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# Community Solar Program Design and Subscription Models

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This slide deck provides an overview of community solar program design and subscription models. It introduces program and subscription design considerations, explains the different components of program and subscription design, and ends with best practices when designing a community solar program. This slide deck was originally developed as part of a working group under the National Community Solar Partnership's Municipal Utility Collaborative.

Contents

# Program and Subscription Design Considerations

# Program and Subscription Design Considerations

Each design element below is covered in more detail in the following slides.

1. Anchor tenants: inclusion or exclusion
2. Customer classes eligible to enroll (residential, Low and Moderate Income {LMI}), commercial)—aka “participant mix”
3. Project-based vs. portfolio-based programs
4. Subscription minimums and maximums
5. Term limits, exit rules, and transferability
6. Subscribers keep RECs vs. no environmental benefits
7. Upfront signup fee vs. no upfront fee
8. Monthly subscription payment: fixed payment vs. floating.

# Connecting Program Goals With Design Considerations

Decisions within each element of program and subscription design may impact the success of the overarching goals of a community solar program. This table reviews where each element discussed in this slide deck connects to four common program goals.

| | | Design Elements | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Anchor Tenants | Customer Classes Eligible To Enroll | Project-Based vs. Portfolio-Based Program | Subscription Minimums and Maximums | Term Limits, Exit Rules, and Transferabil-ity | RECs and Environmental Benefits | Upfront and Fixed Fees | Fixed or Floating Monthly Payment |
| **Community Solar Goals** | **LMI Access to Solar** | | X | | X | X | | X | X |
| | **Customer Cost Savings** | X | X | X | | | | X | X |
| | **Renewable Energy Goals/ Environmental Leadership** | | | | | | X | | |
| | **Customer Demand for and Access to Solar** | X | X | | | X | X | | X |

# Anchor Tenants

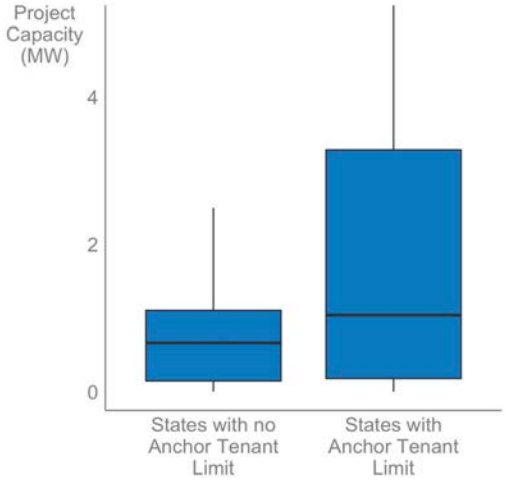
*Anchor tenants are large customers that subscribe to a significant portion of a community solar array.*

Anchors may be:

- Local businesses or franchises with large electricity demand
- Municipal buildings/accounts (libraries, schools, city hall, etc.)
- Community partners or nonprofits with strong local presence.

Anchors can potentially:

- Provide more revenue certainty
- Reduce total project costs through reduced financing and customer acquisition costs
- Reduce subscription costs to non-anchor subscribers.




Project size distributions in states with and without limits on anchor tenants

Programs can limit the subscriptions held by anchor tenants to maintain the “community” element and ensure sufficient shares for smaller subscribers.

- Some states limit the capacity that can be held by anchor tenants (CA, IL, MD, MN, NC, NY, OR).

Whether there is an anchor tenant (and how much of the project they subscribe to) impacts whether the project is representative of the customer base.

# Participant Mix: Customer Classes Eligible To Enroll

- Some programs prioritize a participant mix that reflects the utility customer mix.
- Many programs include a carve-out for LMI participation.
  - Typically, a certain % of the project is set aside for LMI subscribers.
  - Including an LMI carve-out may require cost premiums for other customer classes.
- Choices regarding the desirable participant mix will inform other program design elements, including:
  - Subscription minimums and maximums
  - Term limits, exit rules, and transferability
  - Upfront fees
  - Monthly payment structures.

**Best Practices**

- ✓ Allow all customer classes to participate
- ✓ Provide an LMI carve-out that ensures cost parity or cost savings for LMI customers
- ✓ Provide 20% bill savings for customers

# Project-Based vs. Portfolio-Based Programs

**Project-based programs** allow subscribers to sign up for a *specific project.*

- Subscribers know exactly where their project is located.
- Improved marketing opportunities and customer identification resulting from solar development in the community.
- Subscribers concerned about land use (or other issues) can ensure their project meets their personal criteria.

**Portfolio-based programs** allocate subscriptions based on aggregated solar capacity across the utility's solar portfolio.

- Subscription costs tied to overall portfolio cost
- Aggregates projects together that have different installation costs
- Distributes the advantage of falling solar prices across all program subscribers
- Encourages customers to support more solar development, even if they are already subscribed
- Passes cost savings from the utility's increasing solar capacity directly to program subscribers.

# Subscription Minimums and Maximums

- Subscription **maximums** limit an individual subscriber's monthly capacity.
  - Most programs set the maximum subscription level at ~100% of a subscriber's average annual load, based on the previous year's utility bill.
  - Maximum subscription level:

    total project capacity ÷ minimum number of customers to which a program wants to offer shares

- Subscription **minimums** require subscribers to commit to a minimum monthly allocation.
  - The estimated cost to manage subscribers can inform a minimum subscription level.
  - A subscription minimum may be a barrier to entry (e.g., apartment dwellers have a smaller energy profile than single-family homes).

# Term Limits, Exit Rules, and Transferability

*Shorter subscription terms with an easy in/out process typically lead to reduced subscriber acquisition costs.*

- **Term limits** set the minimum time a subscriber is required to maintain their subscription (multiyear, annual, or month-to-month).
- **Exit rules** determine whether a subscriber must pay a fee for ending their subscription prior to the term limit, and how early they must provide notice.
- **Transferability** either allows or disallows subscribers to "transfer" their subscription to a different utility account within the utility's territory.
  - Can ease the impact of exit fees and term limits
    - Customer moves and wants to keep their subscription
    - Customer wants to transfer their subscription to another customer's account.

**Best Practices**

- ✓ Allow for transfer of subscriptions within the utility territory
- ✓ Do not include a cancelation fee
- ✓ Use a month-to-month term structure

# RECs and Environmental Attributes

RECs from a community solar project can be:

- **Retained** by the solar project owner, utility, or administrator to use for its own claims
- **Retired** on behalf of the subscriber (the person or business buying from/participating in the community solar program)
- **Provided** to the subscriber
  - *Note: Due to the complexity of the REC market, this option may only be desirable for large commercial customers.*

***Only the party that owns the RECs can claim the green power benefits from the solar project.***

***Subscribers should be informed about how RECs are handled and given appropriate language to help them make claims consistent with standard environmental practice.***

***States with existing renewable portfolio standards (RPS) or clean energy standards (CES) have implemented ways for electric suppliers to procure RECs from community solar projects (e.g., Massachusetts, Colorado).***

# Upfront Fees: Options

| Option | Description |
|---|---|
| **Full Upfront Payment** | Subscriber pays for all projected solar electricity generation over a set duration (e.g., 20 years), locked in at a set rate per kWh. A discount can be offered to customers selecting the upfront payment option versus an ongoing payment. |
| **Upfront Payment + Monthly Payments** | This hybrid payment structure combines an upfront payment with either a fixed or floating monthly payment (see the following slides for monthly payment options). |

# Upfront Fees: Pros and Cons

**Pros:**

- Can be combined with monthly payments
- Can help the utility hedge against a community solar project's construction or financing costs
- Can help with customer retention

**Cons:**

- Can present a barrier to entry for LMI participants
- Programs with *no* upfront fees (easy entry) typically have lower customer acquisition costs.

**Best Practices**

✓ No upfront fees

✓ If upfront fees are required, set the fee level low enough to ensure no barrier to entry for LMI customers

**Existing Programs**

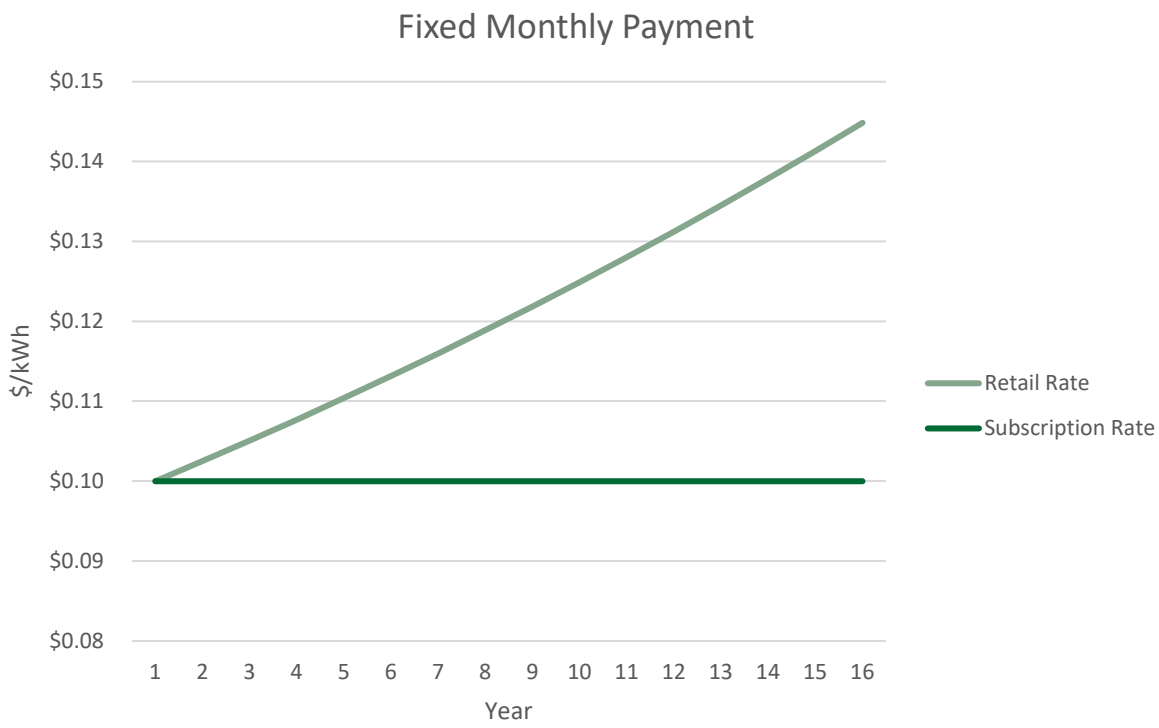
Upfront fees in existing programs surveyed ranged from $75–$325

# Monthly Payment Options

| Payment Basis | Fixed Subscription Price | Varying Subscription Price |
|---|---|---|
| **Capacity-Based ($/kW)** Monthly payment based on the capacity associated with the subscription | The $/kW rate is set and fixed for the life of the project, resulting in a consistent payment every month. | The $/kW rate changes (e.g., annually). Adjustments may account for changes in project maintenance costs or program administrative costs. |
| **Generation-Based ($/kWh)** Payments are a price per kWh delivered | The $/kWh rate for solar subscription is set and never increases. Assuming electricity rates increase, the discount to subscribers increases over time. | The $/kW rate changes (e.g., annually). Adjustments may account for changes in project maintenance costs or program administrative costs. |
| **Subscribe To "Own" Model** | Fixed monthly payment for a set number of years, after which point solar credits are "free." This option is most like a rooftop solar model. | N/A |

# Monthly Payment Options: Fixed

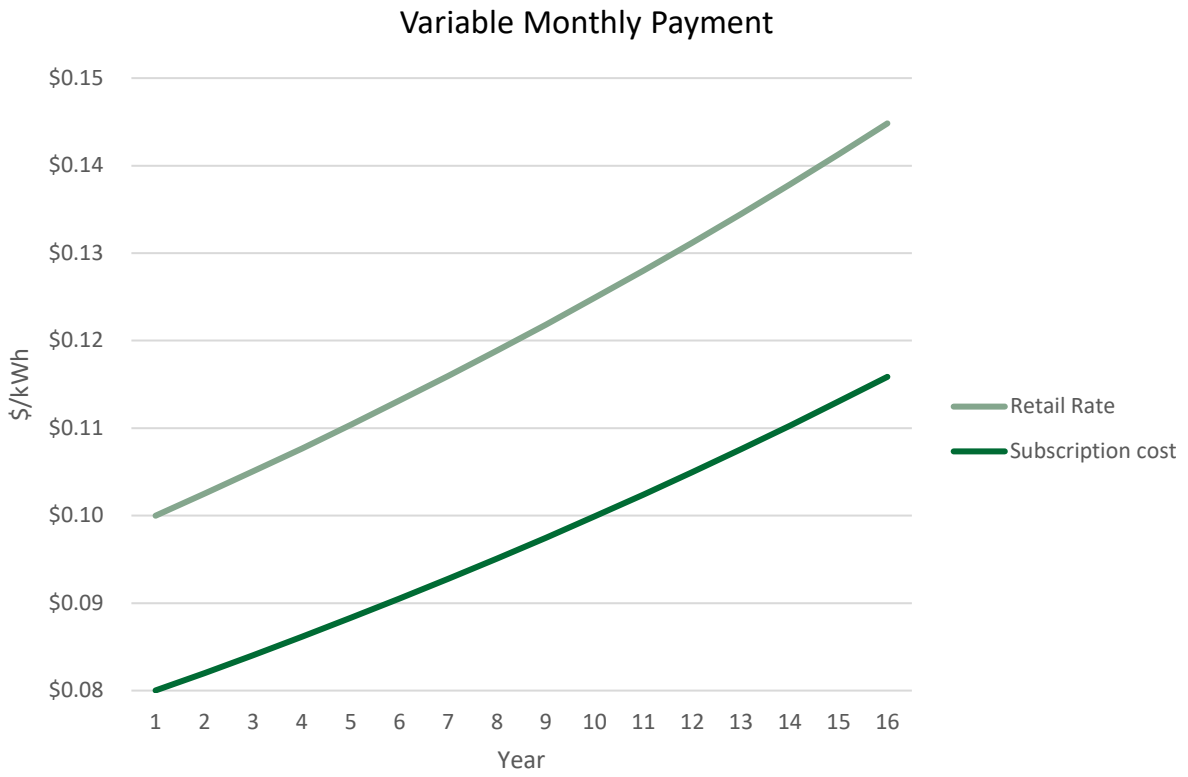
- Provide cost stability/predictability to subscribers
- Offer simple marketing and customer communication
- Not sensitive to retail rate changes year-over-year
- May or may not be a cost premium or cost saving to subscribers.




*Data in figure is illustrative only and not based on actual rates

# Monthly Payment Options: Variable

- May be more complicated to explain to subscribers
- Hedge against retail rate changes year-over-year
- May or may not be a cost premium or cost saving to subscribers
- Can guarantee savings for subscribers while providing greater utility cost recovery (if subscription is set lower than retail as the retail rate changes).




*Data in figure is illustrative only and not based on actual rates

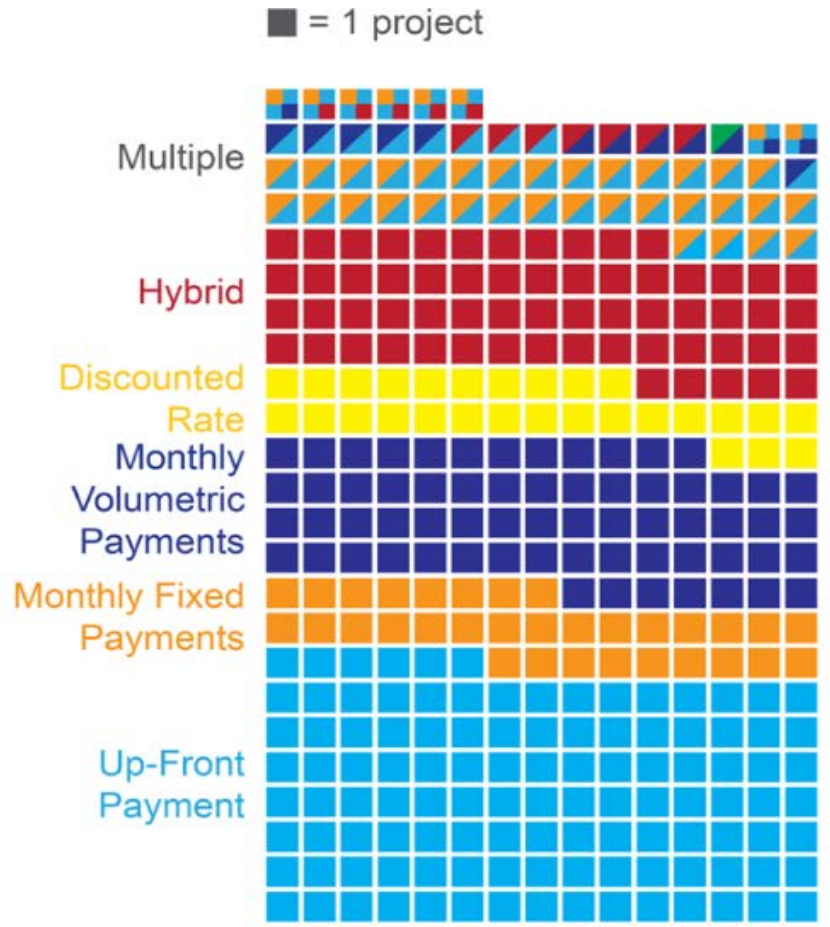
# Subscriber Credit Options

| | Bill Credit to Subscriber | Considerations |
|---|---|---|
| Generation-Based Subscription | Subscriptions are for a defined block of kWh per month or year. Credits are distributed monthly—either as a fixed number of kWh or a variable number of kWh based on the customer's electricity consumption. | Due to the seasonal variability and lifetime degradation of solar generation, total possible subscriptions should be calculated using conservative solar generation estimates. This will ensure the promised number of kWh can be delivered. A portion of the project may need to remain unsubscribed. An anchor tenant may be willing to buy excess generation or accept fewer credits if there is under-generation. |
| Capacity-Based Subscription | Subscription is for a set capacity (kW). A varying number of kWh are credited to the customer bill each month based on actual solar production of the capacity associated with the subscription. | A production guarantee can be used to reduce risk to the subscriber. This guarantee can be in the form of a $/kWh refund if the annual solar production associated with a capacity-based subscription is below a specified amount. This is the most common model of bill crediting. |

# Residential Payment Terms Are Diverse

As of 2020, community solar projects throughout the country utilized varying payment structures:

- **Full upfront payments** were the most common payment structure (46% of projects).
- **Monthly volumetric payments** were the second most common payment structure (22% of projects).
- About 21% of projects offered a hybrid model (combining different **upfront and monthly payments**).
- About 15% of projects offered **multiple payment structures**, most commonly a combination of upfront and fixed monthly payments.
- About 8% of projects offered a **fixed discount** over the customer's electricity rate instead of a payment. This model is expected to grow.



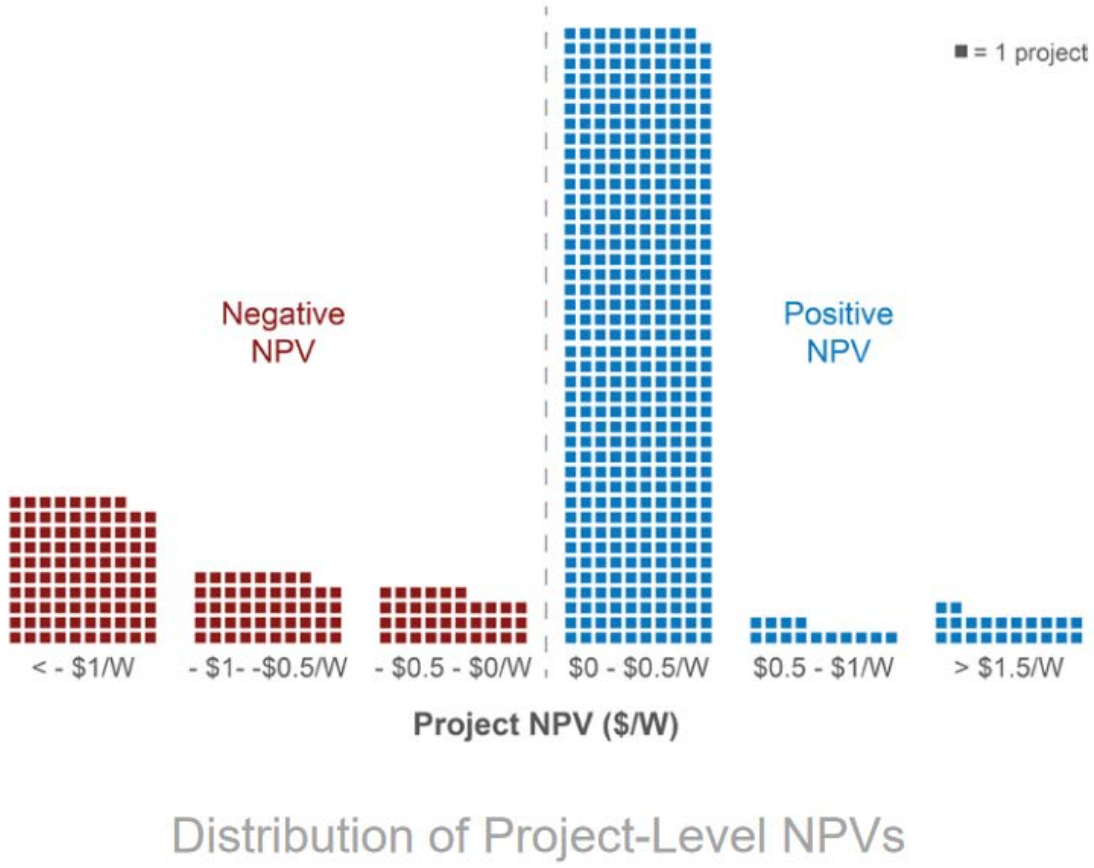

Distribution of Program Payment Methods

https://www.nrel.gov/docs/fy20osti/75438.pdf

# More Than 80% of Projects Have a Positive Net Present Value (NPV) for Residential Subscribers

Across payment terms, the median project-level NPV is about **+$0.37/W** (sensitivity range: +$0.20/W to +$0.46/W) and about 83% (sensitivity range: 74%–86%) of projects yield a positive NPV.

**Most projects result in positive net benefits to customers over the course of the subscription.**

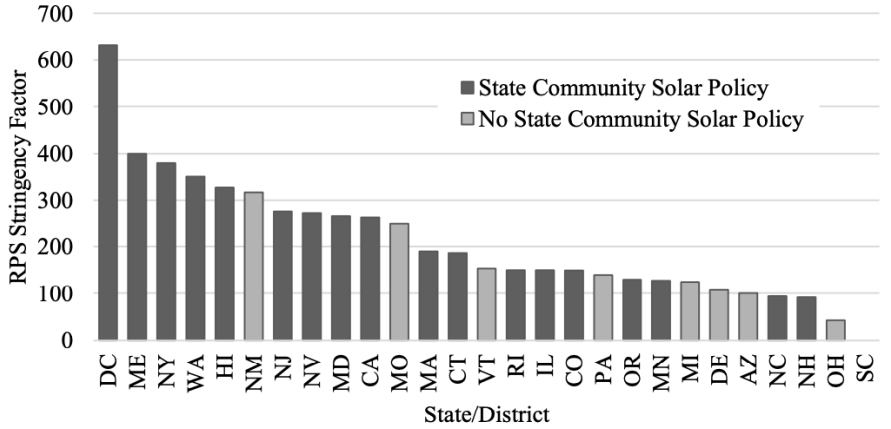



Distribution of Project-Level NPVs

https://www.nrel.gov/docs/fy20osti/75438.pdf

# State Incentives Influence Community Solar Program Design

- 70% of of the 25 states + D.C. with RPS mandates also have community solar policies.
- Community solar projects do exist in states without an RPS, clean energy standard, or community solar policy.
  - Florida, Georgia, and Arkansas have seen utilities develop community solar projects.
  - RECs are likely retained by the subscriber, as they do not have a market value.
- States with existing RPS or CES polices have implemented ways to procure RECs from community solar projects.




Note: The RPS Stringency Factor is calculated as $(Mandate_{final} - Mandate_{initial})/(Year_{final} - Year_{initial})$

# Summary: Program Design Best Practices

- ✓No upfront fees
- ✓Flexible exit rules
- ✓40% of subscriptions set aside for LMI customers
- ✓Easy onboarding and no credit check
- ✓Consolidated billing
- ✓20% bill savings
- ✓Engage subscribers with updates and news
- ✓Continuous improvements through subscriber feedback.

*Research shows that 25% of customers will leave the program after one bad experience. Month-to-month subscribers need more engagement.*

# Appendix: Additional Resources

# Examples: 2022 Sunny Awards for Equitable Community Solar

The **American-Made Sunny Awards for Equitable Community Solar** (The Sunny Awards) is a prize competition that recognizes community solar projects and programs that employ or develop best practices to increase equitable access to the meaningful benefits of community solar for subscribers and their communities. The 2022 winners highlighted numerous projects and programs that provide community solar with wide ranging impacts including LMI customer classes, increased savings, and community ownership among many others.

All of the 2022 winners can be found on the DOE website and some highlights include:

- Community Power Project: https://www.energy.gov/communitysolar/community-power-project-sunny-awards-winner
- DC Solar for All: https://www.energy.gov/communitysolar/district-columbia-solar-all-sunny-awards-winner
- Illinois Solar for All: https://www.energy.gov/communitysolar/illinois-solar-all-sunny-awards
- Shungnak-Kobuk Community Solar: https://www.energy.gov/communitysolar/shungnak-kobuk-community-solar-independent-power-producer-sunny-awards-winner

And many more on the DOE website!

# Utility-Run Programs With LMI Participation: Austin Energy

## Voluntarily offered utility program

**Austin Energy**, a publicly owned utility, was directed by the Austin City Council in 2010 to achieve 200 MW of solar power at a rate of $0.02895/kWh beginning in 2018, which was not a part of the original solar directive. The municipal utility has 2.8 MW of community solar currently and plans to expand by 1.5 MW. The project has a 50% low-income carve-out. Customers keep the RECs and pay a fixed rate for the community solar that replaces the fuel charge on their bill for 15 years. The current community solar rate is $0.0427/kWh for standard customers and $0.0277/kWh for eligible customer assistance program (CAP) customers, compared to the current fuel charge of $0.02895/kWh. Austin Energy has committed to continue providing these types of benefits to limited-income communities and communities of color by ensuring access to the affordability and dependability benefits laid out in their 2030 Climate Protection Plan.

- Austin Energy: Our Energy Roadmap
- Alternative Renewable Energy Option for Residential Customers
- Resource, Generation and Climate Protecation Plan

# Utility-Run Programs With LMI Participation: Xcel Energy

**Mandated community solar program with a carve-out or dedicated LMI projects**

Colorado's Community Solar Gardens Act passed in 2010, requiring a low-income carve-out for community solar projects run by the state's investor-owned utilities. Rules allow projects up to 5 MW in size to be developed by third parties; projects are competitively selected through an annual RFP process managed by Xcel Energy. There are about 100 MW installed as of fall 2020, with about 100 MW in development. Subscribers are awarded a bill credit based on their average retail rate less transmission and distribution charges, which equates to approximately $0.075/kWh for residential subscribers and $0.065/kWh for commercial subscribers. This has evolved over time; initially, each project was required to subscribe 5% of its capacity to LMI customers. Developers and others were not happy with this approach, and subsequent changes have allowed Xcel to manage capacity that is 100% dedicated to LMI subscribers.

- https://leg.colorado.gov/sites/default/files/images/olls/2010a_sl_344.pdf
- Xcel Energy presentation 9/15/20

# Utility-Run Programs With LMI Participation: Hawaii

**Mandated community solar program with utility ownership of LMI projects**

In Hawaii, the Community Based Renewable Energy (CBRE) rules for Phase 2 implementation allow the investor-owned utilities, including Hawaiian Electric Company and its subsidiaries, to operate 9 MW, of which 50% must serve LMI customers. Phase 1 of the mandate was implemented in 2017. Phase 2 was approved in April 2020, and currently the companies are in the process of drafting their request for proposals (RFPs).

- https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A19H20A90614D00155
- https://puc.hawaii.gov/energy/cbre/

# Multifamily Affordable Housing (MAFH) Participation in Community Solar

Affordable housing facilities can participate in community solar or community-solar-like projects in a variety of ways. Often the type of participation depends on whether tenants pay their own electricity bills.

Options include:

- Building subscription to community solar array for common spaces.
- Tenant subscription to community solar array for their own electricity bills.
- Building installs solar on its rooftop or other spaces and net meters the system; cost savings can be passed on to tenants via property improvements.
- Building hosts a community solar project on its facility.
  - https://www.usgbc.org/sites/default/files/2020-02/DHA%20Case%20Study%20October2019_1.pdf
  - https://www.lowincomesolar.org/dha-community-solar-project-keeps-housing-affordable/

*NSCSP has an MAFH Collaborative that addresses participation of this customer group in detail. Please refer to the resources of that collaborative for more information.*

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