Community Solar Value Project
A New Approach to Assessing Locational Value of Community Solar Projects

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"The Value of Going Local" Webinar
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Community Solar Value Project

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- ✓*Nationally known solar power consulting firm founded in 1998*
- ✓*Deep expertise in solar resource analysis, strategic resource planning, & turn-key solar project development support*
- ✓*Utility community solar program design and implementation*
- ✓*Solar Project Buyer's and Seller's Agent Services*
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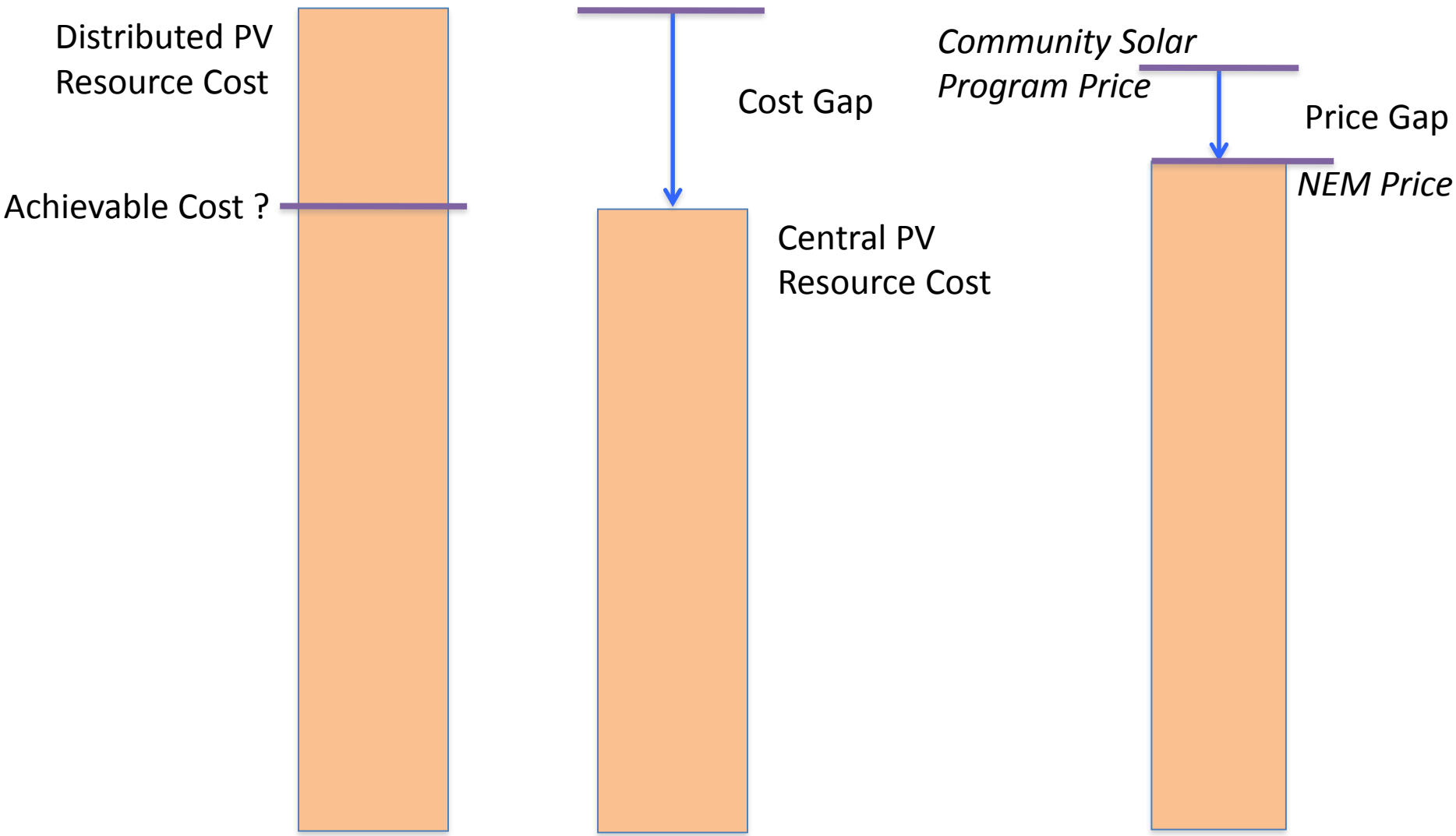
Key Presentation Points

1) Community-scale PV in distributed applications can compete on ***price*** and ***value*** with both utility-scale and customer-sited systems
2) A ***streamlined analysis approach*** can provide utilities with accurate information to support decision-making on the size and location of community solar projects. This simple approach avoids falling prey to “analysis paralysis”.
3) A ***“fleet approach”*** to community solar can provide ***additional benefits*** and ***initial cost reductions*** through the combination of distributed and utility-scale PV projects
4) The analysis of localized value identifies ***the “sweet spot” for community solar*** in the utility marketplace between conventional retail rates and rooftop solar projects -- while balancing the needs of the utility distribution system

A Streamlined Approach to Analyzing Community Solar Project Value in Distributed Applications

1) Determine the “Cost Gap” between Central PV (CPV) and Distributed PV (DPV)
2) Determine the “Price Gap” between Community Solar and customer-sited NEM solar products
3) Design the methodology for closing the cost gap
4) Identify key high value variables of DPV for the utility service area
5) Determine the impacts on DPV and CPV/DPV fleet costs
6) Build upon the fleet costs to develop the program pricing and analyze the competitiveness of a Community Solar (CS) Program vs. Net Energy Metered (NEM) projects

Defining the Cost and Price Gaps



Methodology for Closing the Cost Gap Between CPV and DPV

- A common metric used in resource acquisition decisions is the “Levelized Cost of Energy” (LCOE)
- LCOE is the NPV of project costs divided by the NPV of kWh evaluated over the project life
- Traditionally, since most electricity resources were procured from central station projects on the transmission system only the NPV of project costs were evaluated and compared
- Today, with an increasing emphasis on distributed projects, it is important to evaluate the “*net LCOE*” -- which incorporates the *incremental* benefits of distributed generation on a levelized basis or the “Levelized Benefits of Energy” (*LBOE*)
- A *net LCOE* approach ensures a more valid comparison between CPV and DPV resources – and a more accurate representation of the value of DPV

Categories of Benefits for the LBOE Analysis

- Avoided transmission losses
- Avoided transmission ancillary services
- Reduced distribution line losses
- Distribution ancillary services
- Improved distribution capacity utilization; may avoid/defer upgrades

- Avoided costs of conventional wholesale power**
- Avoided/deferred conventional generation capacity investment**
- Fuel price hedging**

- Reduce GHG and other emissions**
- Reduce water use**
- Conserve ag land, sensitive land
- Meet local sustainability goals
- Other compliance values**

- Solar geographic diversity benefits, risk management
- Potential resilience benefits
- Solar siting, design & operational flexibility to capture strategic benefits

- Potential DR companion measures
- Potential customer-side storage
- Potential added project-design values, e.g., shading

** Also available to centralized PV projects

Methodology for Closing the Cost Gap Between CPV and DPV

- The methodology is designed for a streamlined analysis of a few high value benefits of DPV
- The goal is not to “stack the bar chart” of DPV benefits as high as possible, but to get to a “break-even” level between CPV and DPV resources
- Selecting a few of the highest value benefits for the utility, and using ranges of values and conservative values will help to avoid the debate over the “right numbers” in the future
- For one of this project’s “realistic hypotheticals” we settled on three variables for the LBOE analysis:

◆ Strategic DPV Design

◆ Transmission Avoided Costs

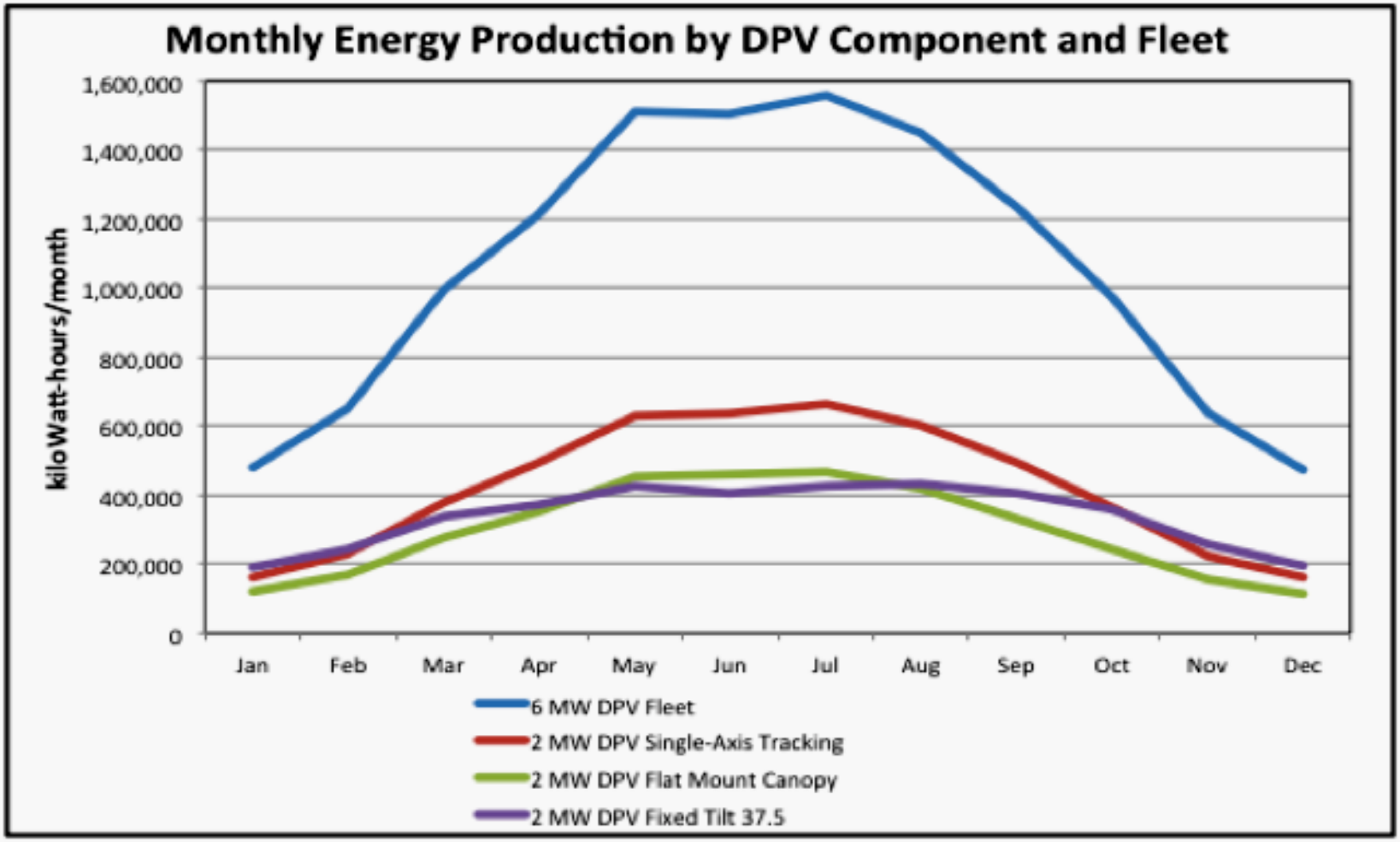
◆ Customer Retention Value

- Note: We are evaluating additional categories of DPV benefits in other regional analysis

1. Strategic DPV Design Benefit

- Incremental benefit for each system type (based on incremental wholesale power avoided costs), relative to CPV:
  - 2 MW fixed-tilt rooftop PV system: $0.000/kWh
  - 2 MW flat-mount parking canopy PV system: $0.0041/kWh
  - 2 MW ground-mount single-axis tracking PV system: $0.0133/kWh
- Taken together, the incremental benefit of this fleet, relative to CPV
  - $LBOE_{DPV}$ = $0.0064/kWh

In many areas of the country, flat-mount carports offer summer-peak production benefits that supplant high-priced peak power resources.



Annual Energy Production Comparison:

- **Fixed Tilt: Baseline**
- **Flat Mount Canopy: -12%**
- **Single-Axis Tracking: +24%**

2. Transmission Avoided Cost Benefits

- Not all transmission costs are avoided on a 1:1 basis
- Yet we know now that DPV avoids significant Transmission Access Charge (TAC) costs; several sources are above and beyond EIA's "postage stamp" forecast of $0.0184/kWh.
- Example: Clean Coalition findings on TAC escalation rate for the California ISO—supported by the even more robust avoided cost findings in other studies—suggests $0.03/kWh
- For this hypothetical case, a conservative $0.01/kWh incremental LBOE is used

3. Utility Customer Retention Benefit

1) The Customer Retention Benefit is the value of attracting customers to a utility-based Community Solar program over a 3rd-party NEM offering. It represents the portion of avoided lost revenues attributed to customers subscribing to a CS program, as opposed to customers installing a NEM system
2) Our assumption is that 15% of the non-bypassable wires charge can be valued as the Customer Retention Value. This is based on market studies showing that 15% of subscribers to CS program want localized solar projects This conservative approach results in a LBOE of $0.0117/kWh
3) For comparison, there is an opportunity cost of NOT retaining a customers and losing them to NEM. The opportunity cost is equal to 100% of the non-bypassable wires charge

Impacts of Results on Community Solar Fleet

Gross LCOEs for Centralized and Distributed PV, in Comparison With Net LCOE of DPV Incorporating Three DPV-Characteristic Benefits

$LCOE_{CPV\ GROSS}$	$LCOE_{DPV\ GROSS}$	$LCOE_{DPV\ NET}$
\$0.0500/kWh	\$0.0750/kWh	\$0.0469/kWh

LCOE Analysis Results for a Hybrid Community Solar Fleet

20 MW CPV $LCOE_{GROSS}$	6 MW DPV $LCOE_{GROSS}$	26 MW Hybrid Fleet $LCOE_{GROSS}$	26 MW Hybrid Fleet $LCOE_{NET}$
\$0.0500/kWh	\$0.0750/kWh	\$0.0556/kWh	\$0.0493/kWh

Price Gap Analysis of Community Solar Versus NEM

- The final step of the Valuation of Distributed PV in Community Solar Applications is to review the fleet LCOEs of the CS program compared to the LCOE of NEM projects.
- In this “realistic hypothetical” we were able to collect information that supported an LCOE estimate for residential NEM PV systems of **$0.132/kWh**
- With a CS fleet *net* LCOE of **$0.049/kWh** there is considerable room for adding a cost-based wires charge and still offer a highly competitive and strategic product to utility customers.
- For example, adding a 5-cent/kWh wires charge results in a CS product offering of **$0.099/kWh**

The Presenter and the Project

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The Community Solar Value Project is focused on improving community-solar program value, through solar + storage + DR and other strategies, at electric utilities in Sacramento and beyond. Led by Extensible Energy, LLC, and drawing on expertise from four energy consulting firms.

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