2021 | THE ACADEMY Engineering & Operations Virtual Conference

Making Community Solar Work for Public Power

KEYNOTE SPONSORS

PREMIER SPONSORS

Expanding Affordable Community Solar Access Across the United States

Kyle Fricker, Technology Manager, Solar Energy Technologies Office, U.S. Department of Energy

APPA Engineering & Operations Virtual Conference

March 24, 2021

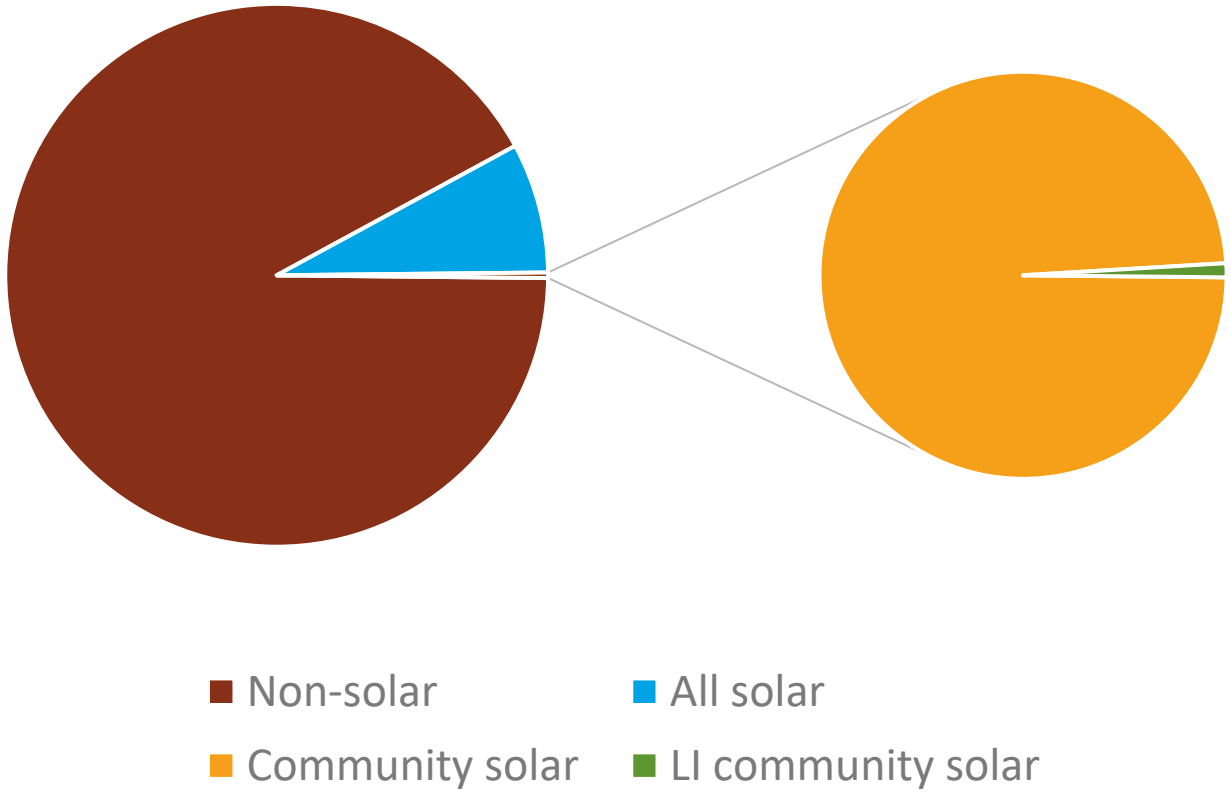
Agenda

1. Community Solar Market
2. Public Power and Community Solar
3. Technical Assistance Opportunities

Community Solar Market

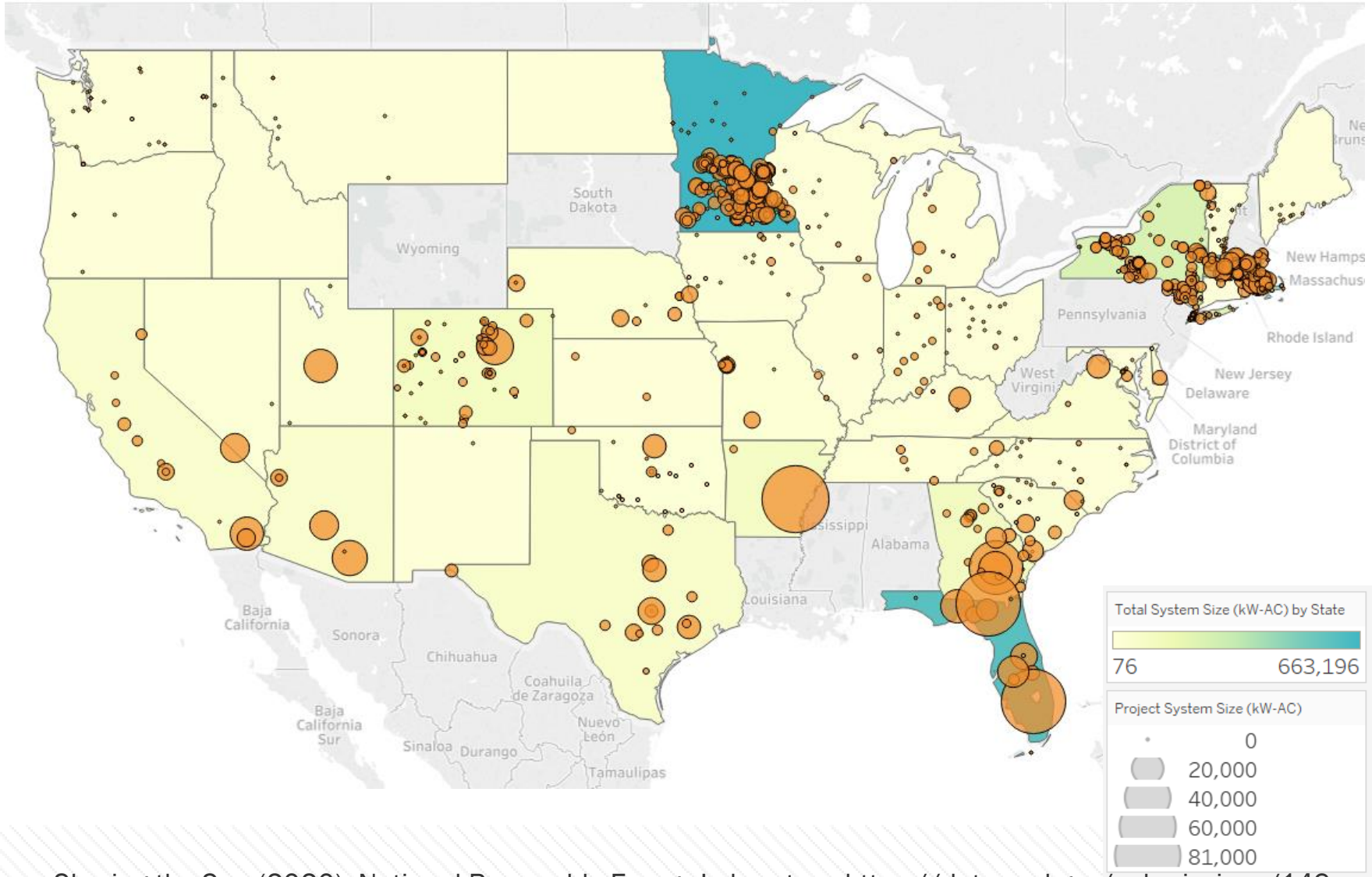
Community Solar Opportunity

- 49% of households and 48% of businesses **cannot** host a PV system of adequate size on their property or virtually net meter an entire system themselves
- Solar represents <10% U.S. electric generation capacity
- Community solar represents <5% of solar
- Low income (LI) community solar represents <1% of community solar



Sources: EIA, SEIA, NREL, NREL (unpublished)

The Community Solar Market



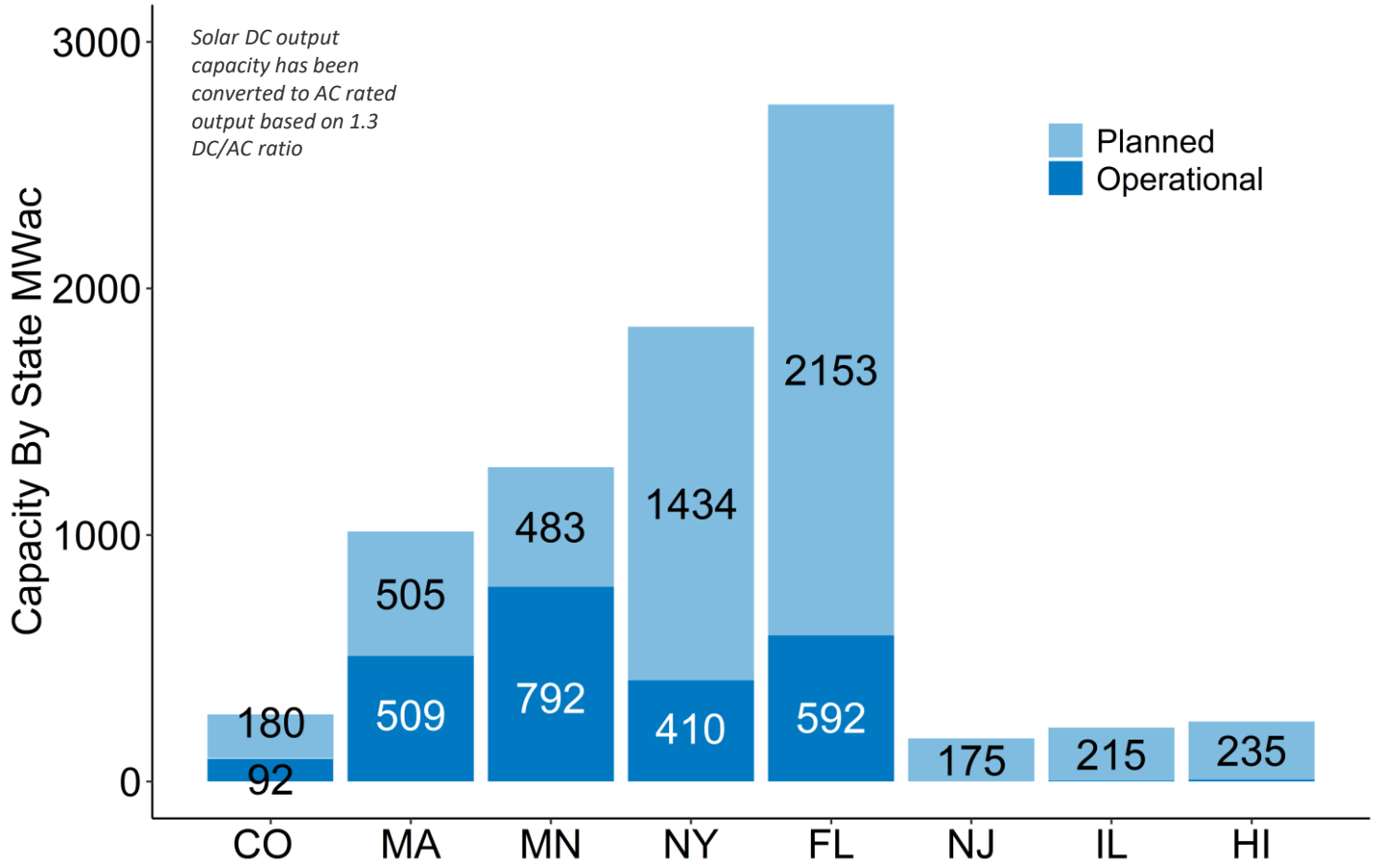
As of July 2020, we estimate that there were >2,600 MW-AC of community solar capacity distributed across >1,200 projects in 39 states and Washington, D.C.

For the cumulative installed capacity, the top 3 states are:

- MN 663 MWac
- FL 593 MWac
- MA 436 Mwac.

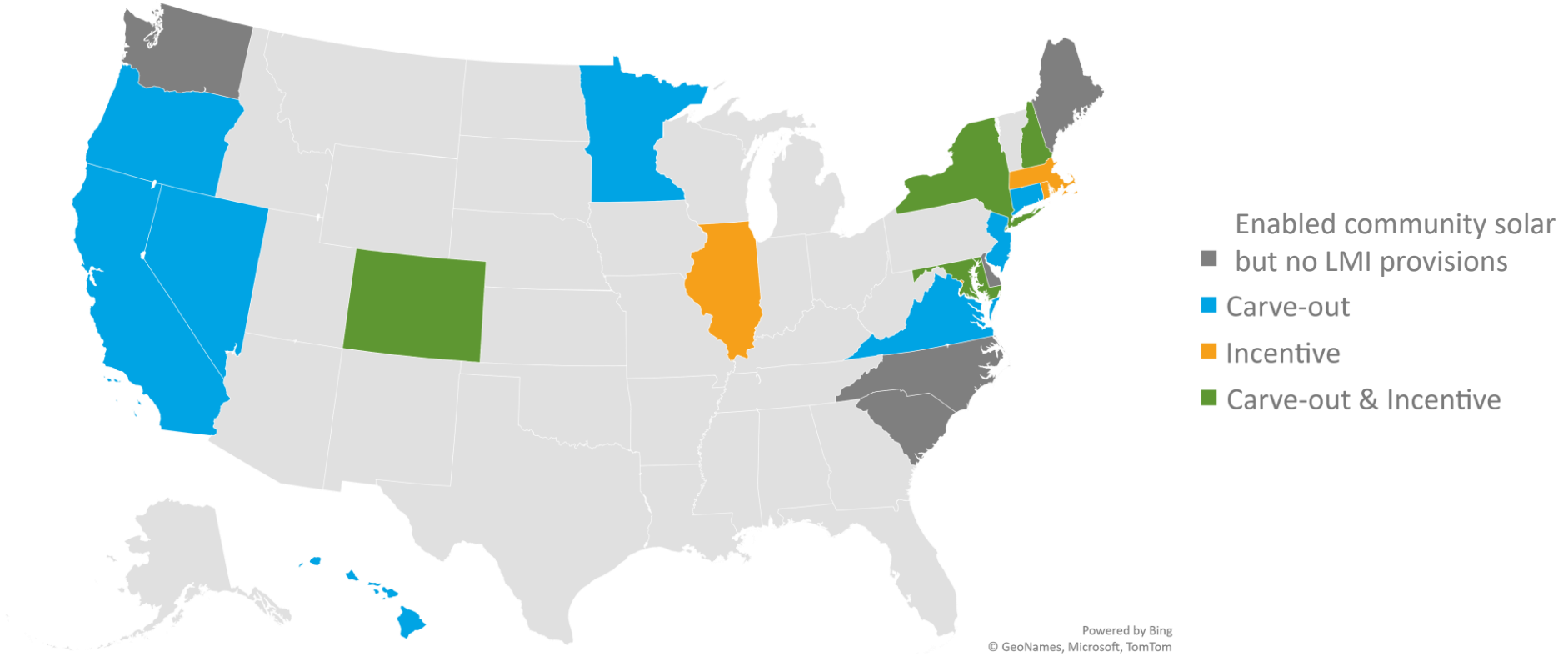
Source: Sharing the Sun (2020). National Renewable Energy Laboratory. https://data.nrel.gov/submissions/149

Community Solar Capacity in Queue Top States



Operational data come from the NREL/UMN Sharing the Sun Data List. 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.

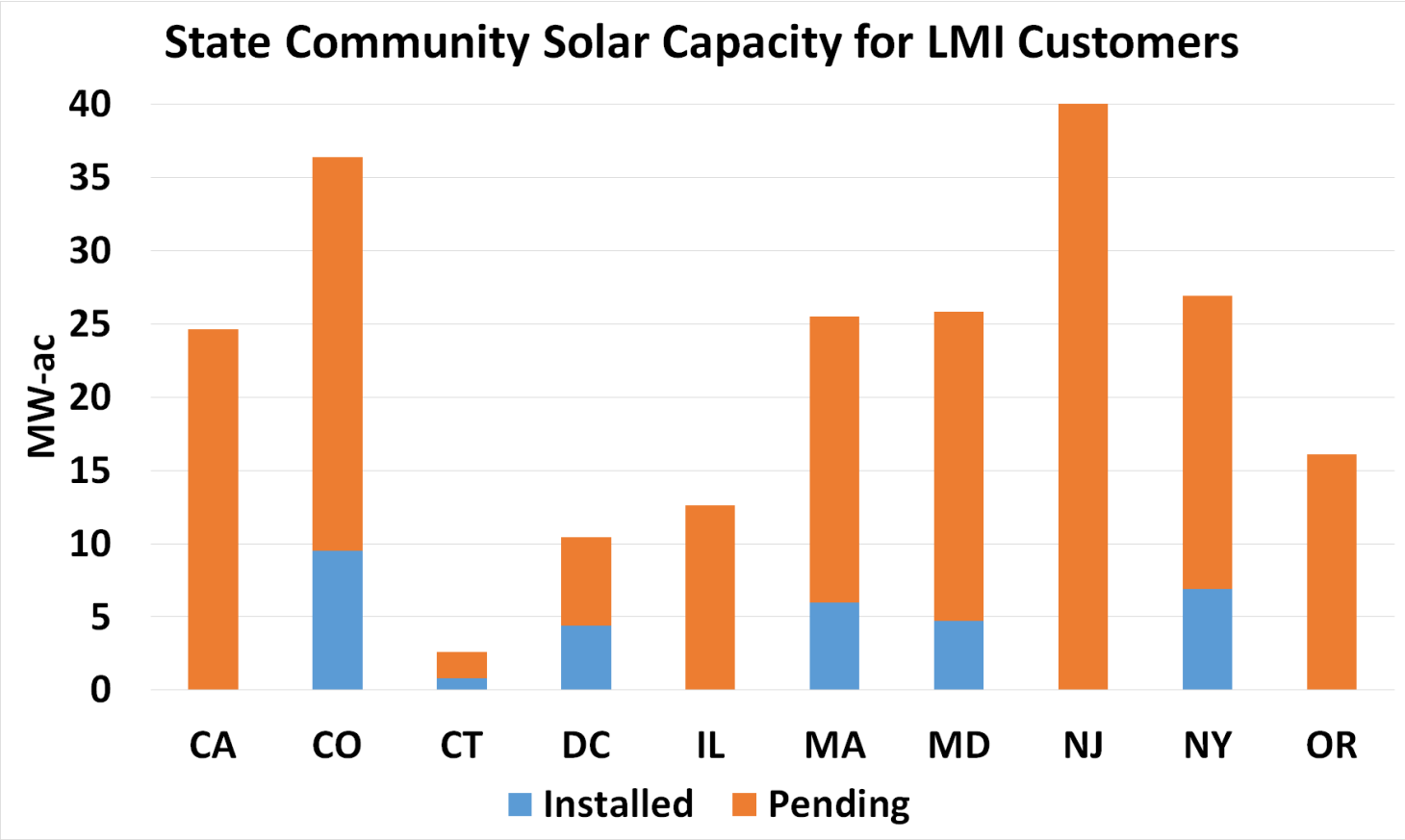
- Five states (CO, IL, MA, MN, and NY) have the most community solar capacity as well as a high number of planned projects.
- NJ, IL, and HI are emerging states with little capacity to date but large planned capacities.
- Over 5,300 MWac in queue.



State LMI Provision: Carve-out / Incentives

- The carve-out approach has been the most common (12 states)
- But many states use an incentive approach (8 states)
- A few states (4) have used both approaches

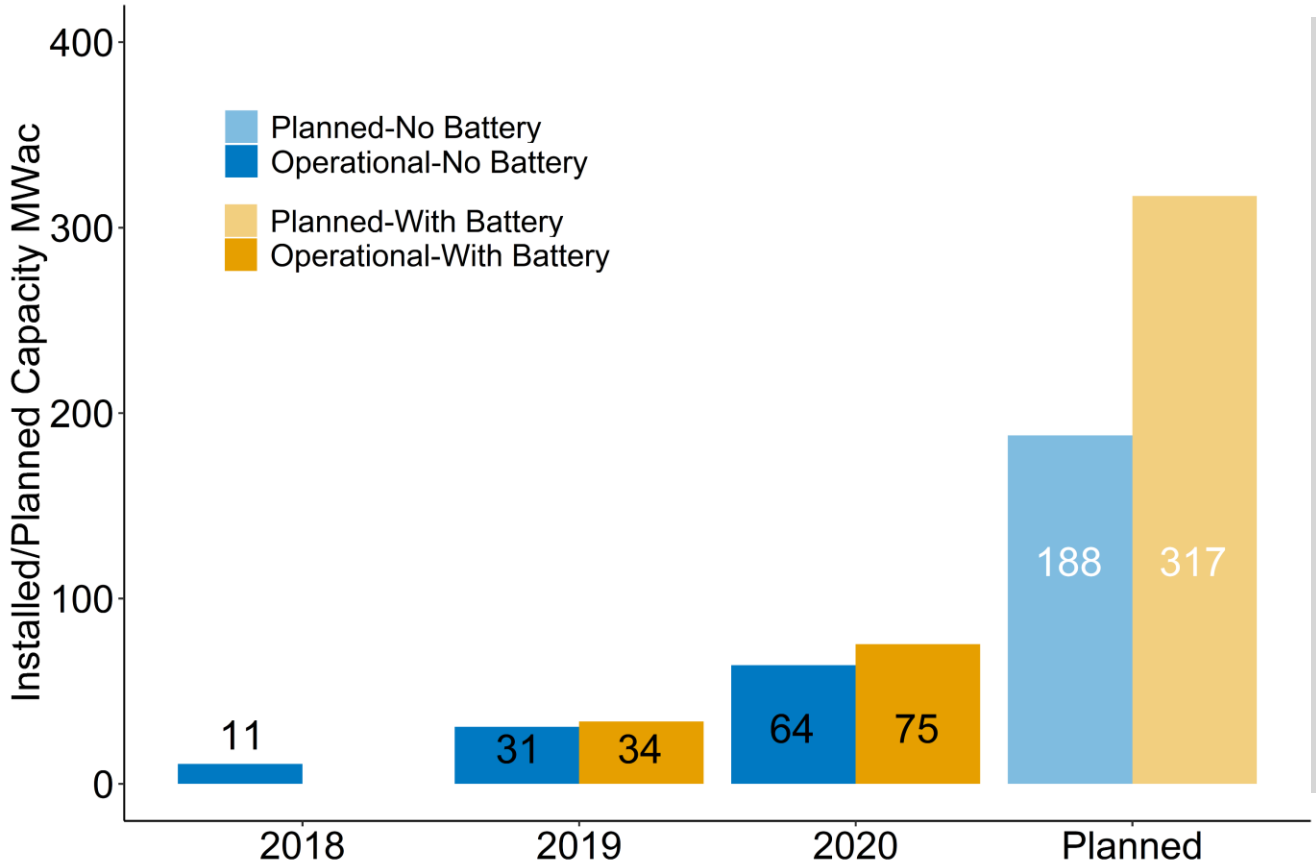
How Much LMI Community Solar is There in the U.S.?



These capacities indicate the community solar project dedicated to LMI customers. 1) Definition for capacity for LMI customers: If a 100MW program requires 30% of capacity to LMI, and 30% of these capacities be set aside for people who meet LMI criteria, the installed/pending capacities are 100*0.3*0.3 = 9 MW, rather than 30 MW. 2) The Pending capacities only include awarded projects. Projects waitlisted/under review/remaining/meet requirements but not awarded are not included. For example, the MD community solar pilot project will have 125 MW community solar focus on LMI customer (at least 125*0.3 = 37.5 for people meet LMI criteria). This figure only shows the current capacity installed/awarded. 3) Some states report capacity on MWdc, assuming DC/AC ratio is 1.3.

- Based on the most recent data, at least 32.3 MW community for LMI customers are in operation, and 225.5 MW are planned. These LMI projects will benefits over 45,000 LMI households.
- LMI projects are developed through:
  - State community solar program with LMI carve-out requirement (CO, CT, MD, NJ, OR)
  - State community solar program with LMI tariff (MA)
  - State LMI community solar program (DC, IL, NY)
  - LMI community solar project investments (CA)

Pairing Community Solar with Storage in Massachusetts



Data Source: Solar Massachusetts Renewable Target (SMART) Application Update

- **SMART program at a glance:**
  - 2 community solar components:
    1. Community shared
    2. Low-income community shared
  - Added incentive for projects paired with battery storage
- **505 MWac community shared projects are planned under SMART**
  - 317 MW with battery storage (94 projects)

Public Power and Community Solar

Municipal Utility Market Share

Total Electric Market Share:

- 10% of US electricity customers
- 9.6% of US electricity sales

Community Solar Market Share:

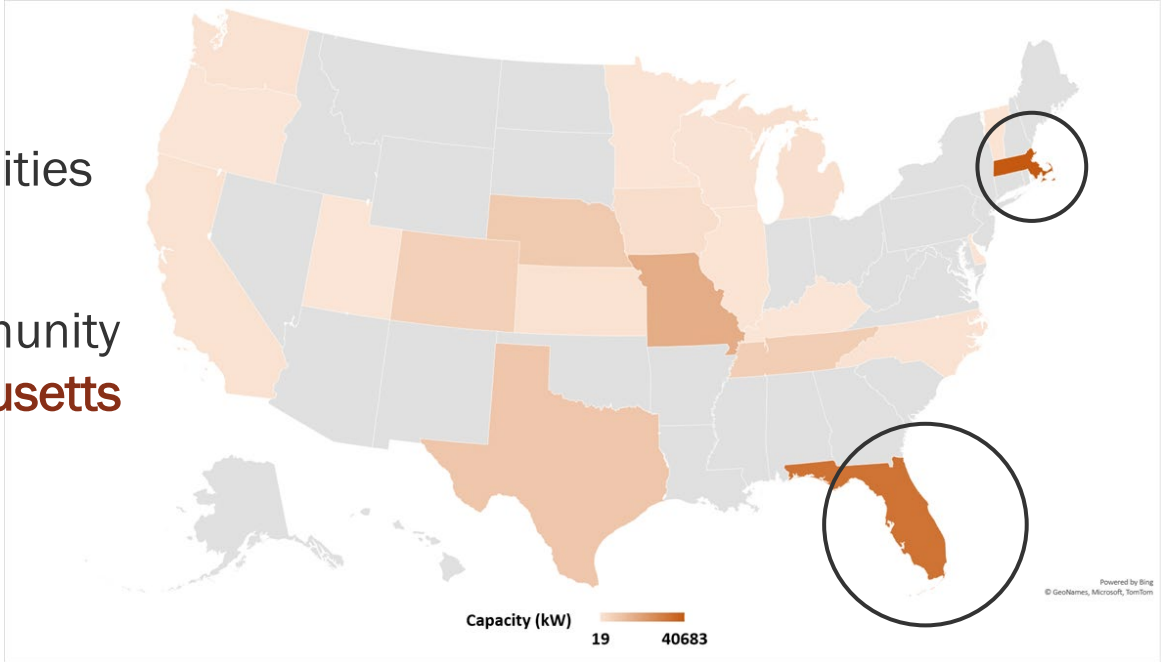
- **6.3%** of US community solar projects (82 projects)
- **4.7%** of US community solar capacity (129 MW)

EIA 2018; Sharing the Sun 2020

Municipal Community Solar by State

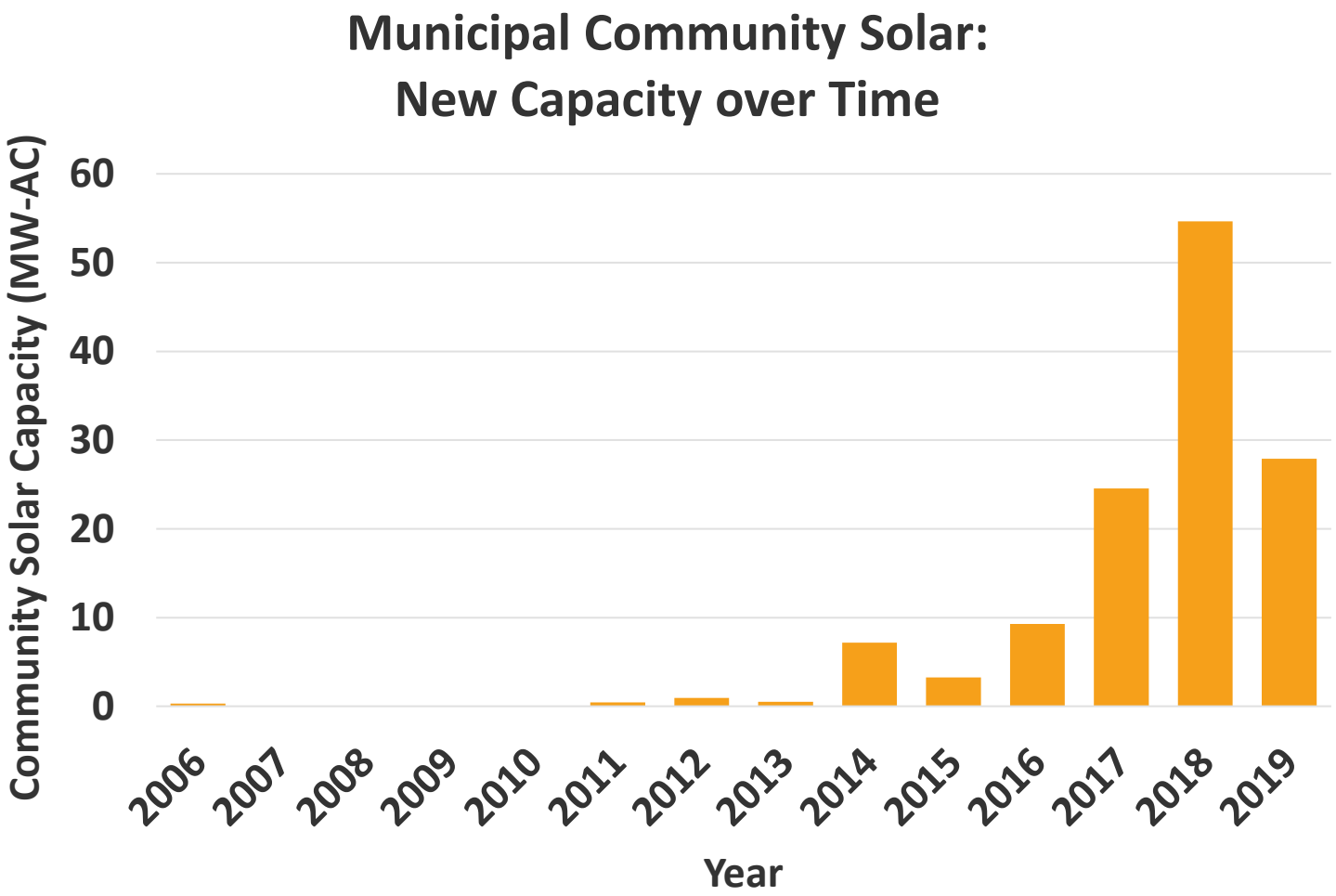
21 states have municipal utilities with community solar.

Over 50% of municipal community solar capacity is in **Massachusetts** and **Florida**.



Sharing the Sun 2020

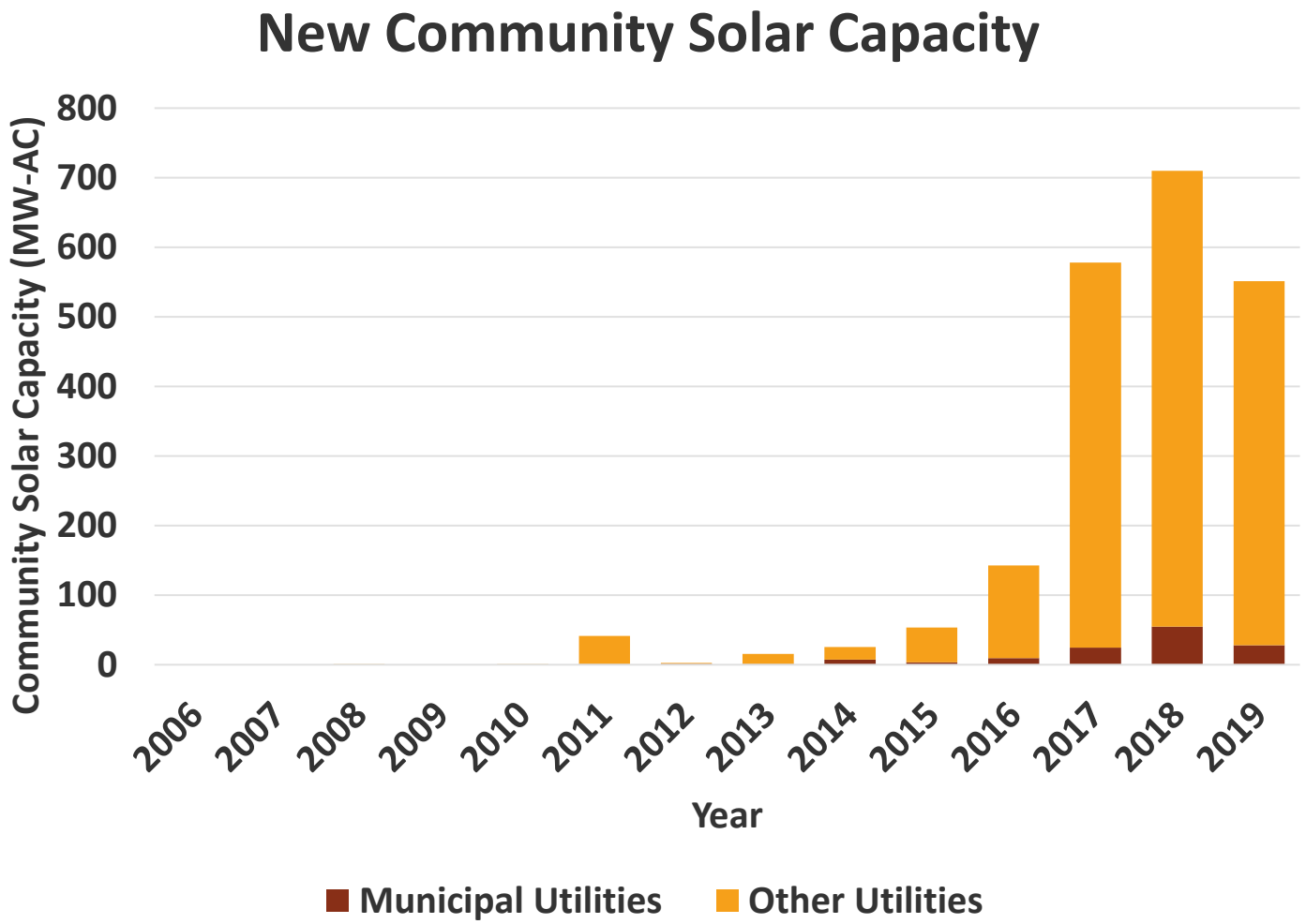
Municipal Community Solar over Time



Municipal community solar capacity is **increasing**

Sharing the Sun 2020

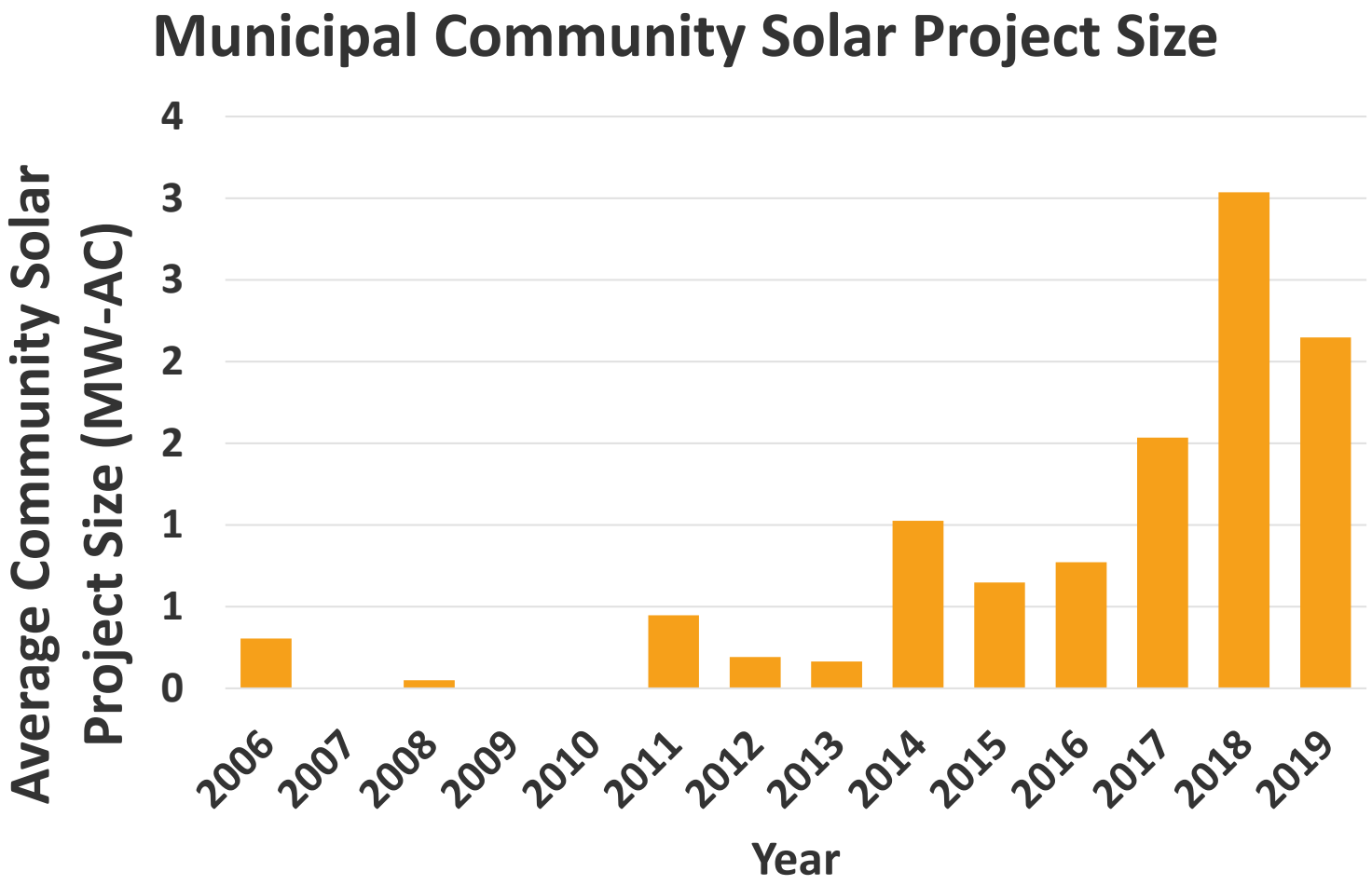
Municipal Community Solar over Time



Municipal community solar capacity is **increasing**, following national trend

Sharing the Sun 2020

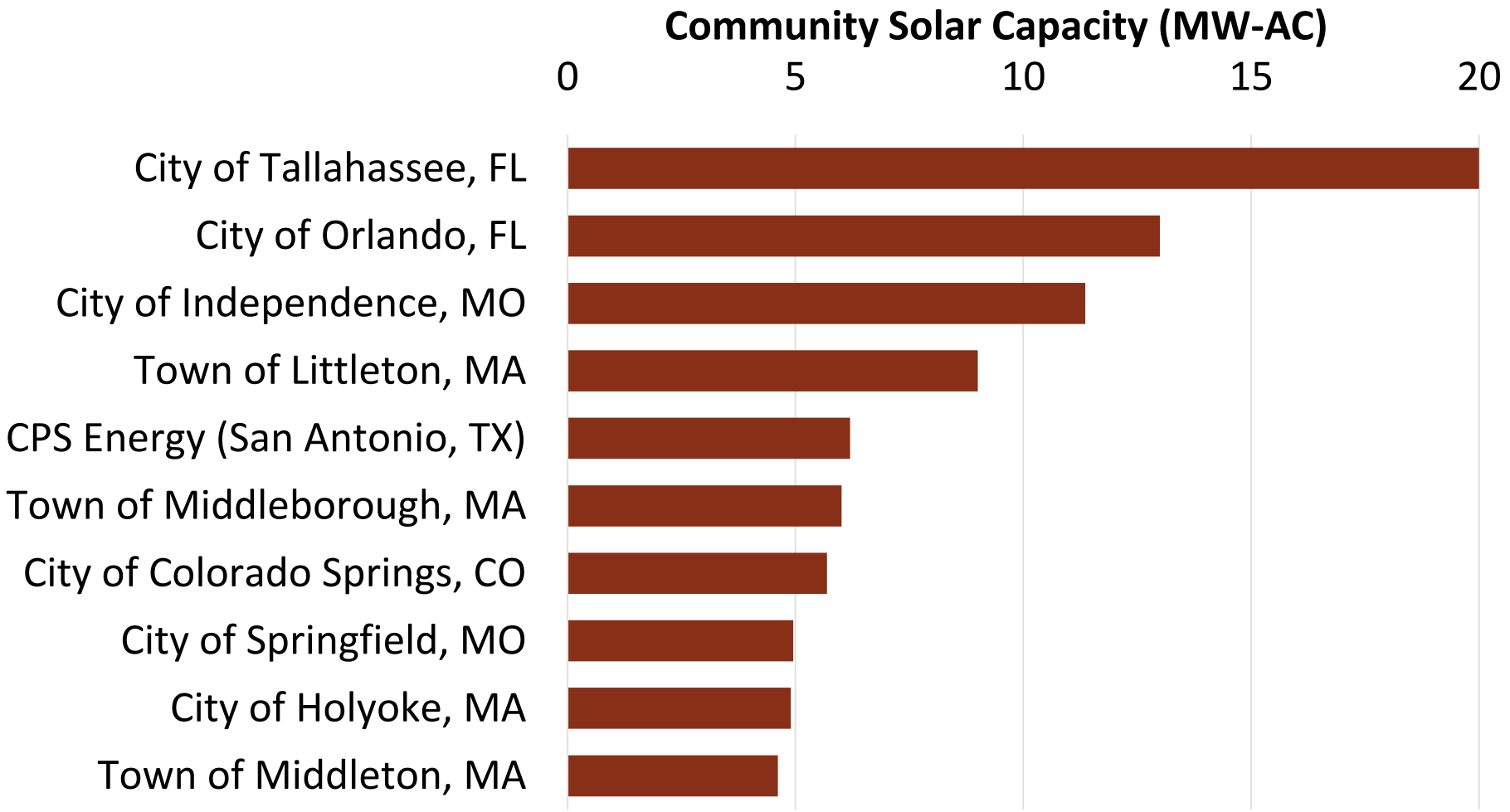
Municipal Community Solar over Time



Municipal project sizes are **increasing**

Sharing the Sun 2020

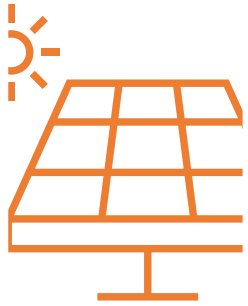
Leading Utilities: Total Capacity



Sharing the Sun 2020

Technical Assistance Opportunities

National Community Solar Partnership – “NCSP”



Network

Partners have access to an online community platform, virtual and in-person meetings, webinars, and other tools to engage with DOE and national lab staff as well as each other.

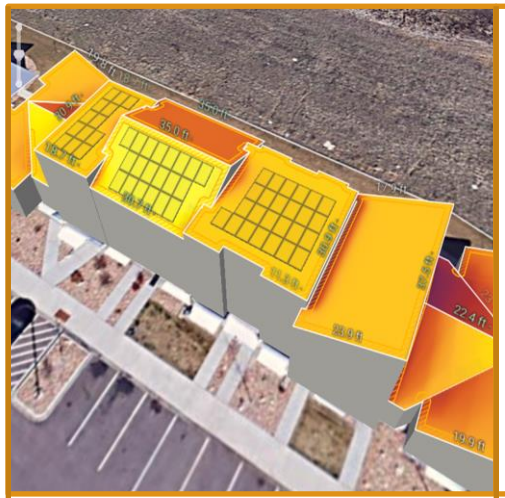
Collaboration

Structured groups of partners form around specific goals to address common barriers in specific community solar sectors by learning from each other and sharing resources.

Technical Assistance

Partners have access to technical assistance resources from DOE, its national laboratories, and third-party subject-matter experts for support on unique local challenges.

Technical Assistance: Recent Efforts

	SEEK		
Analyzing bill savings in different program designs with International Center for Appropriate and Sustainable Technology	Investigating aggregated financing approaches to accelerate adoption of community solar by faith-based organizations with the SEEK project	Exploring options to site and finance community solar on municipal properties with Michigan Energy Options	Developing metrics for a tribal community solar project to ensure community solar benefits can be distributed equitability with X-Utility

Current Collaboratives

Multifamily Affordable Housing

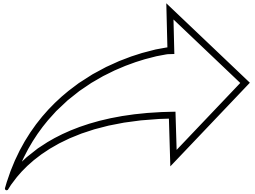
[Download the Multifamily Affordable Housing Collaborative fact sheet]

Municipal Utilities

[Download the Municipal Utility Collaborative fact sheet]

Collaborative Process

Assessments & Action Plans

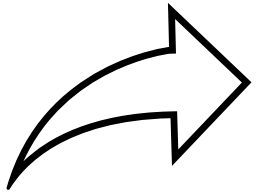


Resource Repository

Technical Sessions

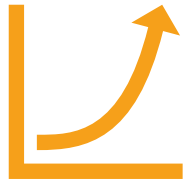
Peer Learning

Technical Assistance



Toolkits

Dissemination

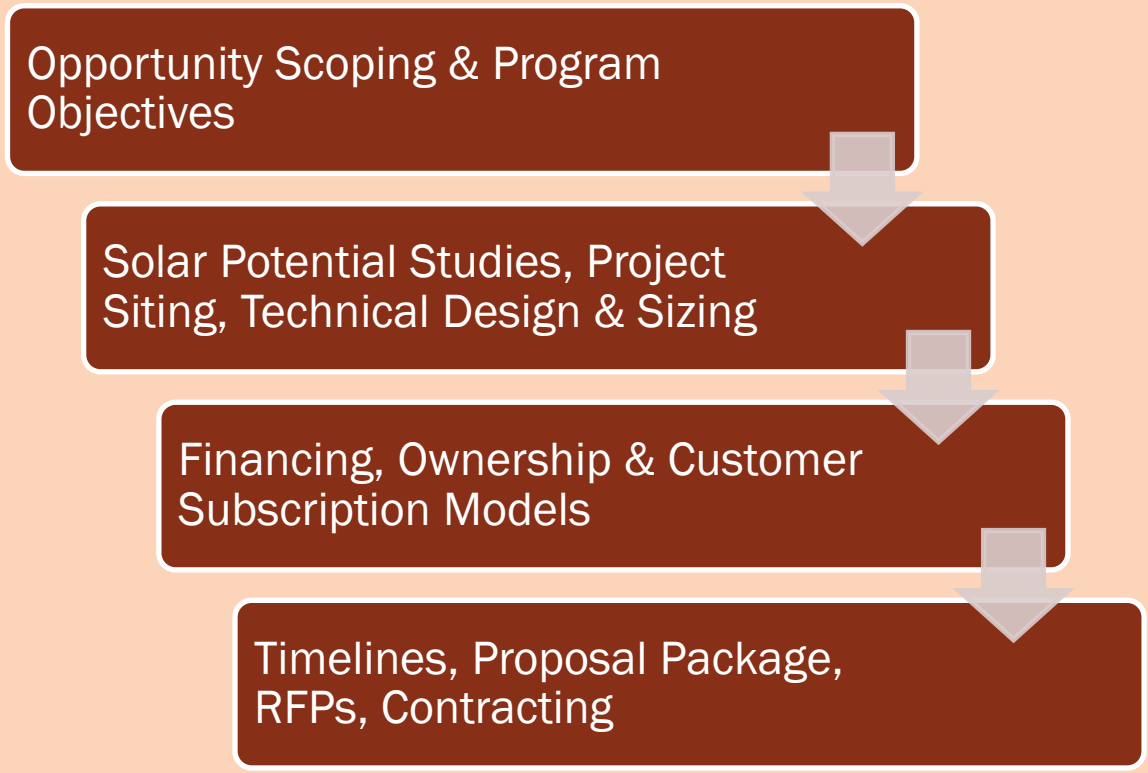


Replication

Municipal Utility Collaborative Updates

- Active Technical Assistance
  - Program Evaluation
  - Customer Outreach and Engagement
- APPA resource hub: https://www.publicpower.org/deed-rd-funding/national-community-solar-partnership

TA Example: *Project Planning Workgroup*



https://survey.alchemer.com/s3/6219297/Interest-Form-Community-Solar-Workgroup

NCSP Technical Assistance: Types of TA Available

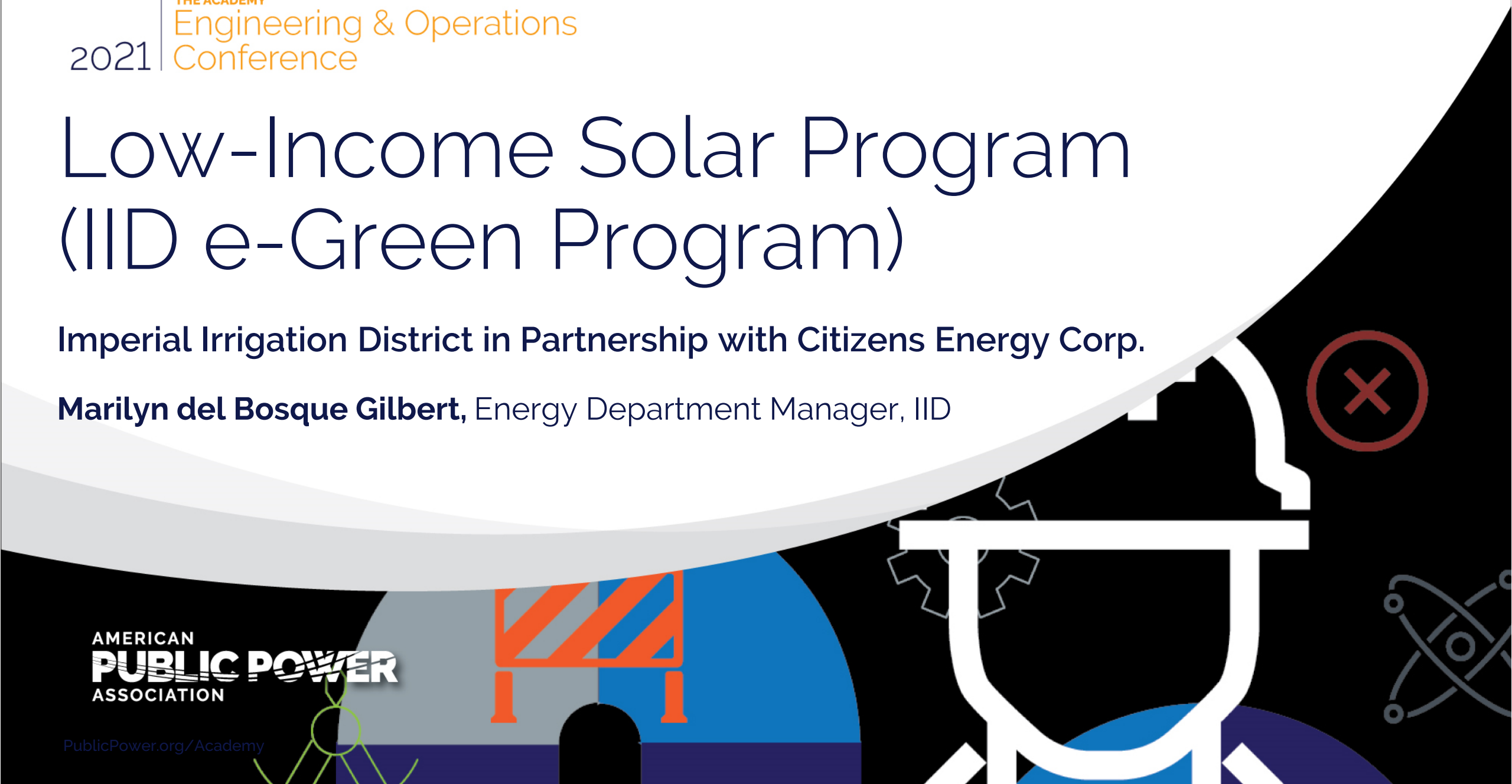
- Consultation
- Presentation(s)
- Support for workshops or other meetings
- Technical review of proposed plans or documents
- General information/education to inform development of community solar initiative rules, guidelines, etc.
- Technical analysis and modeling of potential program costs, benefits and impacts
- Exploratory and foundational research
- Data analysis, evaluation, and model/tool development.

2021 | THE ACADEMY Engineering & Operations Conference

Low-Income Solar Program (IID e-Green Program)

Imperial Irrigation District in Partnership with Citizens Energy Corp.

Marilyn del Bosque Gilbert, Energy Department Manager, IID



AMERICAN PUBLIC POWER ASSOCIATION

PublicPower.org/Academy

Background

AMERICAN PUBLIC POWER ASSOCIATION

About IID

- 3rd largest public power provider in California
- Manage more than 1,000 MWs of renewable resources including solar, geothermal, biomass and small hydro
- Over 157,000 electric customers
- Service territory spans more than 6,400 square miles, encompassing all of Imperial County and parts of Riverside and San Diego counties
- Geographically located along the Mexicali, Mexico international border
- Abundant renewable energy resources in the region
- Several disadvantaged communities in service area with high unemployment rates and low median income
- Agricultural based economy

About Citizens Energy Corporation

- Boston-based nonprofit
- Founded by former Congressman Joseph P. Kennedy II
- 40-year history of channeling revenues from successful energy ventures to programs that help low-income customers
- Learn more about them at www.citizensenergy.com

Project

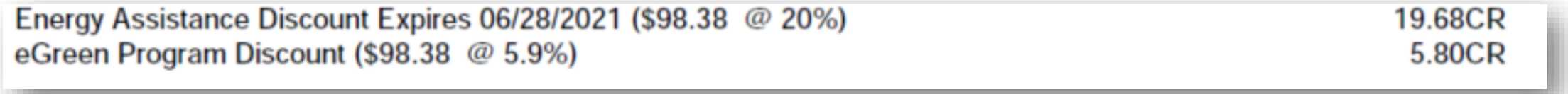
AMERICAN PUBLIC POWER ASSOCIATION

Overview

In September of 2019, IID in partnership with non-profit Citizens Energy Corporation, commissioned the first-of-its-kind community solar project tailored to providing clean and renewable energy to over 11,000 low-income customers at a low cost.

How it Works

- Project generates 30 megawatts of power, IID purchases 20 of the megawatts under a 23-year power purchase agreement at a low wholesale rate. Citizens Energy provides the balance of the generation approximately 10 megawatts at no cost to IID.
- Savings result in approximately **$1 million annually**, which are passed on directly to IID's qualified low-income electric customers in the form of an additional monthly discount on their electric bills through a new eGreen program.
- Residential Energy Assistance Program (REAP) and eGreen Program
  - In the first year, actual savings resulted in $920,000. Just a little below the estimated savings.
  - 51% of Low-Income customers receive 30% discount and 49% receive 20% discount.
  - All 11,000 plus customers on IID's REAP program were automatically enrolled in the new eGreen program so they could benefit from the additional discount.
  - Through REAP income qualified customers can receive a 20% discount on their monthly electric bill and income qualified seniors (age 62 and older) can receive a 30% discount.
  - Through the eGreen program these customers can expect an additional estimated 5% discount on their monthly bill, which is shown as separate line item.



At-A-Glance

- 30 MWs of solar energy produced
- 23-year power purchase agreement
- Over 11,000-plus low-income customers benefit
- ~$1M in annual savings passed on to income qualified customers
- The blended price per MWh in year one is $20.96 (includes the 20MW and 10MW)
- The annual cost per MWh to IID for the first year of the PPA is $31.44, with an 0.5 percent annual escalation factor
- Although the annual cost flows through the IID's Energy Cost Adjustment, IID utilizes the Public Benefit Charge Reserve Fund to pick up the annual PPA cost
- The Public Benefit Charge is a non-bypassable, usage based charge mandated by California statute to fund specific activities, including investments in renewable energy and low-income programs
- $36M IID's cost of electricity over the life of the agreement
- Project located on 200 acres of IID-owned land
- 107,000 solar panels
- 280 construction jobs created during the construction phase
- 08-30-2019 – Commercial Operation Date
- 09-25-2019 – Commissioning Date

Benefits

- Customer Support
  - IID is known as the “renewable energy capital” and this project was a great opportunity to make local renewable energy available to our low-income customers at low-cost.
- Financial
  - Annual estimated savings of $1 million passed on to customers.
- Meet Standards
  - Support local renewables to help meet California’s Renewable Energy Portfolio Standard.

Challenges

Project challenges, in terms of administrating the program:

- With participation in IID's Residential Energy Assistance Program fluctuating constantly from month-to-month, projecting the monthly community solar discount can be challenging. It involves a constant monitoring and tracking of participation and the amount of funds available from the 10 MW allocation to distribute amongst the low-income customers.
- Programming your accounting and billing system to provide the discount is another factor to consider

Participation

- The eGreen Program was customized to bring renewable solar clean energy to low-income families without the need for on-site installation.
- No enrollment required. IID's Residential Energy Assistance Program (REAP) customers are automatically enrolled in the program.
- eGreen provides up to 5 percent additional discount to REAP customers' monthly electric bills.
- IID has a "Low-Income Solar Contribution Agreement" with Citizen's Imperial Solar. At this time, the program is only available to low-income qualifying customers.

2021 | THE ACADEMY Engineering & Operations Conference

Community Solar for Public Power

Paul Zummo
Director, Policy Research and Analysis
American Public Power Association

Exploring Community Solar for Public Power

- Considerations for potential projects
- Public Power Case Studies
- Funding opportunities through National Community Solar Partnership

Issues to Consider Before Implementation

- Is there internal/external pressure to provide solar resources?
- What is the level of customer interest, if any?
- Do you have the means to implement and run a community solar program?
- Would program benefit all customers, not just participants?
- How does it fit into your portfolio?
- Will you need to develop new infrastructure?

Ownership Structure

- **Customer owned**: customers organize to develop project
- Customers would have to be motivated to manage

- **Utility owned:** direct utility ownership of project
- Public power utilities unable to claim ITC

- **Third party ownership:** Most common model for public power. Utility enters into PPA for production, manages project.
- If project ends up undersubscribed, could leave utility holding the bag.

Pricing Options

- Capacity-Based
  - Participants own, lease, or subscribe to certain amount of panels
  - Participants receive bill credit proportioned to share of the product
  - Normally, participants pay up-front – before project has started
  - Ownership is for life of the system
- Energy-Based
  - AKA “pay as you go”
  - Participants pays for the system through a per-kWh charge
  - Typically price is set at a premium from retail rate
  - Rate is locked in, thus participants hope over time the energy rate will be lower than retail rate

Bill Credits

- In a capacity-based system, bill credits allotted based on share of the system
- If customer owns 1% of 100 kW array, and retail rate is 10 cents/kWh, customer receives $10 credit from 10,000 kWh production in a month (based on 100 kWh share)
- Under an energy-based system, customer pays premium rate for share of project, then retail for all other kWh.
- Over time, as retail rate increases, premium will become savings

Other Considerations

- Mitigate undersubscription risks through pre-project surveys
- Advertise the program where possible
- Consider keeping deposit and purchase price as low as possible
- Engage in continuous marketing
- Place arrays in visible public space to highlight project
- More information available: https://www.publicpower.org/resource/community-solar-z

Case Studies

Moorhead Public Service (MPS)

- Capture the Energy project established in 2011 to provide incentives for rooftop solar
- Moderate interest, so resources allocated to Capture the Sun program
- RFP for three arrays totaling 60 kW
- Customers able to purchase 310 watt panels at $470
- Credit based on production allocated annually – administrative burden too high to do monthly
- Successful program – has expanded

CPS Energy

- Simply Solar program: Roofless Solar
- 1 MW community solar program – Big Sun
- CPS works with Clean Energy Collective to build arrays
- Participants pay for share of project
- Can purchase up to 120% of historical usage
- Bill credit for each kWh - $0.09 /kWh
- Credit remains fixed for lifetime of program

Orlando Utilities Commission

- Residential/commercial customers can subscribe for all or portion of monthly bill
- Percent of usage in 10% increments at fixed rate of 6 cents per kWh in lieu of fuel charge
- No upfront cost
- Can remain on program as long as you move within OUC service territory
- Percentage subscription can be increased as long as the program is not sold out
- 13 MW of community solar available

Sterling Municipal Light Department

- First community solar plus storage installation in Massachusetts
- 1 MW solar installation with 1 MW/2 MWh storage system
- Worked with Origis Energy
- Storage system enables to SMLD to avoid congestion charges
- Participants enrolled up to 25% of total bill at fixed, 25-year rate

NCSP Working Group

- In collaboration with DOE and NREL
- Participants will work in parallel to scope community solar projects for their community
- 9-10 months
- Developing a business case for an exploratory project or site-specific project
- Topic-specific sessions – defining project goals, marketing, program design, etc.
- Participants commit to 3-5 hours per month
- Link to express interest: https://survey.alchemer.com/s3/6219297/Interest-Form-Community-Solar-Workgroup
- Deadline to complete interest form: **COB this Friday, March 26th**

Thanks!

Paul Zummo

pzummo@publicpower.org

(202) 467-2969

Q&A

AMERICAN PUBLIC POWER ASSOCIATION