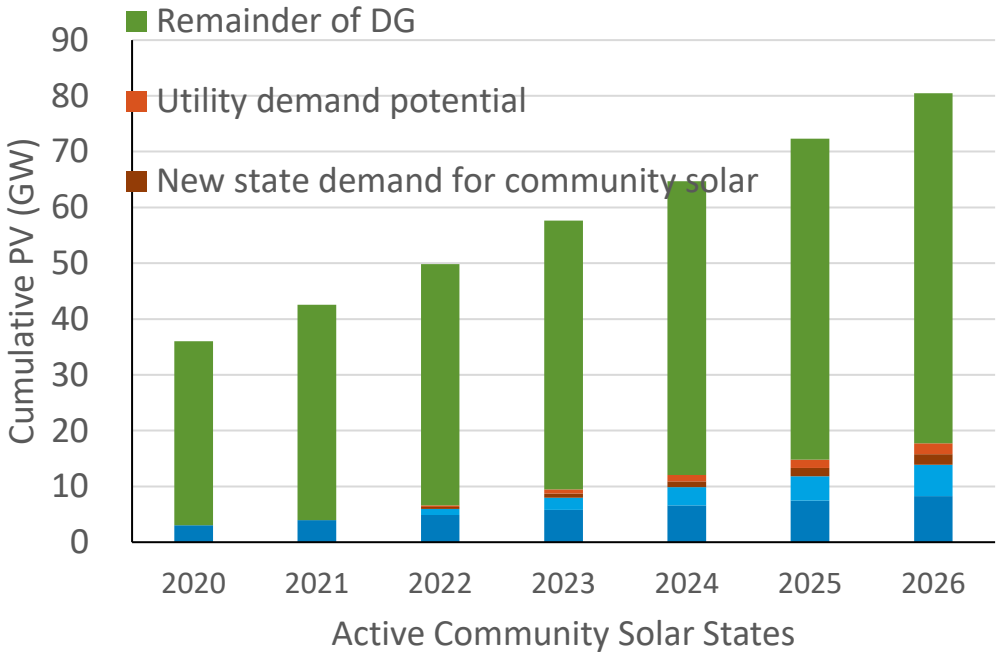
- If we can expand demand from the 20 states with existing Community Solar programs to 50% of DG within their states, the projected Community Solar market would increase 4.4 GW to 11.8 GW by 2025.
  - That would entail those states to grow the Community Solar DG percentage from 9% to 50%.

Building New Community Solar Markets



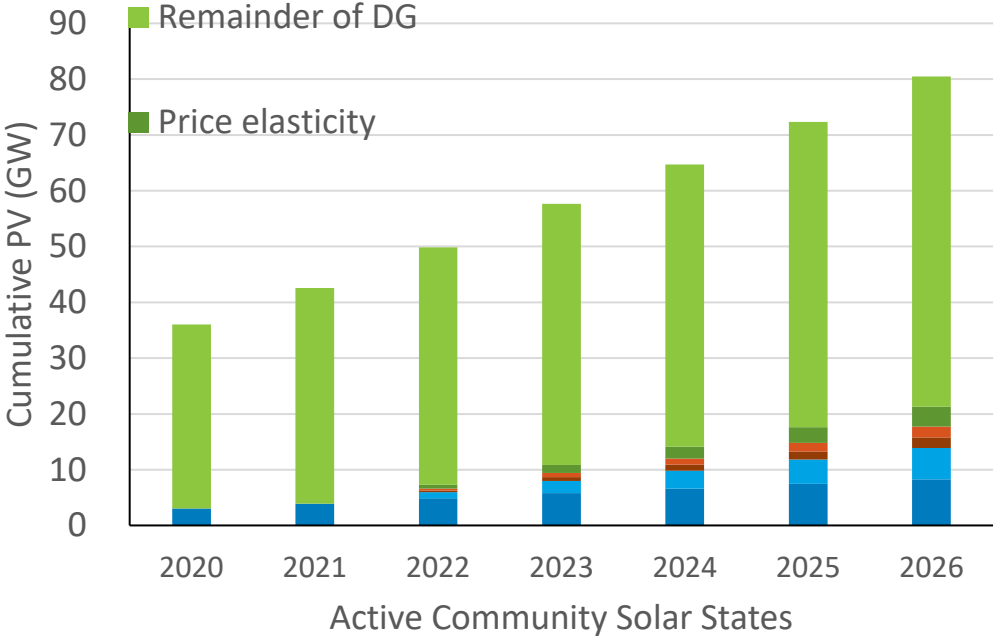
- If we can expand demand from the 7 states without existing Community Solar programs, but which were interested in NCSP State Collaborative to 50% of DG within their states, the projected Community Solar market would increase 1.5 GW to 13.3 GW by 2025.
  - That would entail these states to grow the Community Solar DG percentage from 4% to 50%.

Creating Community Solar Demand from Utilities



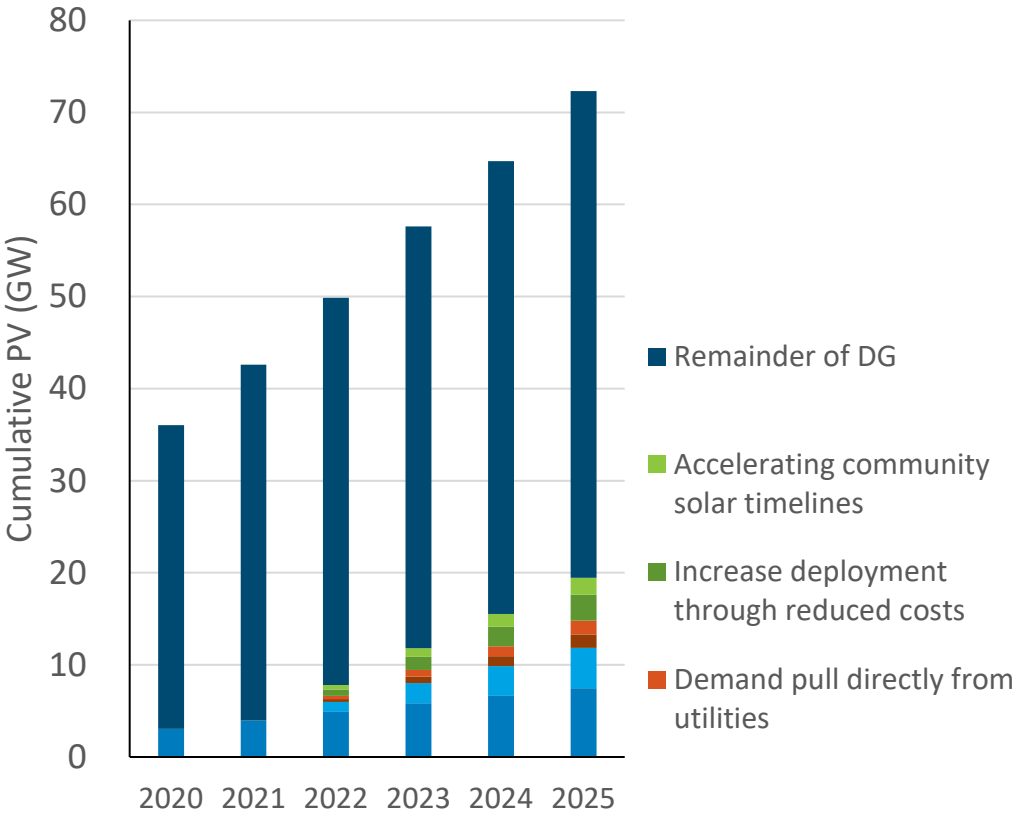
- If we can expand demand from the remaining states without existing Community Solar programs, through increased utility demand, to 40% of DG within their states, the projected Community Solar market would increase 1.5 GW to 14.8 GW by 2025.

Lowering the Cost of Community Solar



- If we can lower Community Solar costs by 30%, the projected Community Solar market would increase 2.8 GW to 17.6 GW by 2025.

Bringing Capacity Online Early



- If we can get Community Solar projects to come online early, an additional 1.9 GW of community solar development could be deployed between 2022-2025, bringing cumulative capacity to 20 GW (or 5MM-equivalent residential community solar subscriptions).
  - Doing so would require that community solar captures approximately 40% of additional DG PV capacity projected to come on-line in the 25 states interested in Community Solar, and 25% of additional DG PV capacity projected to come on-line in the remainder of states through utility programs (up from 25% and 4%, respectively).
  - Further, it would require more growth through a 30% reduction in Community Solar costs, and bringing all 2026 scheduled projects online early (from 2022-2025).

DOE Community Solar Drivers

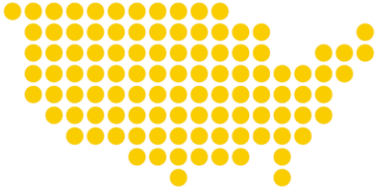
	Access to technical expertise and capacity building (On-demand TA)	State regulatory and policy environments (States Collaborative)	Access to capital (Credit Ready Solar)	Low-income customer acquisition and management (LIHEAP platform)	Hearts and minds (consumer awareness campaign, certification/recognition program)	Additional Capacity
Demand pull directly from utilities	1.0 GW				0.5 GW	**1.5 GW**
Accelerating community solar timelines	1.0 GW		0.6 GW		0.2 GW	**1.9 GW**
Increase deployment through reduced costs (price elasticity)	0.3 GW		0.3 GW	2.0 GW	0.3 GW	**2.8 GW**
Creating Community Solar demand from non-"active" states		1.2 GW			0.3 GW	**1.5 GW**
Growing Community Solar demand in "active" states.		3.0 GW			1.4 GW	**4.4 GW**
Totals	2.3 GW	4.2 GW	0.9 GW	2.0 GW	2.7 GW	**12.1 GW**

Q & A

Join NCSP

>1000
PARTNERS

>700
ORGANIZATIONS



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STATES

LOCAL GOVERNMENTS	STATE GOVERNMENTS	UTILITIES	NON-PROFITS	FOR-PROFITS
Cities	Regulators	Investor Owned	National Scale	Developers
Counties	Agencies	Cooperatives	Community Groups	Financiers
Regional Planning	Legislatures	Public Power	Academia	Consultants

Looking Forward

Stay engaged with NCSP through signing up for **our online community platform** and attending future events!

Support the new 2025 target of **5 million community energy subscribers** with a **billion dollars** of savings!

Get involved by applying for technical assistance, joining a working group, or sharing a community solar success story.

Join NCSP:

ncsp.solarinyourcommunity.org

Connect with us!

community.solar@ee.doe.gov