



## Equitable Solar Communities of Practice Webinar Series

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National Community Solar Partnership+  
Solar Energy Technologies Office  
U.S. Department of Energy

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# Today's Webinar Speakers



**Ariel Drehabl**

Management & Program Analyst

*U.S. Department of Energy*



**Vero Bourg-Meyer**

Senior Project Director,  
Solar & Wind

*Clean Energy States Alliance*

# Solar Energy Technologies Office (SETO) Overview

## MISSION

We accelerate the **advancement** and **deployment of solar technology** in support of an **equitable** transition to a **decarbonized economy no later than 2050**, starting with a decarbonized power sector by 2035.

## WHAT WE DO

Drive innovation in technology and soft cost reduction to make solar **affordable** and **accessible** for all Americans

Enable solar energy to support the **reliability, resilience, and security** of the grid

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



# The National Community Solar Partnership+

NCSP+ is a coalition of stakeholders working to expand access to affordable, distributed solar to every U.S. household

## NCSP+ Supports:

- Community Solar
- Community-benefitting commercial solar
- LMI residential rooftop solar + storage
- Microgrids
- Distributed solar + storage aggregations such as Virtual Power Plants

## NCSP+ Provides Participants:

- No-cost technical assistance
- Funding opportunities
- Research and analysis
- Peer-to-peer networking
- Online courses and training
- Tools and resources to support equitable scaling



# The Meaningful Benefits of Solar

*These meaningful benefits are embedded in all NCSP+ activities and initiatives:*



**Equitable  
Access and  
Consumer  
Protections**



**Meaningful  
Household  
Savings**



**Resilience,  
Storage,  
and Grid  
Benefits**



**Community-led  
Economic  
Development**



**Solar  
Workforce**

# Equitable Solar Communities of Practice

## Project Overview:

- Officially launched in early 2024
- Supporting the expansion of equitable benefits of solar through stakeholder-led process
- Landscape and gap analysis
- Public convening over the summer
- Report to be published this fall



## Solar United Neighbors

*Equitable Access and Consumer Protections*



## Clean Energy States Alliance

*Meaningful Household Savings*



## Clean Energy Group

*Resilience, Storage, and Grid Benefits*



## Cooperative Energy Futures

*Community-led Economic Development*



## Midwest Renewable Energy Association

*Solar Workforce*

Learn more at <https://www.energy.gov/communitysolar/equitable-solar-communities-practice>

# Meaningful Household Savings from Solar

*Equitable Solar Communities of Practice*

October 2024



# Research Goals

How to (a) define, (b) require, (c) guarantee, (d) verify, and (e) communicate meaningful savings from solar?



Image Sources PowerPoint

# Outline

- Research Questions and Methods
- Introducing General Findings and Best Practices
- A Journey Through Common Savings Models
- Scaling Best Practices

# Research Questions and Methods

What we did

# Meaningful Solar Savings Community of Practice Team



# Some Research Questions

- General
  - What is a meaningful household solar saving?
- Methodology
  - What counts as a saving?
  - How is it typically represented, calculated, communicated?
  - Across sectors?
- Benefits sharing
  - What are existing processes for verification and accountability?

# Some Research Questions – C'ed

- Policy goals
  - Do states or the federal government currently require savings? If so how/how much?
- Guarantees
  - Do developers ever guarantee savings? Under what conditions?
  - How do escalators influence savings?
- Consumer protection
  - How are contracts structured to protect savings in the long term?
  - How are consumers protected against risks?
- Information
  - What do consumers need to ensure they receive a meaningful household saving?

# Introducing General Findings and Best Practices

Briefly

# No Universal Definition of “Meaningful” Exists

## - 1

- A variety of approaches: Bill savings vs. bill credits vs. financial value vs. bill parity
- Post-IRA, federal funding programs drive LMI solar savings standards – Their implementation is not yet fully tested or evaluated (though some are similar to state approaches)
  - EPA Solar for All:
    - 20% of an average household’s electricity bill in the utility territory
  - Treasury 48(e)/48E(h):
    - 20% bill credit discount rate [30% proposed for 48E(h)] for community solar
    - 50% of “financial value of the energy” to tenants, equally shared, for affordable housing



# No Universal Definition of “Meaningful” Exists

## - 2

- State LMI solar policies and perspectives on savings are varied and not all programs include savings requirements
  - No savings requirements does not mean no savings!
  - Not intentionally structuring for savings may mean no savings
- Verifying savings is hard and understudied

# Example Savings Targets from State Programs

State	Program	Savings Target
DC	DC Solar for All	Targeting <b>50% reduction to the average electric bill</b> (based on the residential rate class average electricity bill for 2016), i.e., approximately <b>\$500 annually</b>
HI	Green Energy Money \$aver On-Bill Financing Program	Minimum estimated post-installation bill savings (including loan or lease repayment) is <b>based on the of disconnection notices</b> : 0 = 5% savings; 1 to 4 = 10% savings; 5+ = 15% savings  For third-party owned systems, regardless of disconnection notices, minimum bill savings is 20%
IL	Illinois Solar for All	The customer must see at least a <b>50% savings on the value of the credits received</b> from the system
MA	SMART	Participant must receive <b>a net savings</b>
MD	Community Solar LMI-PPA Grant Program	Incentivizes <b>savings that exceed 15% below the utility's Standard Offer Service rate</b> The greater the saving, the greater the incentive
NH	Low-Moderate Income Solar Grant Program	A <b>minimum of 75% of the project's net revenues</b> from electric generation must directly benefit LMI participants
WA	Community Solar Expansion Program	The project administrator must demonstrate how the project will deliver continuing direct benefits to low-income subscribers (e.g., <b>credit</b> for the power generation for the community solar project <b>or other mechanisms that lower the energy burden</b> of a low-income subscriber)

# Advantages and Disadvantages of a Universal Metric

- Unified metrics are very useful as goals but hard in practice
- Sectors, markets, and deployment models matter in achieving and communicating savings to consumers. We will look at a few examples later on
- E.g., 20% may be easy to achieve in certain parts of the country, and hard in others

# A Proposed Soft Definition of “Meaningful Savings”

- A saving consumers can “see and feel”
  - **See** = It is communicated clearly to customers - Current challenges:
    - Lack of understanding of utility bills and multiple bills
    - Confusing concepts (% discount, dollar value, % savings baseline, frequency, households vs. building vs. portfolio, etc.)
    - Established developer practices but no clearly accepted methodology
    - Inputs into solar savings change over time
  - **Feel** = It makes a material difference in people’s lives and does not just replace one technology with another
    - A percentage metric can be in practice very large or very small!
    - Need for engagement of low-income tenants in crafting indirect benefit proposal

# A Few Best Practices to Achieve Savings

In addition, the following best practices are helpful to create programs with meaningful savings

1. Set savings goals based on the market
2. Structure solar contracts to minimize consumers' risks and include strong consumer protections
3. Make savings easy to understand
4. Adopt consolidated billing
5. Reduce the risk that savings will not occur
6. Combine solar with energy efficiency to deepen savings
7. Create and implement a verification strategy to ensure savings are achieved

# A Journey Through Common Savings Models

Down the yellow brick road

# Savings Models Big Picture

- Rooftop
  - Direct ownership
    - Cash purchase
    - Purchase with solar loan
  - Third-party ownership (TPO)
    - Lease (with/out escalators)
    - PPA (with/out escalators)
- Community solar
  - Subscription-based (most common)
- Fixed rate
- Escalating rate
- Fixed discount
- Offsite direct ownership
- Cooperative ownership
- “Assistance model”
- Multifamily (direct or TPO)
  - Direct bill benefits
  - Indirect bill benefits

# Let's Take a Quick Look at What Goes Into Savings with a Few Examples

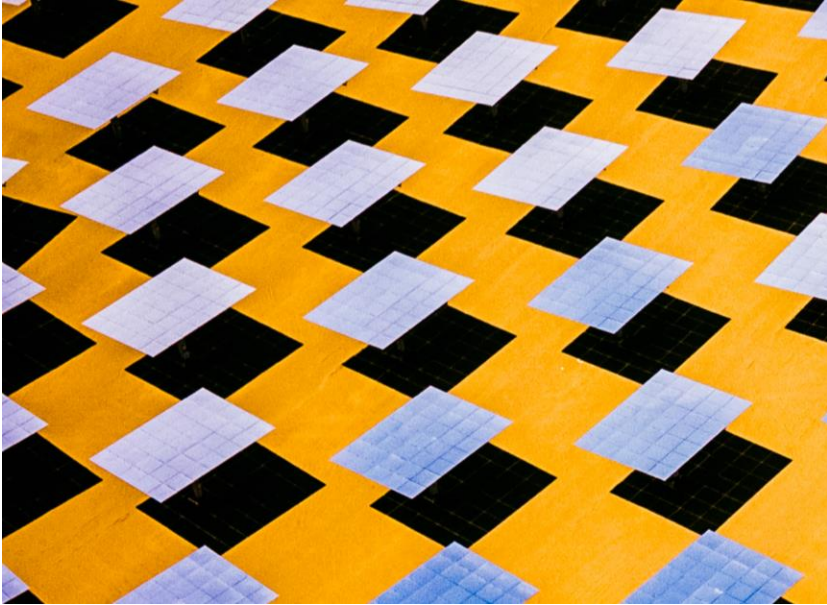


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# Understanding Inputs to Rooftop Solar Savings Over Time – Direct Ownership

+ \$

- Lower utility consumption (Size) → lower utility bills
- Tax credits
- Net energy metering (NEM) credits
- Renewable energy certificates (RECs)

## OVER TIME

Influenced by system performance, utility rates and rate structure, including fixed charges, consumer consumption (load), and the weather

Influenced by regulatory and legislative changes (taking into account grandfathering)

# Understanding Inputs to Rooftop Solar Savings Over Time – Direct Ownership

+ \$

- Lower utility consumption → lower utility bills
- Tax credits
- Net energy metering (NEM) credits
- Renewable energy certificates (RECs)

Impacted by level of incentives available

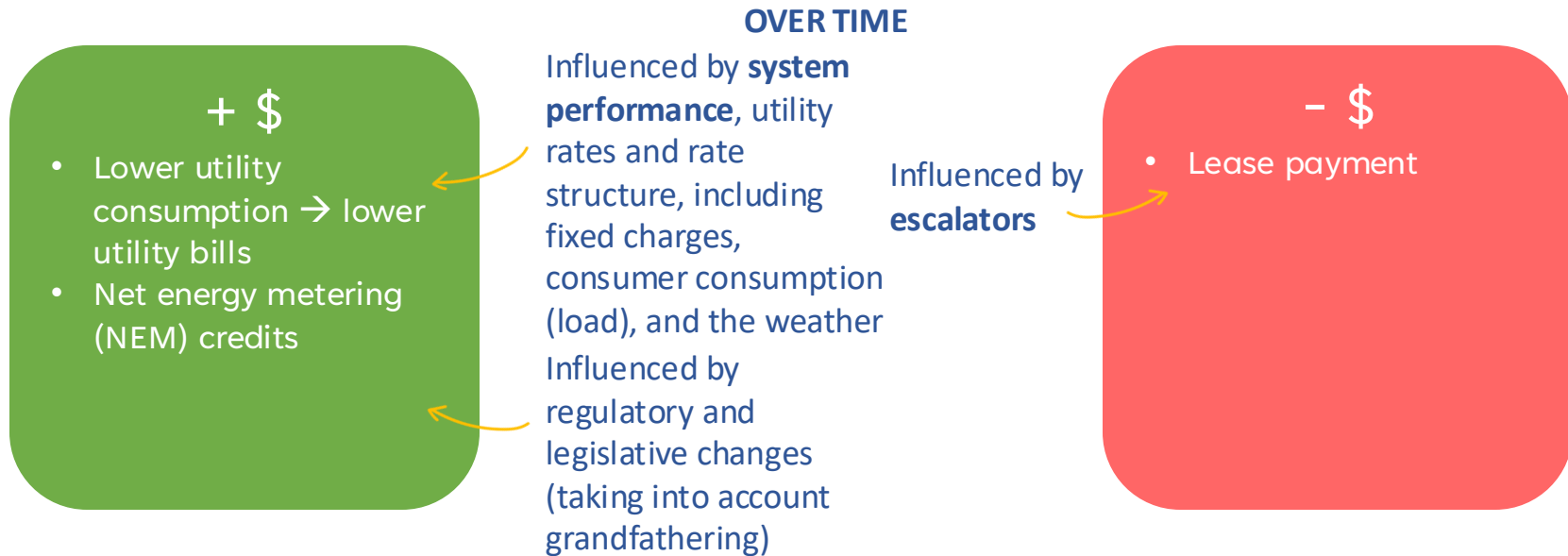
## OVER TIME

Influenced by financial structure and terms, including interest rates, contract term, amortization style, and others

- \$

- Purchase cost of system (or down-payment)
- Debt service payment
- Cost of operation and maintenance (O&M)
- Cost of insurance, if insured

# Rooftop Solar Savings Inputs – Third-Party Ownership / Lease



# Rooftop Solar Savings Inputs – Third-Party Ownership / PPA – Shifting Risk

OVER TIME

+ \$

- Lower utility consumption → lower utility bills
- Net energy metering (NEM) credits

Influenced by **system performance**

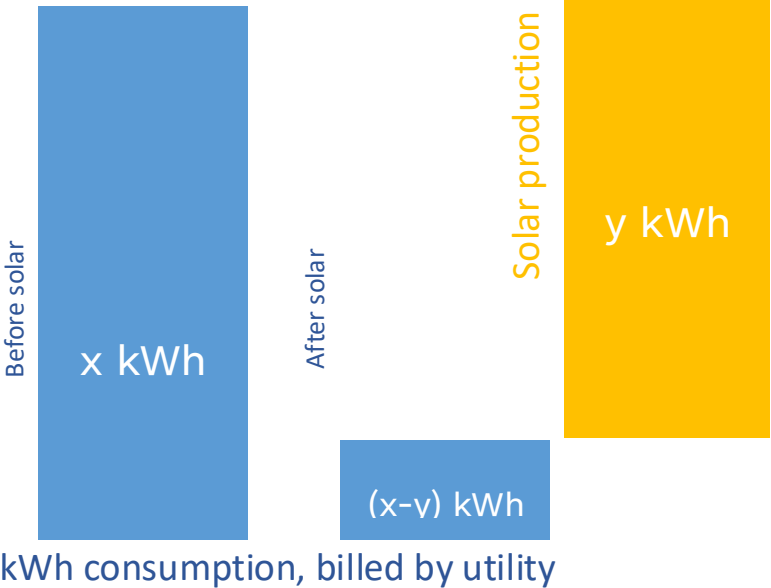
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- PPA payments, linked to actual production

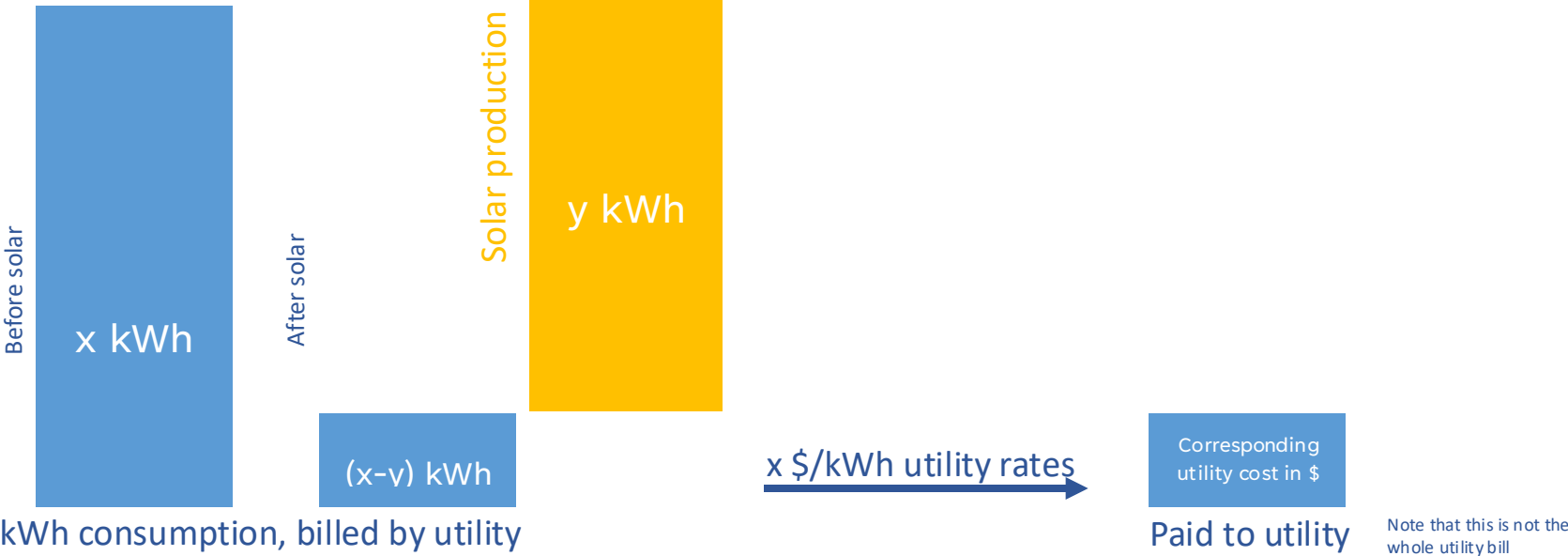
# Multiple Inputs Makes “Guaranteeing” Solar Savings Difficult

- Savings are generally not guaranteed (some exceptions for year 1) but they can be and are in practice **projected**
- Important to structure contracts for savings in the long-term (program parameters)
  - Escalator analysis
  - Performance guarantees
  - Performance monitoring
  - Warranties (does not include labor)
- Consider added **value** vs. **savings**

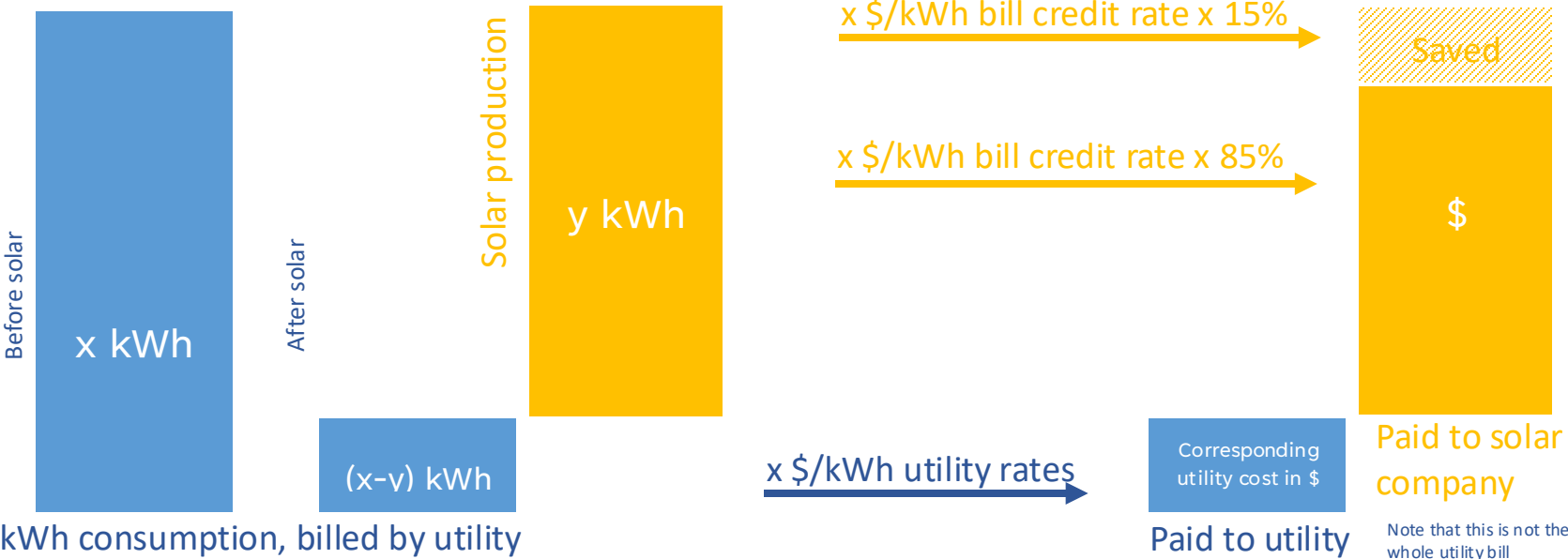
# Understanding Common but Not That Simple Community Solar Savings Models



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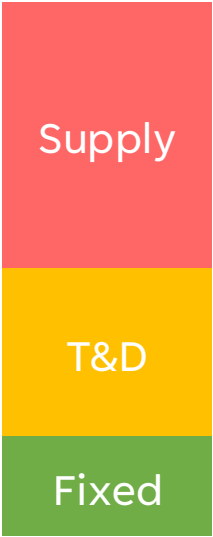


# Understanding Common but Not That Simple Community Solar Savings Models



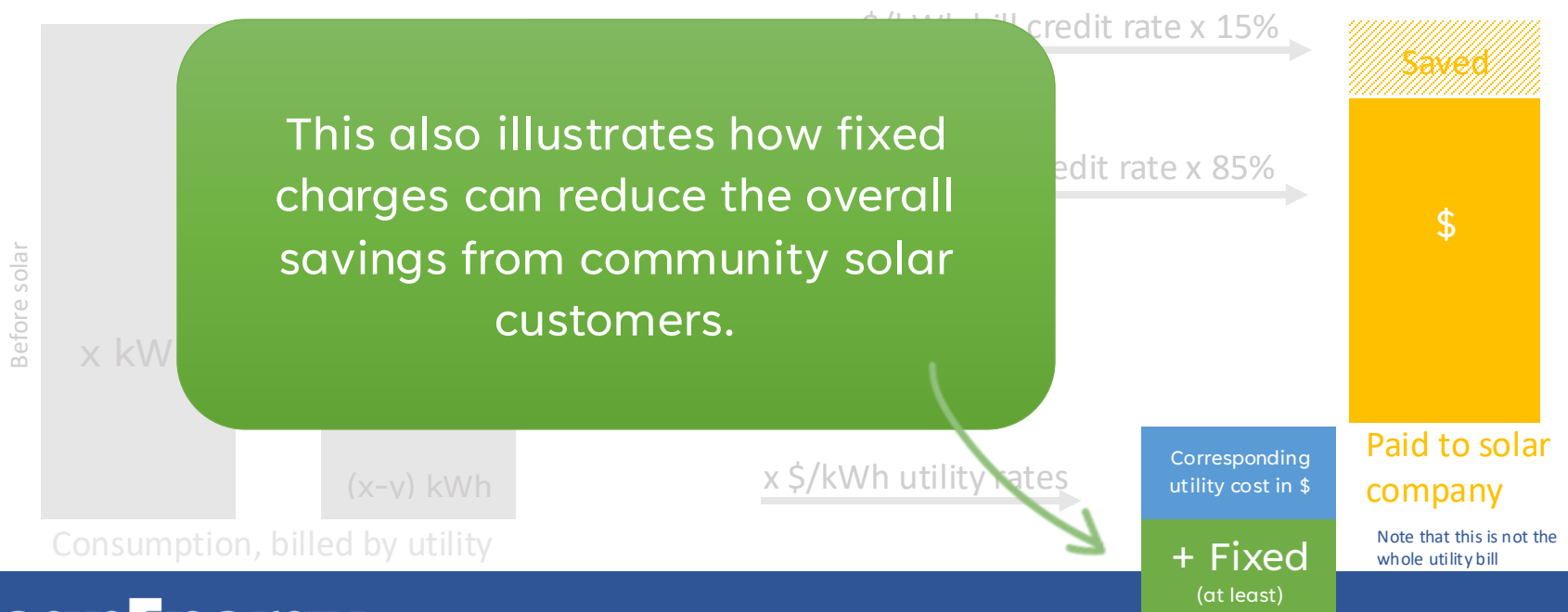


# Understanding Common but Not That Simple Community Solar Savings Models



In practice, however, bills include other things, which may or may not be offset by the credits!

# Understanding Common but Not That Simple Community Solar Savings Models

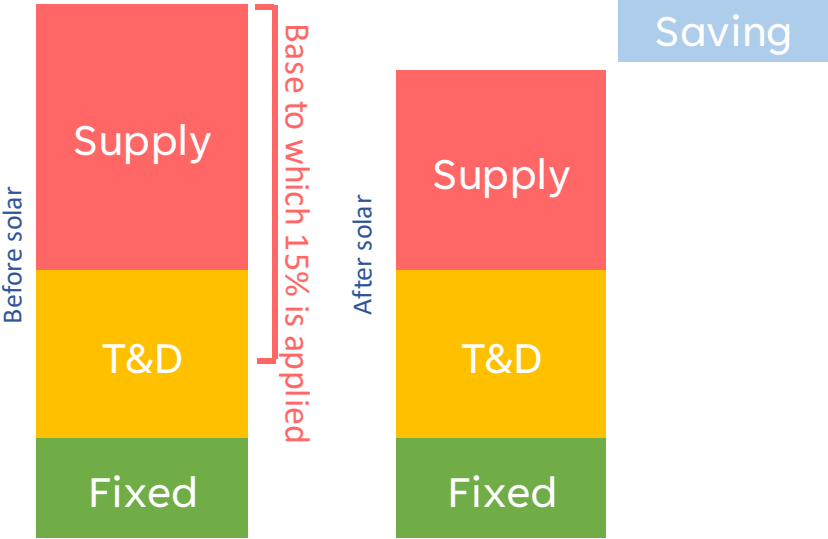


# Understanding Common but Not That Simple Community Solar Savings Models

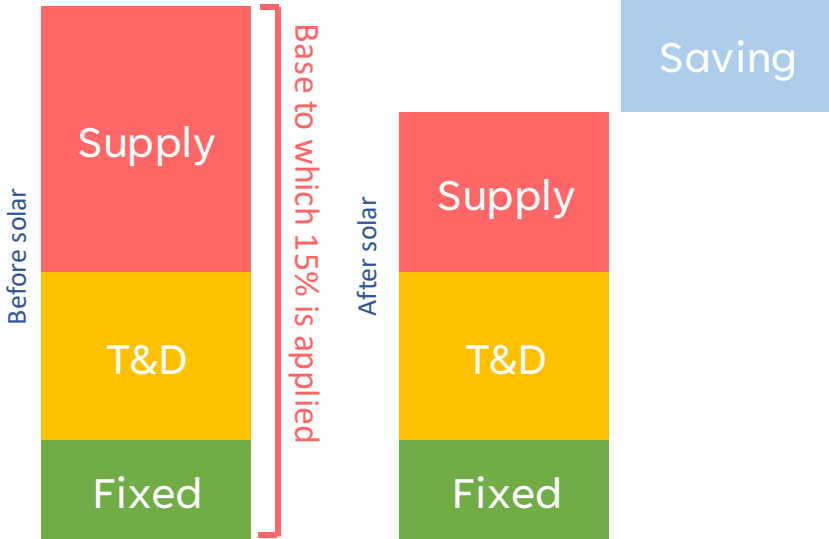
- In addition, the size of the offsets depends on the bill credit rate, which can be complex
  - They may be expressed as a monetary credit or as a kWh credit!
  - They may or may not be the retail rate
- CCSA: Move toward “value-based compensation approaches”
  - For example: VDER in New York is locational

# Extremely Simplified – Not Representative of a Particular Project or Market

\*Hypothetical and simplified\* example of 15% bill credit discount rate



\*Hypothetical\* example of 15% whole bill saving



# “Guaranteeing” Solar Savings with Community Solar?

- As with rooftop, utility rates can go up and down, consumption changes over time, performance etc. influences savings
- In addition, the compensation value and structure for community solar makes it hard to develop just one approach and one standard
- Multiple bills with different billing cycles create additional confusion
- Fixed charges that cannot be offset by credits are seen as particularly problematic by practitioners

# A Few Multifamily-Specific Challenges

- There are challenges specific to multifamily, including:
  - Traditional split incentive issue
  - For rooftop, roof size constrains the savings
  - Master-metered building tenants without bills [indirect benefits only]

# Scaling Best Practices

The way forward

# General Research Needs Uncovered

- Conduct empirical studies of solar saving and collect much more information about the actual savings achieved at the household level by different solar programs and different types of solar projects over time
- Research why different programs do or do not collect data on savings, and identify a range of solutions to explore
- Research the data that would be desirable to collect from utilities to accurately measure savings for different types of programs



# [Repeat] Best Practices to Achieve Savings

1. Set savings goals based on the market
2. Structure solar contracts to minimize consumers' risks and include strong consumer protections
3. Make savings easy to understand
4. Adopt consolidated billing
5. Reduce the risk that savings will not occur
6. Combine solar with energy efficiency to deepen savings
7. Create and implement a verification strategy to ensure savings are achieved

# 1. Set savings goals based on the market

## Activities

- States, municipalities, and utilities should set explicit savings goals for their solar programs based on local market and grid conditions

## Research needs

- Collect more information about the goals of different programs, as well as those programs' actual achieved results
- Evaluate whether programs with savings goals expressed in percentages of households' utility bills vs. in US dollars fare better, and evaluate the usefulness of savings goals for multifamily affordable housing
- Analyze the implications of a 20% bill savings target in different markets and for different types of solar projects
  - How easy or hard would 20% be to achieve?
  - How many dollars does 20% savings translate into for a household in different markets and types of projects?

## 2. Structure solar contracts to minimize consumers' risks and include strong consumer protections

### Activities

- Program administrators should include specific consumer protection measures in their programs and should monitor compliance with them
- Program administrators should require performance guarantees to ensure that low-income customers are receiving the promised benefits

### Research Needs

- Analyze the specific consumer risks associated with different contractual models
- Research the specific consumer protections that should be adopted for different types of solar programs
- Evaluate structures that mitigate the risk that high seasonal costs for solar could create occasional net increases for low-income households

# 3. Make savings easy to understand

## Activities

- Program administrators should require solar companies to present information about solar contracts in standard ways that make it easy for consumers to understand potential savings and compare offers from different companies
- Program administrators should offer support, through helpdesks and other ways, to ensure that consumers understand models to achieve savings and can self-determine whether savings are achieved

## Research Needs

- Study consumer education efforts and billing practices to identify specific best practices that should be implemented more widely

# 4. Adopt consolidated billing

## Activities

- Solar advocates, the solar industry, and state governments should:
  - Produce more information about how consolidated billing works and why it is important
  - Push for consolidated billing in all locations where community solar is allowed

## Research Needs

- Evaluate costs and/or savings associated with consolidated billing for utilities

# 5. When possible, reduce the risk that savings won't occur

## Activities

- Solar for All program awardees will develop programs with 20% minimum net savings targets. They should also evaluate whether federal funds can be used to reduce risks that regulatory or market changes will eat into savings from solar

## Research Needs

- Further study how the programs identified in our research to guarantee savings perform, and how savings are verified there
- Study how escalator clauses have worked in practice and identify best practices for escalator clauses so that they do not inappropriately reduce future household savings

# 6. Combine solar with energy efficiency to deepen savings

## Activities

- States, utilities, and solar companies should consider and act on the potential to couple solar with household energy efficiency measures to increase total savings, making them larger and more meaningful
- Administrators for WAP and LIHEAP should consider how to automatically direct these customers to solar programs with high saving potential

## Research Needs

- Study structural, data, and market barriers to the EE to solar, and solar to EE project pipeline
- Develop best practices for WAP and LIHEAP administrators to refer customers to solar programs

# 7. Create and implement a verification strategy to ensure savings are achieved

## Activities

- All state programs should monitor the performance of the solar systems installed through their programs
- Solar programs, at a minimum, should include regular spot checks that evaluate the level of savings being achieved through their programs

## Research Needs

- Study verification methods to identify best practices and recommend standards for verification of household savings



# Thank you!

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