

# Perspectives on Community Solar Program Design

**MWCOG Built Environment & Energy Advisory Committee Community Solar Workshop**

**Tanuj Deora, Chief Content Officer**

October 18, 2017



# About SEPA



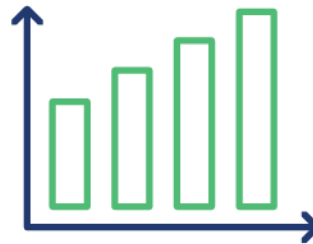
---

SEPA's mission is to facilitate the electric power industry's smart transition to a clean energy future through education, research, standards, and collaboration.

---



COMMUNITY



DATA



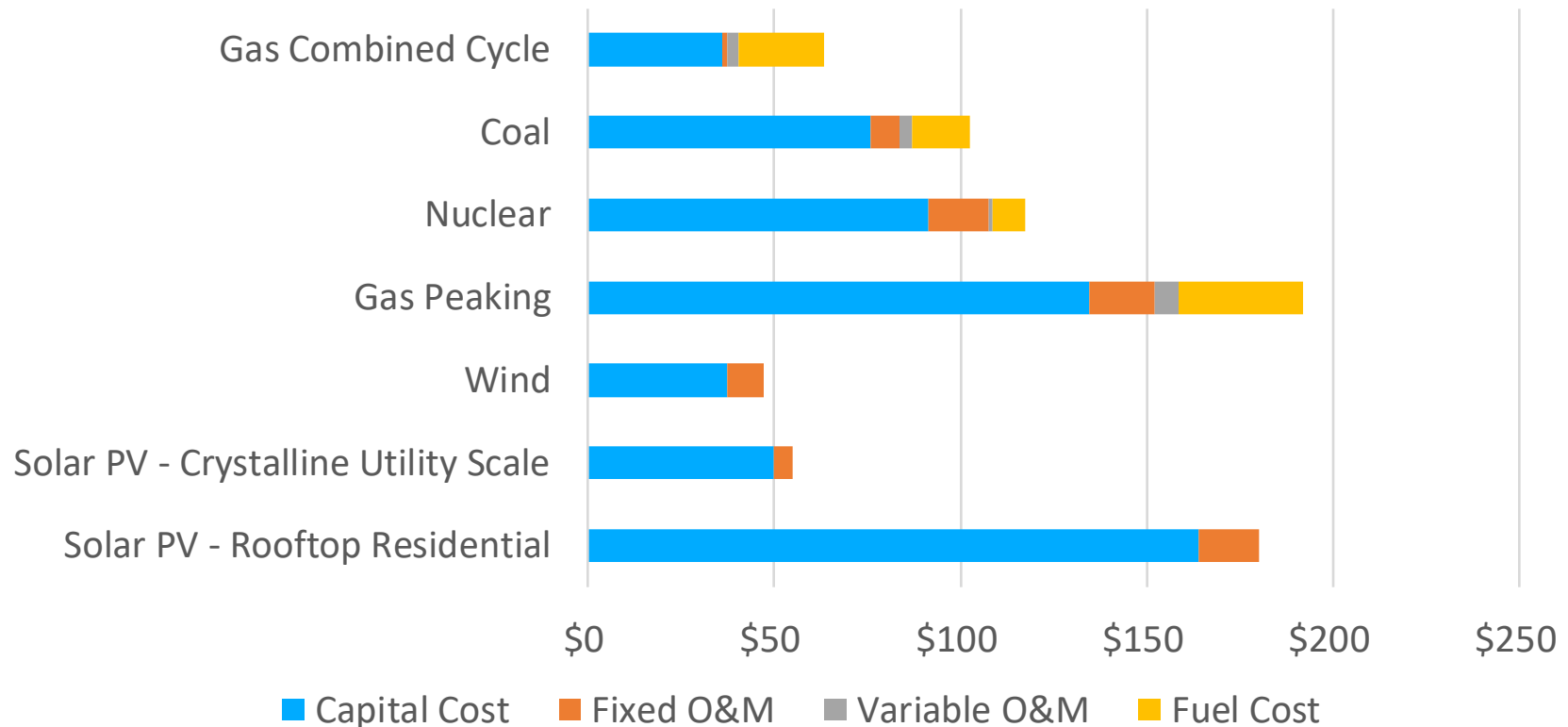
INSIGHTS

# Solar Market Update

## Capital Cost vs LCOE

**Utility scale solar is cost competitive with traditional generation resources**

Lazard LCOE by Component (Mid Point)



Source: Lazard's Levelized Cost of Energy Analysis - Version 10.0

# The US Solar Market

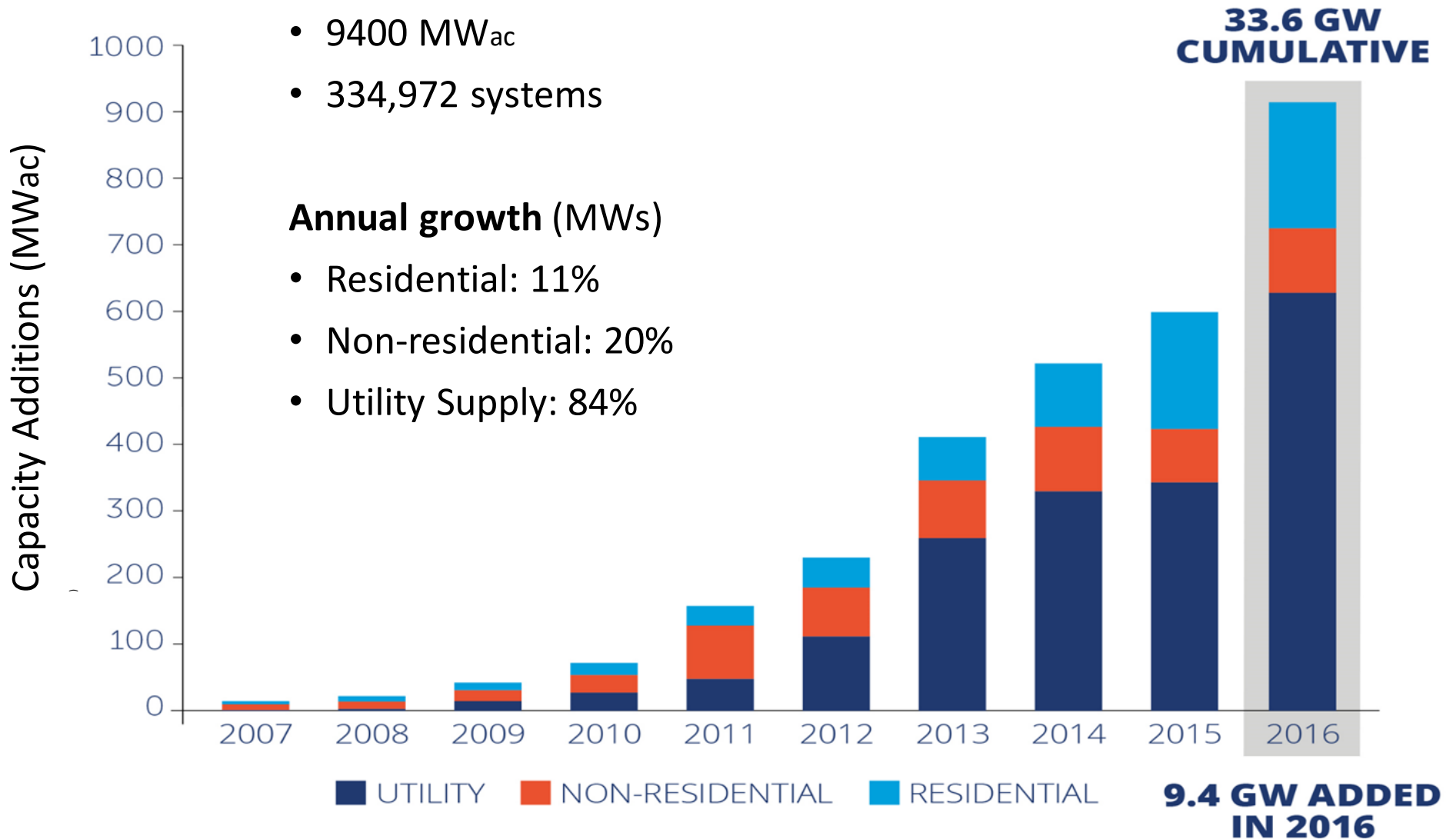


## In 2016:

- 9400 MW<sub>ac</sub>
- 334,972 systems

## Annual growth (MWs)

- Residential: 11%
- Non-residential: 20%
- Utility Supply: 84%

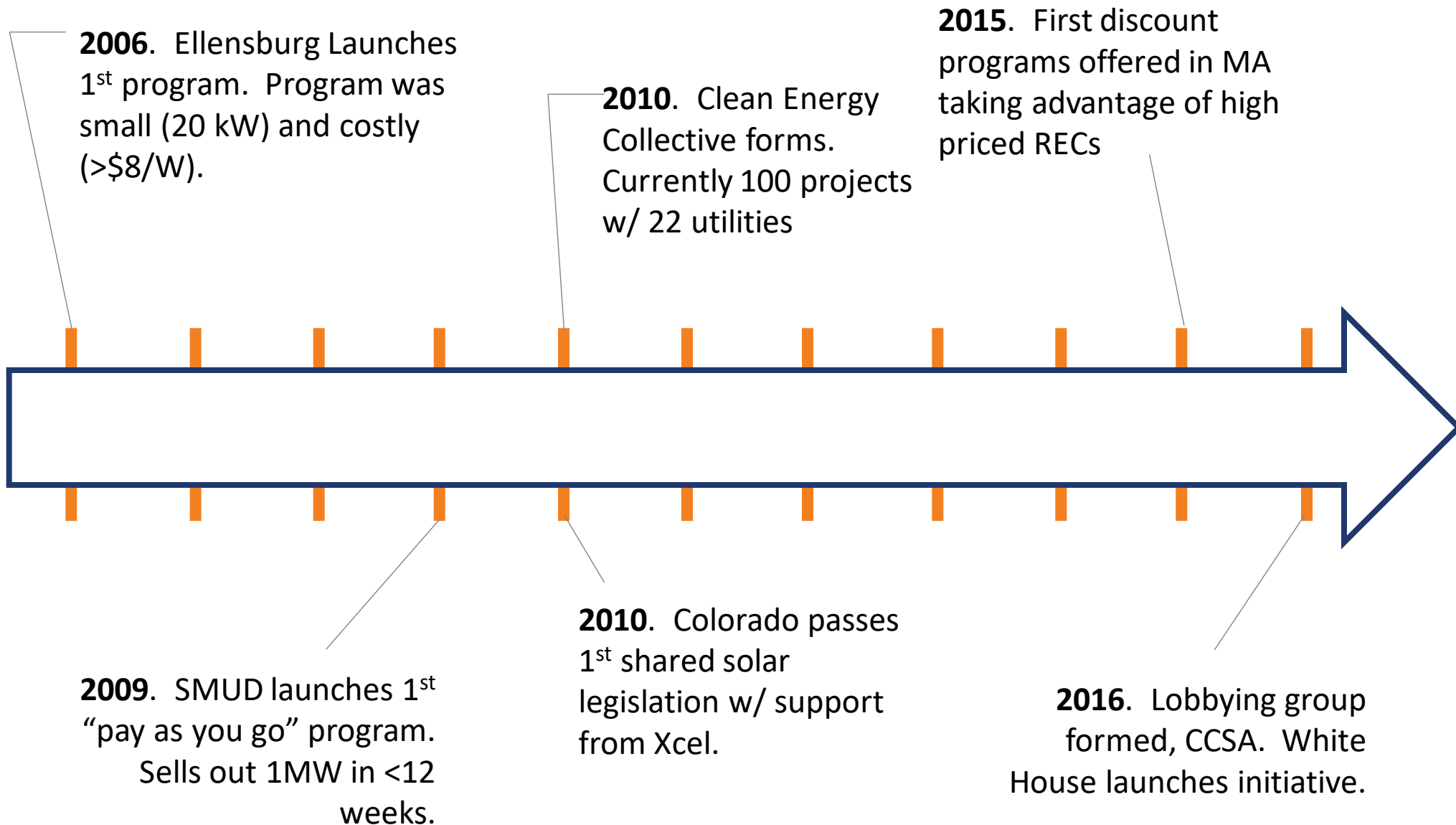


Source: Smart Electric Power Alliance, 2007-2017.

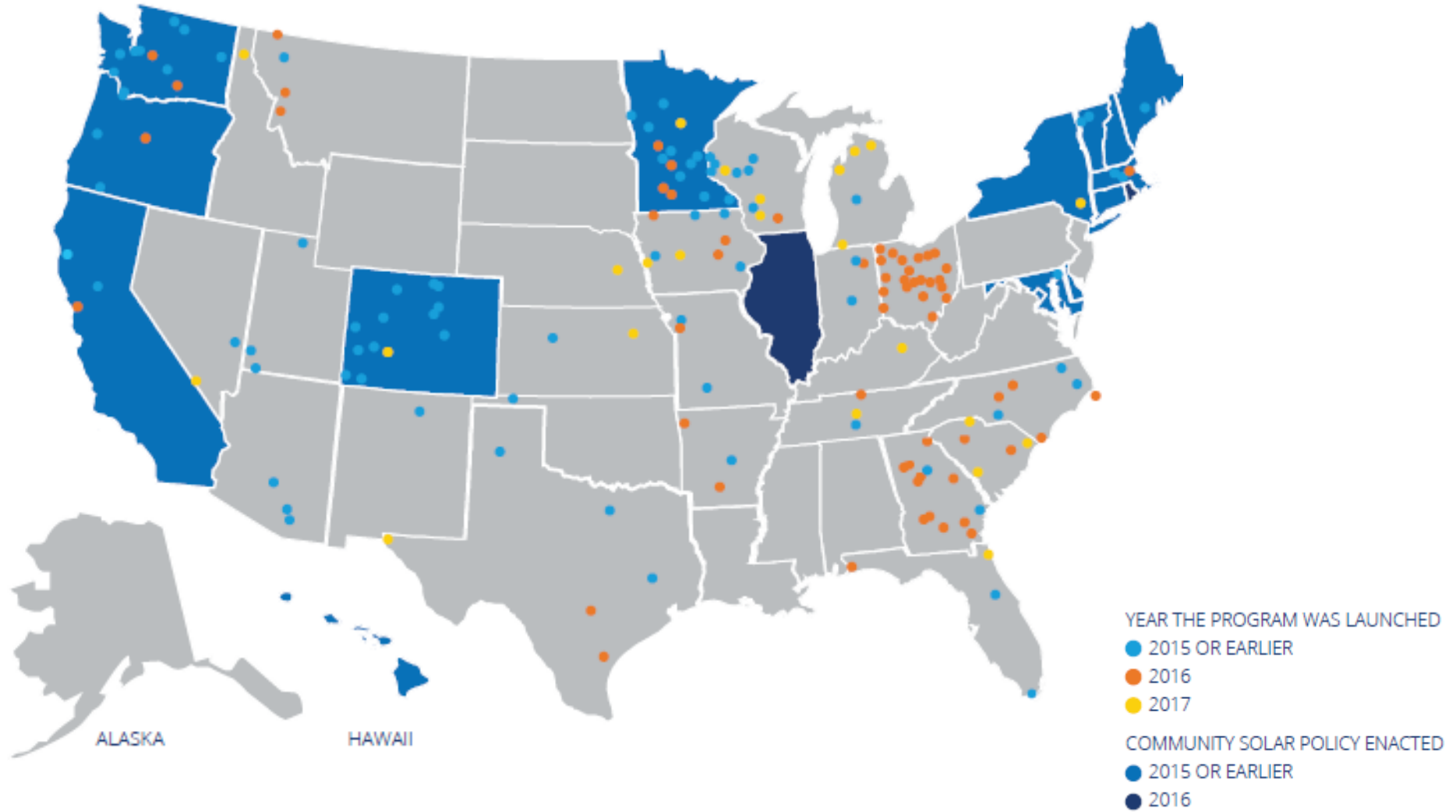
# Community Solar Update



## What is it?



# Community Solar Policy & programs?



Source: SEPA Analysis

[www.sepapower.org](http://www.sepapower.org)

# Community Solar

## Background

**But programs for the most part are quite small in absolute size and relative capacity.**

- Median program is 102.5 kW
- 75% of programs leverage systems less than 800 kW
- Largest program is around 75 MW (Xcel MN)

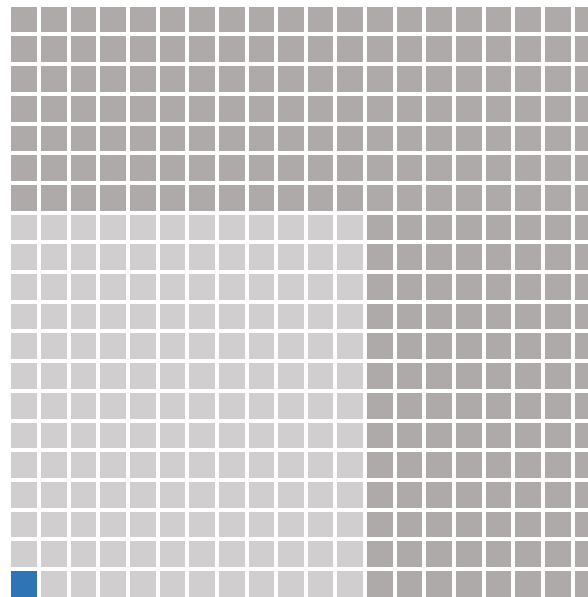
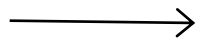
### Cumulative Installed US Capacity

(2014 MW)

Rooftop  
Solar



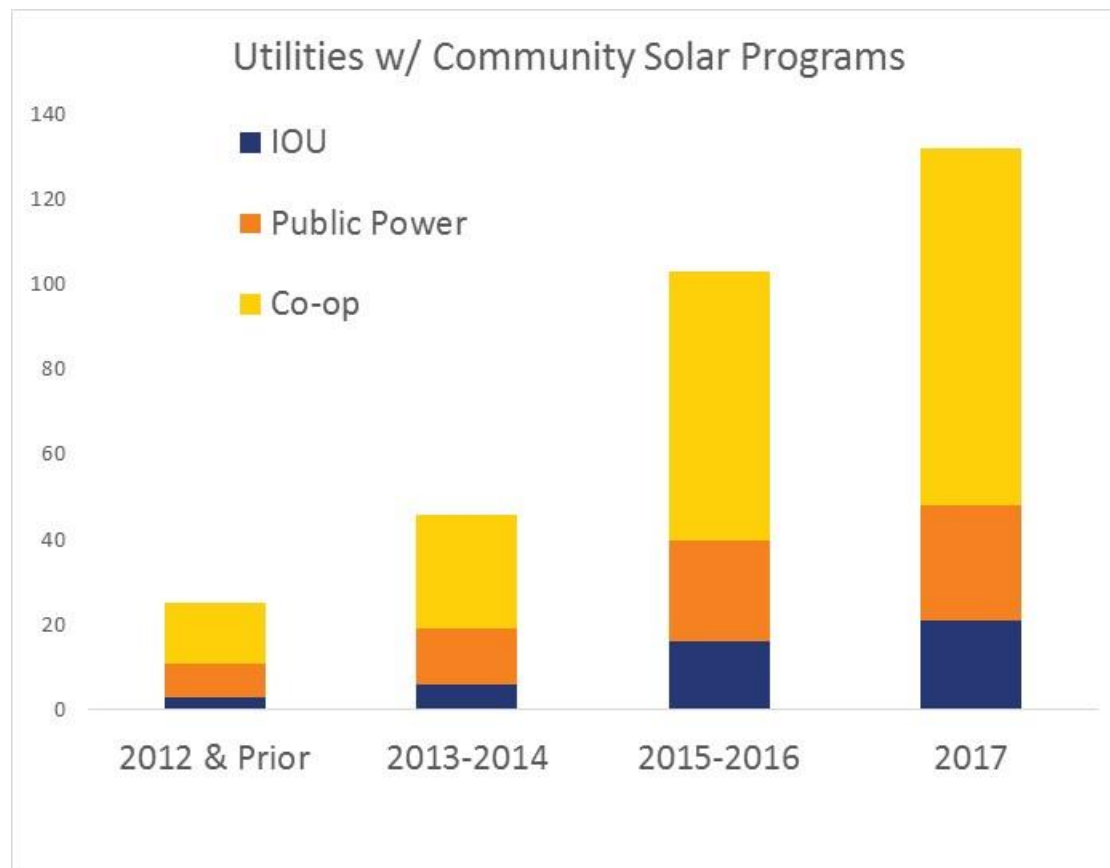
Community  
Solar



Utility-Scale  
Solar

# Community Solar Background

**Program count has been growing rapidly. The capacity of programs doubled in the last year to over 300MW**



## COMMUNITY SOLAR FAST FACTS:

.....  
171 UTILITIES HAVE ACTIVE  
PROGRAMS

.....  
311 MW ONLINE

.....  
OVER 300 MW OF  
PROGRAMS IN  
DEVELOPMENT

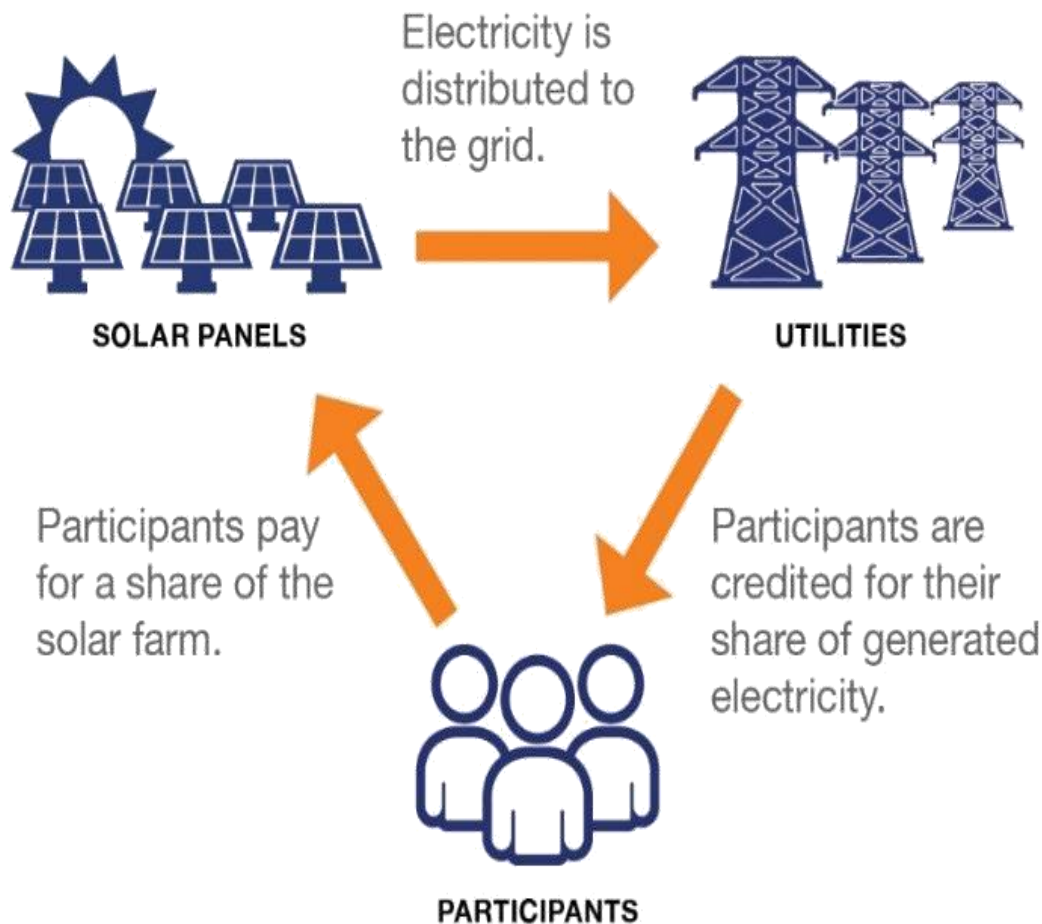


# Community Solar Update

## What is it?



# What is community solar?



## Customer Benefits








- Increase customer access
- Ability to hedge costs
- Portability within utility service area
- Leverages economies of scale

## Utility Benefits

- Can be strategically sited
- Proactive customer engagement
- Support the local PV industry
- Opportunity to gain understanding of solar resource

# Community Solar

## Low income options

| Strategy   | Example  |
|--|--|
| Subsidized by other participants                 |    |
| Subsidized by nonparticipant ratepayers          |    |
| Use existing bill assistance funds               |    |
| Use donations of time and/or equipment           |   |
| Donate excess generation                         |    |
| Use a state incentive (RECs / Production Credit) |    |

# Program Design

Who runs the program?

- Utility Role
- Asset Owner

What is the subscribers economic proposition?

- Subscriber Payment Structure
- Subscriber Initiation Fee
- Subscriber Credit
- Generation Guarantee

What are the participation restrictions?

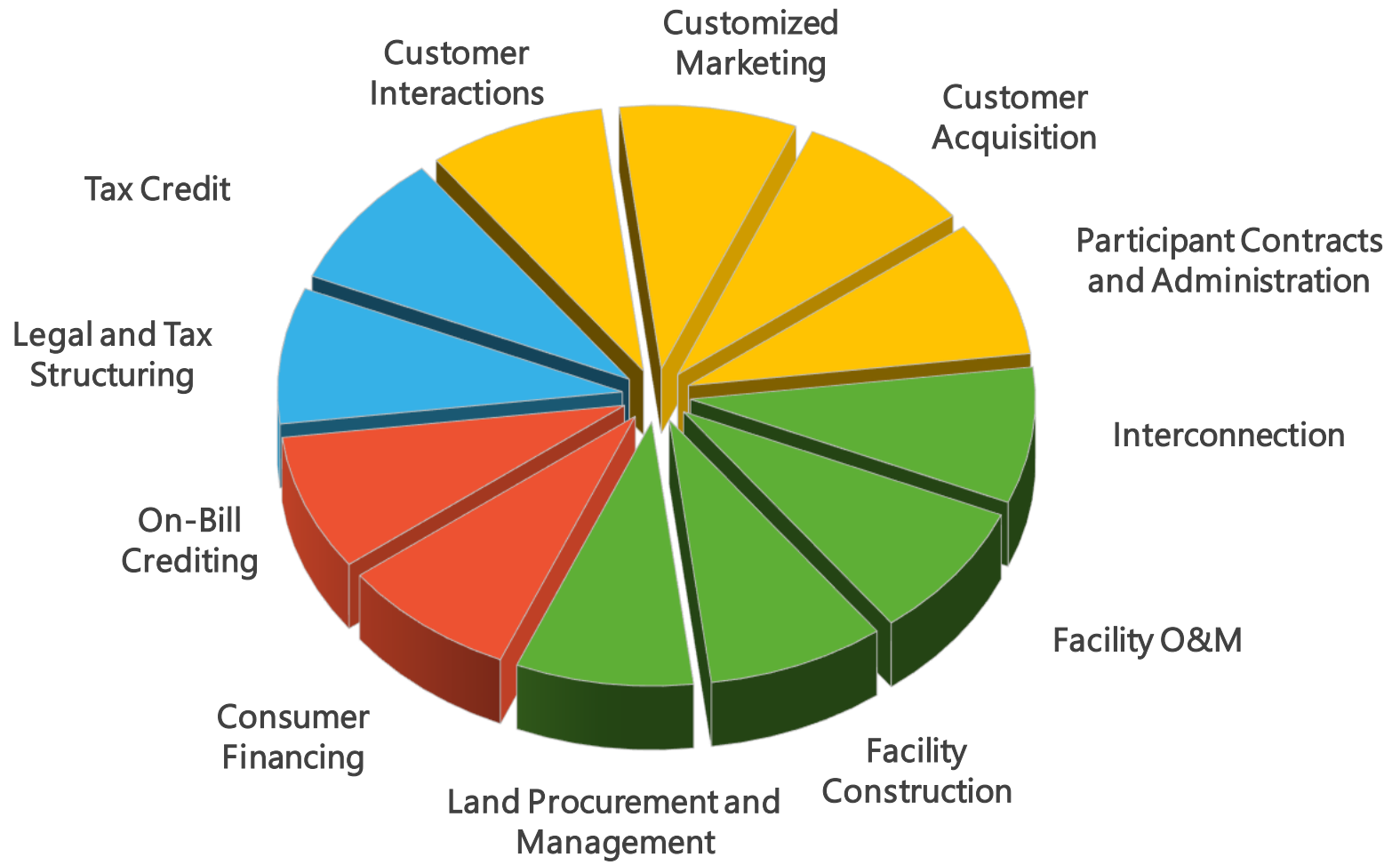
- Target Customer Classes
- Siting & Scale Impacts
- Participation Limit: Residential
- Participation Limit: Non-Residential

What are the other terms & conditions?

- Minimum Term
- Program Length
- Unsubscribed Energy
- Subscription Transferability
- Additional Grid Benefits
- REC Treatment

# Community Solar

## What tasks are needed



# Community Solar

## Market Research General Lessons

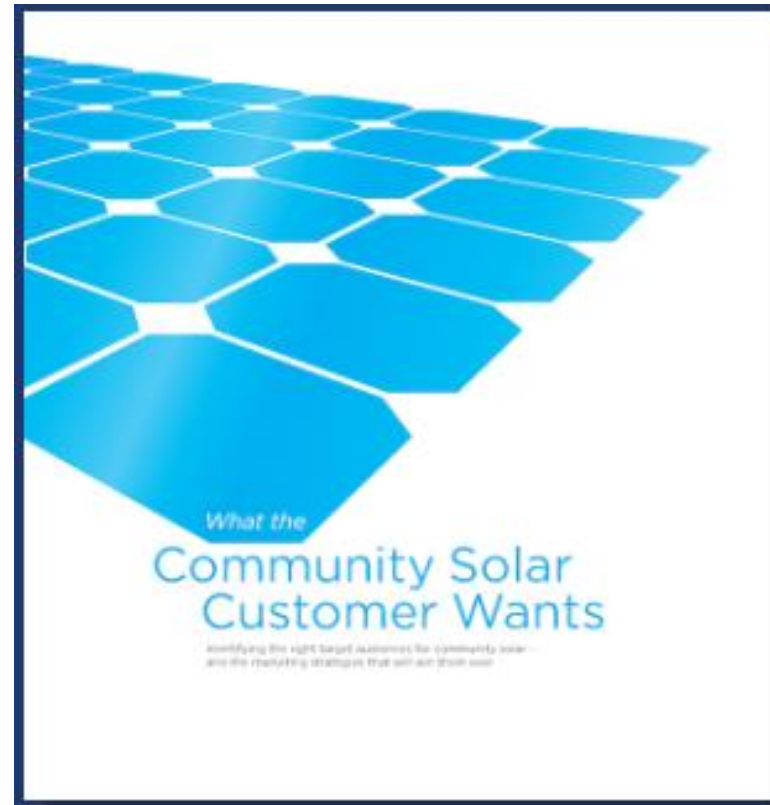
|                           |  |
|---------------------------|--|
| <b>Education</b>          | Information & education is essential (both internally and externally). Designing a simple program makes education easier.  |
| <b>Economics</b>          | You need to offer some sort of economic benefit such as a rate hedge or a reasonable ROI.  |
| <b>Term</b>               | Long term commitments are scary – customers compare their subscription to their cell phone contract.   |
| <b>Production Data</b>    | Access to power production data doesn't change overall satisfaction (vast majority of customers don't care) but it protects against consumer protection outcry (minority who do care are vocal). |
| <b>Tailored messaging</b> | Worry less about tailored messaging to different groups, more about a single economic messaging.   |

\*You can ignore all of this if you just want to build a single, small project [www.sepapower.org](http://www.sepapower.org)

# Customer Research

## Existing Studies

**Study 1 Survey of over 7,000 residential prospective subscribers for select utilities.**



# Contact Information

**Tanuj Deora**

Chief Content Officer

[tdeora@sepapower.org](mailto:tdeora@sepapower.org)

202-552-4411

**Dan Chwastyk**

Manager, Utility Strategy

[dchwastyk@sepapower.org](mailto:dchwastyk@sepapower.org)

202-660-0861

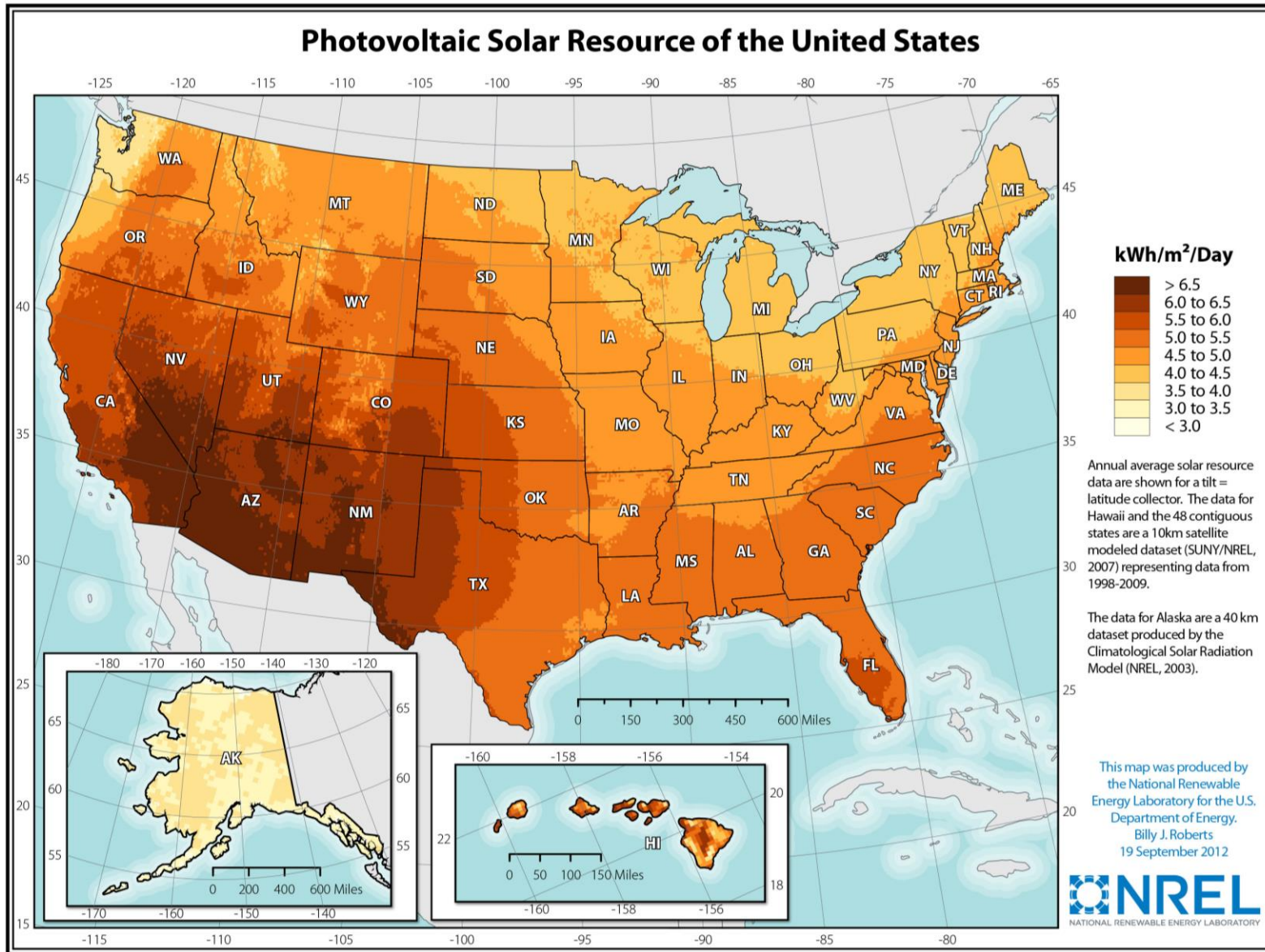


**Smart Electric  
Power Alliance**



# Solar Market Update

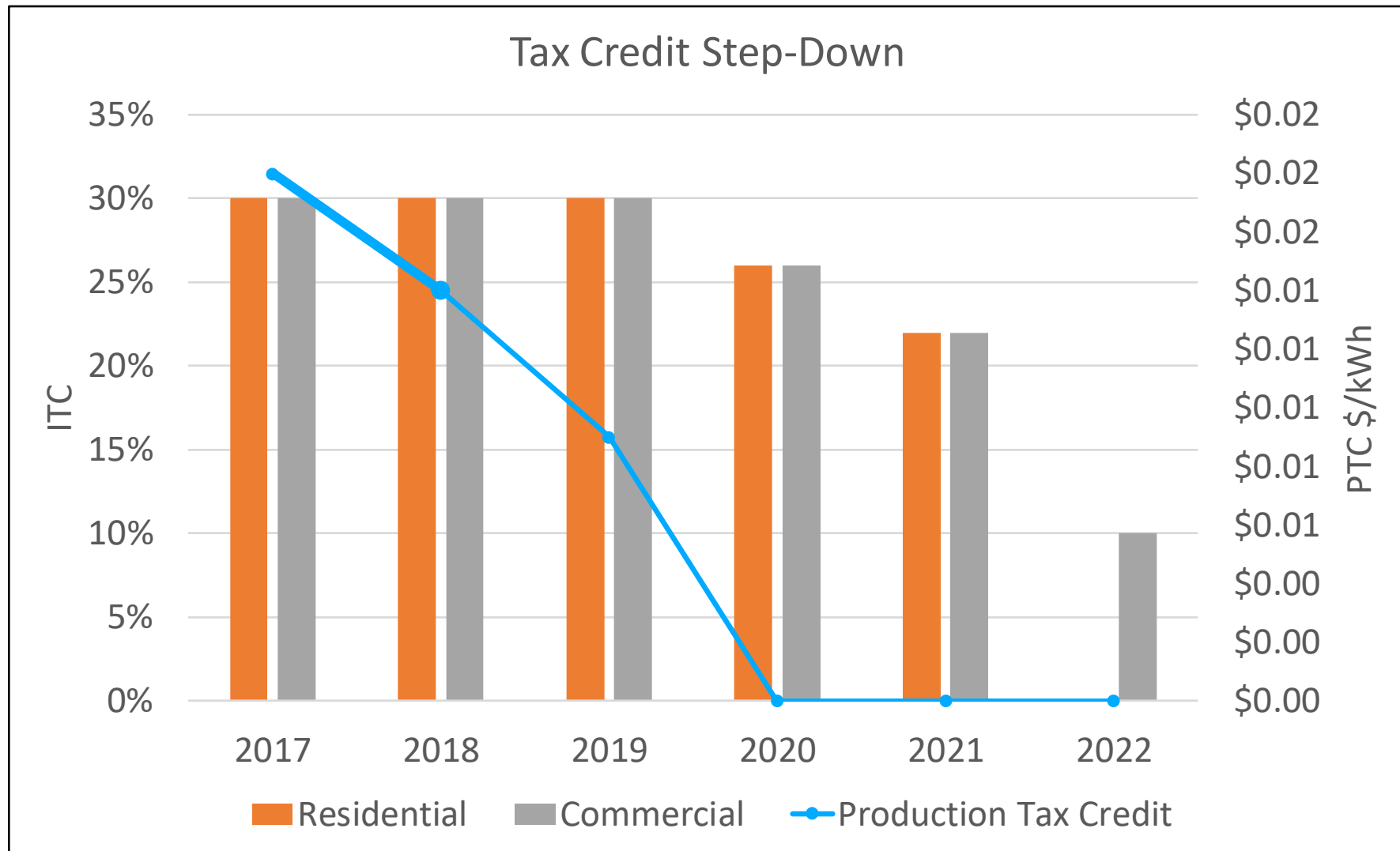
## Solar Resource



Source: NREL

# Solar Market Update

## Declining Tax Credit Schedule



# Solar Market Update

## C&I Customer Research: Drivers

- Defend against rising electricity rates
- Achieve savings in avoided energy costs
- Futureproof locational energy supply needs at key sites
- Avoid/reduce emissions
- Insulate business from regulatory uncertainty around climate risks
- Respond to demand for sustainable / low-carbon products

# Community Solar

## What IOUs pursued programs?

|    | <b>VOLUNTARY</b>        |
|----|-------------------------|
| 1  | Consumers Energy        |
| 2  | El Paso Electric        |
| 3  | Entergy                 |
| 4  | Green Mountain Power    |
| 5  | Gulf Power              |
| 6  | Madison Gas & Electric  |
| 7  | Oklahoma Gas & Electric |
| 8  | Rocky Mountain Power    |
| 9  | Salt River Project      |
| 10 | Tucson Electric Power   |
| 11 | Westar Energy           |

|    | <b>POLICY DRIVEN</b>          |
|----|-------------------------------|
| 1  | Avista Utilities              |
| 2  | Central Hudson Gas & Electric |
| 3  | Central Maine Power           |
| 4  | Eversource                    |
| 6  | National Grid                 |
| 7  | NYSEG                         |
| 8  | Pacific Gas and Electric      |
| 9  | Portland General Electric     |
| 10 | Xcel Energy CO                |
| 11 | Xcel Energy MN                |

# Community Solar

## Insource vs Outsource



Full Service



IT & Billing



Customer Management



# Community Solar

## What are the benefits

A vast majority of programs are developed as a “customer play”, not a “revenue play”.

### Utility Benefits

- Proactive customer engagement
- Can be strategically sited
- Support the local PV industry
- Opportunity to gain understanding of solar resource
- Mitigate load defection

### Customer Benefits

- Increase customer access to solar ownership
- Ability to hedge costs or realize ROI
- Program can be flexible, i.e. portable w/in service area & short terms
- Leverages economies of scale
- No O&M responsibility

# Community Solar

## MG&E Case Study

- Leveraged local city-owned roof space for site
  - City of Middleton municipal operations center (MOC)
- 500 kW / targeted 250 participants
- Participation fee = \$47.25 per 0.25 kW block
- Current premium is 2.8¢/kWh
- Program length = 25 years
- Distribution charge tied to prevailing rate; credit of ½ transmission charge and all generation & fuel charges
- **Project fully subscribed** and waiting list is forming; public “commissioning” in January 2017




|                       | Standard Rate                  | Solar Rate     |
|-----------------------|--------------------------------|----------------|
| Electricity Service   | \$0.100                        | \$0.120        |
| Distribution Service  | \$0.034                        | \$0.034        |
| Transmission Service  | Included in electricity charge | \$0.008        |
| <b>Total cost:</b>    | <b>\$0.134</b>                 | <b>\$0.162</b> |
| <b>Solar Premium:</b> |                                | <b>\$0.028</b> |

# Community Solar

## Alliant Energy Case Study

- 5MW project planned, looked to carve out portion for community solar.
- Wanted to avoid NEM & still provide an economic benefit to customers.
- Solar pricing was a concern. LCOE for project was ~9-12c/kWh. Solution was to mix in low cost wind
- Mix of resources helps for program expansion
- Pending Iowa Utilities Board approval. Planned launch of November 1, 2017
- Receiving pushback for lack of additionality & pricing
  - “Iowa utility offers high ‘green’ pricing without adding renewables” Midwest Energy News



~2 MW

15.6c/kWh charge  
3.3c/kWh credit

- Reserve a 100% solar block for \$13.61 a month
- Reserve a 50% solar / 50% wind block for \$6.70 a month
- Reserve a 25% solar / 75% wind block for \$3.24 a month



# Community Solar RMP Case Study

- 20 MW facility with a 5.5c/kWh PPA with Juwi
- Goals were 1) provide a financial benefit to participants, 2) not affect nonparticipants, 3) work with existing rate structures
- Unbundle the rate, fixing the “generation charge” while allowing the “delivery charge” portion to vary.
- Allowed to recover unsubscribed cost from ratepayers by Utah PSC
- **Project fully subscribed** before construction begun



|                       | Standard Rate                 | Solar Rate    |
|-----------------------|-------------------------------|---------------|
| Generation            |                               | \$0.055       |
| CS Admin              | Bundled                       | \$0.022       |
| Delivery              |                               | \$0.04        |
| Energy Charge:        | \$0.085<br>\$0.115<br>\$0.145 | \$0.117       |
| <b>Solar Premium:</b> |                               | <b>Varies</b> |

# Community Solar Customer Research



**Are you interested in participating in a community solar program?**

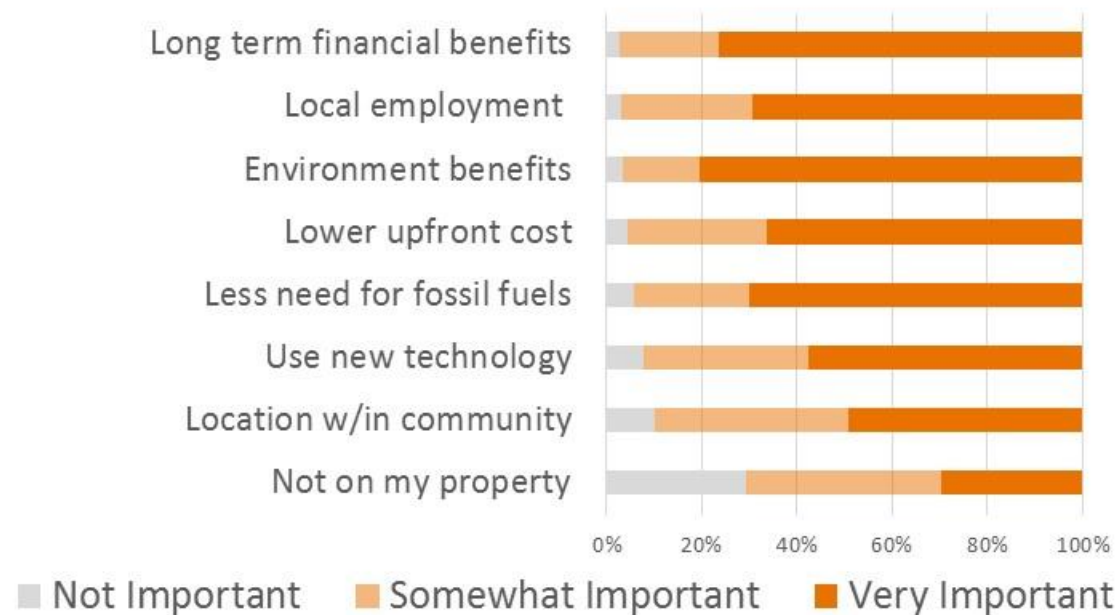
**14%** Interested  
before  
explanation

**82%** Interested  
after  
explanation

# Community Solar Customer Research



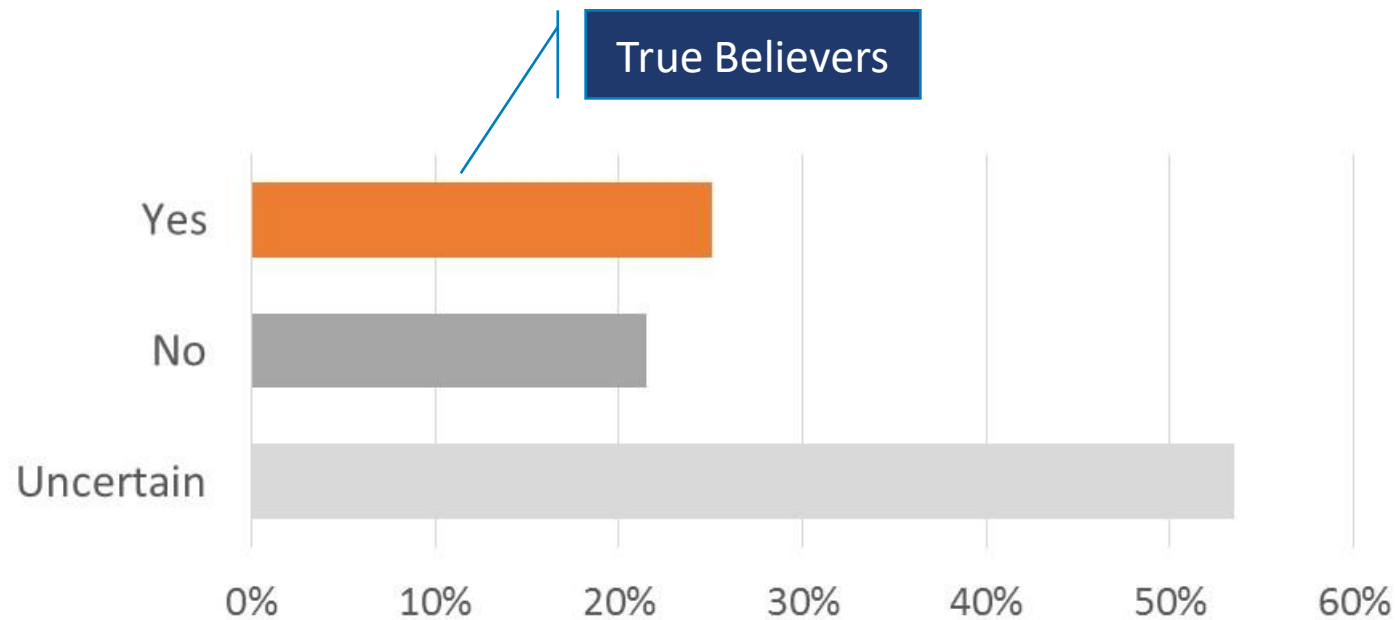
**Why are you interested in participating in a community solar program (what are you looking to gain)?**



# Community Solar Customer Research



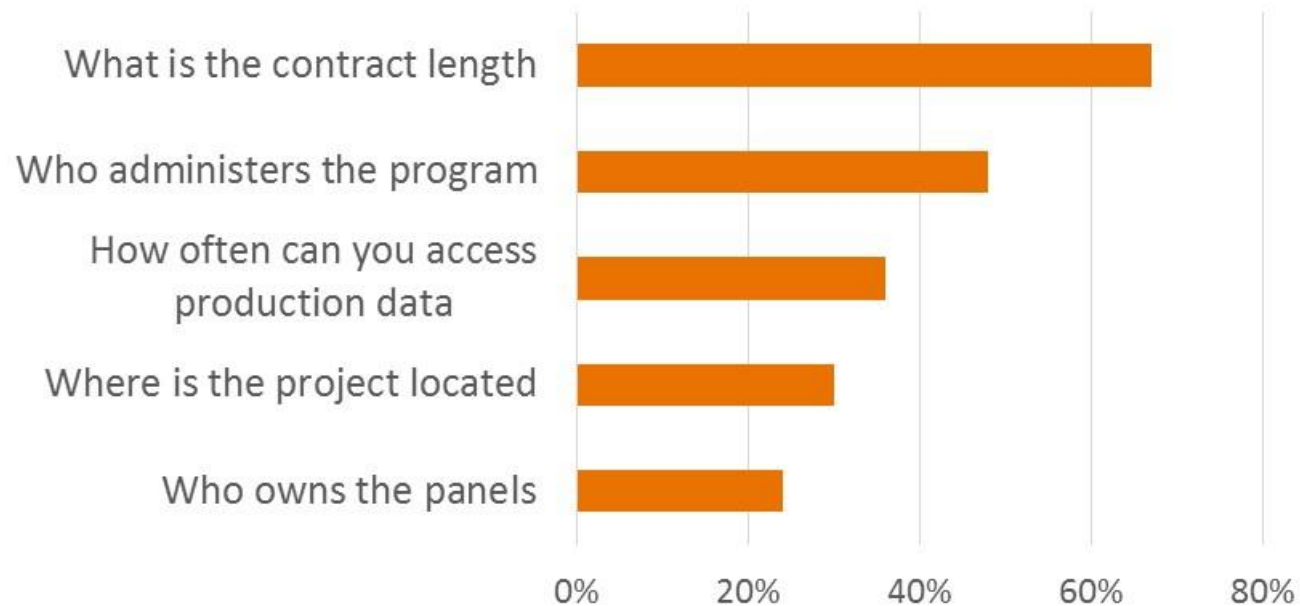
**Would you be willing to pay a premium to participate in a community solar program?**



# Community Solar Customer Research



**What program design elements do these true believers care most about? (% of time listed as top 3 priority)**



Source: SEPA Shelton Group Survey

# Community Solar

## Customer Research

**Who are these true believers? Based on survey data, Shelton Group ID'd two distinct groups.**



- Younger, affluent couples
- Like having an ownership stake
- Driven by concerns for their kids/being a good example
- In-community location is more important to them
- Worried about inconsistent production of a rooftop system

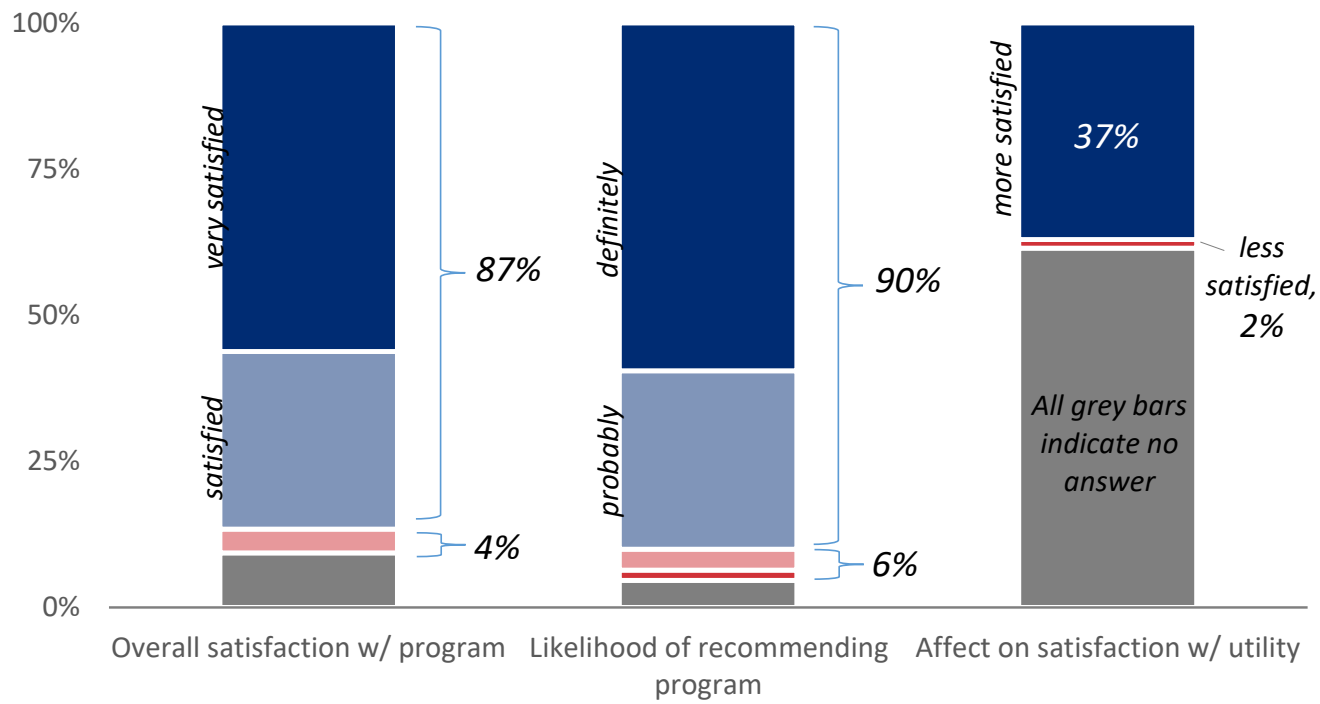


- Older, often empty-nest women
- More income-diverse
- Haven't really thought much about solar before
- Driven by concerns for the environment and locking in lower rates
- Utility sponsorship is more important to them
- Adverse to ongoing maintenance required for a rooftop system

# Community Solar Customer Research

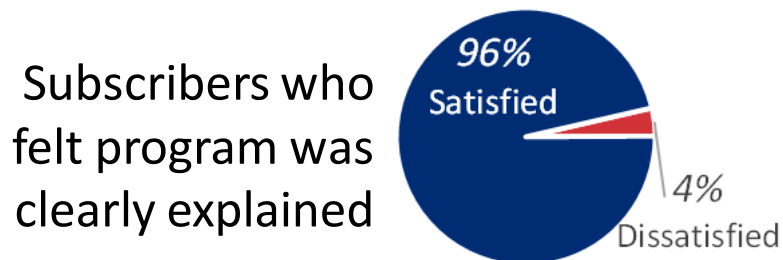


Actual subscribers were largely satisfied with their participation, w/ a large share saying it improved their relationship with their utility.



# Community Solar Customer Research

**Program education had the closest tie to program satisfaction of all tested variables.**



Other variables tested:

- **Upfront program vs. rate program:** slightly greater satisfaction in upfront payment programs
- **Absolute cost of upfront payment:** no statistical difference
- **Premium of rate program:** not enough data
- **Availability of real-time data:** no statistical difference.

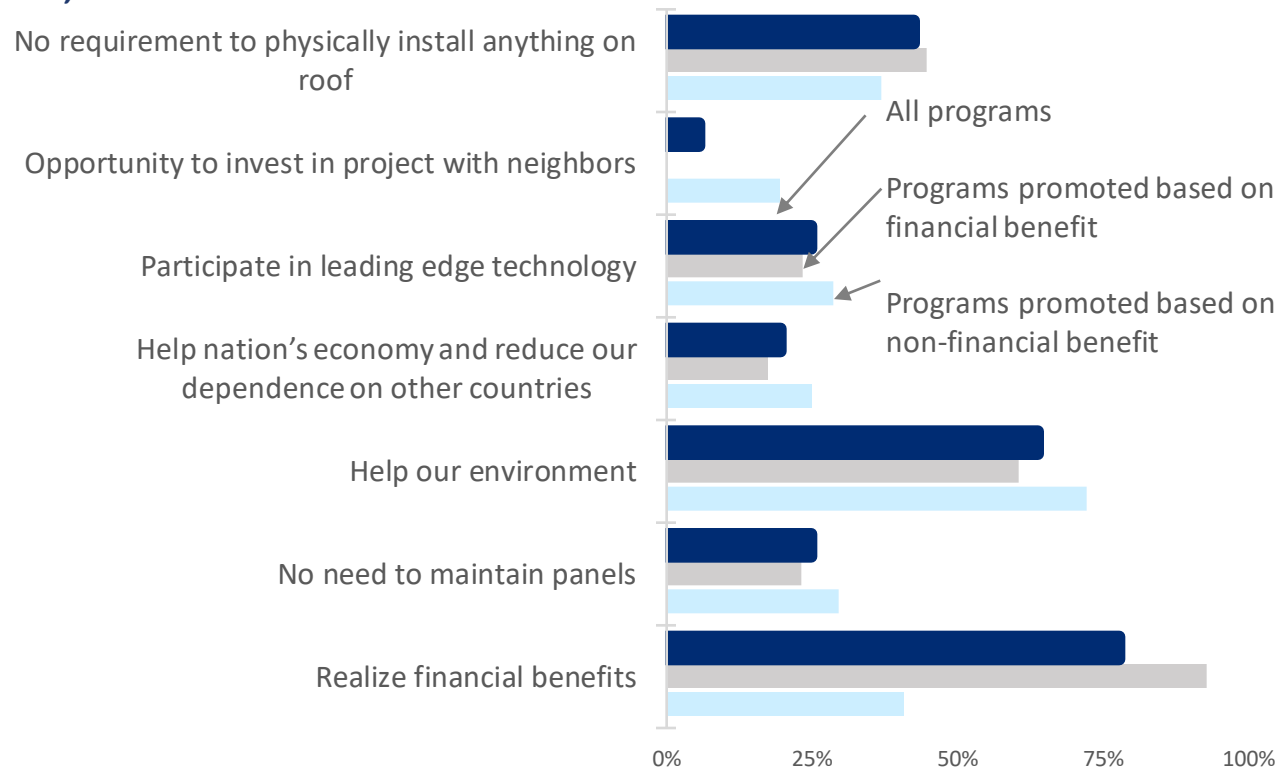


# Community Solar Customer Research



Actual subscribers share the same motivations as potential subscribers: 1) financial benefits, 2) environment, 3) all else.

Q) Why did you join the community solar program (multiple answers allowed)



# Community Solar

## Customer Research

Of the dissatisfied minority, the main complaint was that they weren't receiving the benefit they expected, or it wasn't clearly presented.

*"Bill is confusing - would like info on monthly solar production on bill"*

*I thought the savings would be averaged monthly. I don't trust that I will be given the savings advertised*

*The amount of credits projected in the offering brochure are **greatly inflated** compared to what we have received*

Program generated **12.5% more** than expected in year 1!

# Program Design

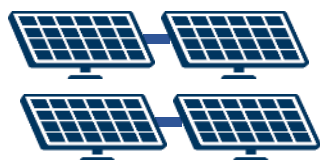


| Program Attribute            | Typical Options in Program Design       |                                     |                               |                             |
|------------------------------|---|-------------------------------------|-------------------------------|-----------------------------|
| Utility Role                 | Full Administrator                      |                                     | Administrator w/ Outsource    | Billing-only                |
| Asset Owner                  | Utility                                 | Utility PPA with Developer          | Developer                     | Subscriber                  |
| Subscriber Payment Structure | Up Front Payment                        |                                     | Ongoing Rate Payment          | Hybrid                      |
| Subscriber Initiation Fee    | Fee                                     |                                     | Fee Refundable after Min term | No Fee                      |
| Subscriber Credit            | Retail Rate (vNEM)                      |                                     | Community Solar Credit Rate   |                             |
| Generation Guarantee         | Guaranteed Monthly Generation           |                                     | Variable Generation           |                             |
| Target Customer Classes      | Residential                             | Select C&I                          |                               | All Customer Classes        |
| Siting & Scale               | Designed for Visibility                 |                                     | Designed for Locational Value |                             |
| Participation Limit: Res.    | 100% Avg. Consumption                   |                                     | Other                         |                             |
| Participation Limit: C&I     | <= 20% of Project                       | <= 50% of Project                   |                               | No Limit                    |
| Minimum Term                 | None                                    | 1 to 2 Years                        |                               |                             |
| Program Length               | 5 Years                                 | 10-20 Years                         |                               | PPA Length / System Life    |
| Unsubscribed Energy          | Fully Recovered from RatePayers         | Partially Recovered at Avoided Cost |                               | Recovered from Participants |
| Subscription Transferability | Portable & Transferrable                | Available to Waiting List           |                               | Sold at Market Value        |
| Additional Grid Benefit      | Considered (Distributed, Storage, etc.) |                                     | Not Considered                |                             |
| REC Treatment                | Retired                                 | Transferred to Customer             |                               | Held or Sold to Market      |

# Why Role to Can 3<sup>rd</sup> Parties Play in Voluntary Markets?



Did you receive support from any external organizations on any components of your program? (Midwest respondents only)



Project Development/EPC

**76%** of utilities  
used 3<sup>rd</sup> party support



Marketing/Customer  
Acquisition

**38%**



Program  
Design/Consultation

**33%**



Project Finance/Equity  
Investor

**29%**



Subscriber Billing/Utility  
Billing Integration

**14%**



Ongoing Customer  
Engagement

**NA**