

Sharing the Sun: Community Solar Deployment, Subscription Savings, and Energy Burden Reduction

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National Community Solar Partnership

NATIONAL COMMUNITY SOLAR PARTNERSHIP | U.S. DEPARTMENT OF ENERGY

National Community Solar Partnership



Network

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



Collaboration

Structured groups of partners form around specific topic areas and/or sectors to address common barriers and goals by learning from each other and sharing resources supported by DOE, and National Labs, and other external partners.



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.

A coalition of stakeholders that are working to enable community solar to power the equivalent of five million households by 2025, creating \$1 billion in energy bill savings realize other benefits, such as increased resiliency and workforce development.

New National Community Solar Partnership Target Metrics

- Community solar currently serves 600,000 households (3 GW)
- New target metric represents a 700% increase by 2025 (20 GW)
- Savings reflective of 20% bill reduction







Market Status

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

Community Solar Capacity by State



By the end of 2020, we estimate that there were at least 3,253 MW-AC of community solar capacity distributed across ~1,600 projects in 39 states and Washington, D.C.

Community solar projects in the Contiguous United States

Data Source: Sharing the Sun Project List 2020

The Rapid Growth of Community Solar

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More and Larger Projects

Community solar capacity has increased both because more projects have come online and because projects have generally become larger over time.

Florida and Arizona built large size (over 50 MWac) community solar projects in 2020



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.
- Leading states are changing dynamically. Florida and New York have emerged as key markets in recent years.



New community solar capacity (MWac) by year and state

Most capacity (64%) and projects (76%) are developed and operated by third parties



Community Solar State Policies (1/2)

- 21 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 State Policies (2/2)

- Some states currently have limited policy activities regarding community solar.
- FL, AR, GA, and TX have voluntary community solar programs that contribute to 80% community solar deployed in states without legislation.
- Voluntary community solar projects have grown significantly in recent years. For example, FL has deployed 560 MWac projects since 2018



Cumulative Installed Capacity by State with/without Enabling Legislation*

* Legislation applies to at least one utility in the state

Community Solar Capacity in Queue Top States



Operational data come from the NREL Sharing the Sun Project List 2020. CO: Planned solar capacities include projects under Xcel program; FL: Planned capacities include FPL and Duke Energy Program; MA: Planned capacities include SREC II (converted to AC) and 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. MD: Planned capacities include MD Community solar pilot program. OR: Planned capacities include Oreaon community solar program. 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

As of 2020, five states (CO, MA, MN FL, community solar installed + in queue.

MD, OR, NH, IL, HI are implementing state-level community solar programs.

"Planned" indicates community solar projects in queue and will be installed thereafter

Equitable Community Solar

This section discusses how various policy and market factors have shaped deployment of programs serving lowand moderate-income households.

Community Solar: Good Practices for Equitable Solar Access

- Many community solar customers subscribe on a monthly basis rather than one-time upfront payments. Community solar can expand consumer adoption of solar energy
- We identified four general approaches to encourage equitable community solar development: (1) policy mandates, (2) financial incentives, (3) equity requirements, and (4) voluntary utility-led programs



Note: states with multiple colors means that they have offered multiple approaches

LMI Solar Access: Potential Capacity

- At least 26 MW_{ac} community solar dedicated to LMI participants has been installed, with 211 MW_{ac} pending across 10 U.S. states by the end of 2020.
- Installed LMI capacity refers to community solar capacity serving LMI households. Pending LMI defines projects that have received awards or are under construction.
 - Projects waitlisted, under review, or meeting requirements but not yet awarded are not included in this category.



Installed Pending

The Subscriber Value Proposition

Analysis of Subscription Contract Value: Estimated subscriber value shows that most subscribers now save money with community solar

- Residential subscriber contract data are currently matched individually to 403 projects; 1,037 additional projects are in programs modeled with representative contracts offered in that program
- For each available contract, we built a cash flow model to calculate the net present value (NPV) of the contract. We needed to make assumptions in order to determine the financial value of a subscription contract, including:
 - Annual utility rate escalation: low scenario 1.5%, central scenario 2.5%, high scenario 3.5%
 - Annual solar facility degradation factor: low scenario 0.75%, central scenario 0.5%, high scenario 0.30%
 - Discount rate: low scenario 8.4%, central scenario 6.4%, high scenario 4.4%

- Additional assumptions included:
 - **Standard contract assumptions**: We used standard contract term assumptions where the contracts did not specify or were flexible within a wide range.
 - **Retail rates**: We used retail rates from the Utility Rate Database and the Energy Information Administration.
 - PV production: We calculated PV production using the System Advisor Model.
 For projects above 1 MW we assumed 1-axis tracking and for those below 1
 MW we assumed fixed tilt.

 This methodology is sensitive to future retail rate changes, solar production, and economic variables. We performed sensitivities around these factors, which are presented in the following slides.

NPVs study covered over 70% projects through most years, 81% overall

NPV Coverage

• Three reasons for missing NPV data: 1) complicated contract, 2) missing contract data and 3) missing retail rates



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NPVs are Increasing Over Time

Net Present Value (\$/W)

- The median NPV of subscriptions has been positive since 2016, when state-legislated programs began to rapidly expand
- Virtual metering for programs in CO, MN, MA, and NY after 2017 also increase the overall NPVs



Error bars show p10 and p90. Light blue bars show high and low sensitivities to rate escalation, inflation, and discount rates

Example: Net Present Value of Community Solar in Massachusetts

- The average community shared solar subscription in Massachusetts has a net present value (NPV) of \$0.15/W.
- Translated to an annuity equivalent, the average subscription yields a benefit of ~\$14/kw·yr.
- To cover 100% of average electric load, the average community solar subscription reduced energy burden by ~0.5pp for the lowest income bracket.
- Energy burden is defined as the percentage of gross household income spent on energy costs, inclusive of electricity, natural gas, and delivered fuels and exclusive of transportation
- Including the MA \$0.06/kWh low-income adder to the average subscription, community solar reduces energy burden for the lowest income bracket by ~3.2 pp.



Energy Burden in Massachusetts with and

Additional data sources: DOE LEAD tool, EIA-861. Energy burden is shown for the first-year of a subscription with community solar benefits shown as an annuity equivalent with a 7% discount rate. The <u>MA low-income adder</u> is available to projects with >50% of offtake to subscribers below 65% state median income. NREL | 25 Pp: percentage point

Resources

- Join the National Community Solar Partnership: <u>https://www.energy.gov/communitysolar/community-solar</u>
- View published slides on market trends: <u>https://www.nrel.gov/docs/fy21osti/80246.pdf</u>
- Download a list of community solar projects: <u>https://data.nrel.gov/submissions/167</u>
- View equitable community solar data and practices: <u>https://www.nrel.gov/docs/fy21osti/79548.pdf</u>
- Read other community solar publications: <u>https://www.nrel.gov/state-local-tribal/community-solar.html</u>

Q&A

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