A Prosperous Marriage?
Targeted Program Design for
Community Solar + DR

Jill K. Cliburn, CSVP Program Manager
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Speed Talk: 1) In order to reach the market penetration that climate preservation demands, we need “solar-plus” integration strategies 2) We can start with willing community solar-plus participants 3) …So let’s find them!

From gardens…
To grid resources
CSVP: Driving Net Solar Cost Reduction

- Strategic solar design/specifications
- Best-practice project financing/procurement
- Utility-driven target market development & a more customized offer
- DR and storage companion measures increase net solar value
Shape of the Challenge In Different Time Domains

Source: CAISO 2014

Tucson PV Plant Performance
EnergyStorage.org
Solar +
Demand Response
Community Solar Plus DR… Why??

• According to The Shelton Group (SEPA, 2015) >60% of residential utility customers want a solar option; in focus groups, *they prefer community solar to rooftop solar*
• Matching CS with companion measures (DR, storage) offers customers a chance to be sure their solar counts
• Bundling services cuts costs, adds convenience, and promotes utility customer-retention
• DR may be designed to address seasonal peaks, daily peaks and steep load-ramping, daily forecasted solar variability, or variability in even shorter timeframes
• Utilities are starting to see that DR often makes more sense than batteries, and DR + batteries makes more sense than batteries alone
Community Solar Plus DR… Why Not??

- Rule of Thumb: Simpler is Better
- Indications that DR of any kind is little-understood; less than half of customers nationwide (SGCC, 2015) have heard of smart grid, an overarching concept for DR
- Even within utilities, DR for renewables integration is new and requires some program changes
- A community solar-plus program implies that the utility is going to engage with customers in a conversation about what a 21st Century utility needs to look like

Why Not!
Putting the Question to the Subset Who Are More Aware…

[Bar chart showing percentage of awareness for various smart grid technologies]

DNV GL for Smart Grid Consumer Collaborative
“Consumer Value in Action” 2015
# Matrix One
## 10 DR Measures

<table>
<thead>
<tr>
<th>DR Option</th>
<th>Enablement Cost</th>
<th>Incentive Cost</th>
<th>Avg. Load Impact per Unit</th>
<th>Seasonal Availability</th>
<th>Impacts by Weather Condition</th>
<th>Events Feasible per season</th>
<th>Max event hours per season</th>
<th>Respons time to signal</th>
<th>Duration of Impact</th>
<th>Re-charging necessary?</th>
<th>Resource Magnitude Per Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Curtailable Load (Day-ahead)</td>
<td>Low-Medium $25/kW-yr or less</td>
<td>$10-$30/kW-month for capacity (+ energy payments)</td>
<td>Limited to end-use</td>
<td>Limited to summer season</td>
<td>Limited to summer season</td>
<td>Frequent to less than 50</td>
<td>100</td>
<td>20-26 Hours</td>
<td>2-6 Hours</td>
<td>Yes; usually limited to one event per day</td>
</tr>
<tr>
<td>2</td>
<td>Curtailable Load (Day-of)</td>
<td>Low-Medium $25/kW-yr or less</td>
<td>$15-$35/kW for capacity Month (+energy payments)</td>
<td>Limited to end-use</td>
<td>Limited to summer season</td>
<td>Limited to summer season</td>
<td>Frequent to less than 50</td>
<td>100</td>
<td>3-5 Hours</td>
<td>2-6 Hours</td>
<td>Yes; usually limited to one event per day</td>
</tr>
<tr>
<td>3</td>
<td>Auto-DR</td>
<td>$10-282$/kW</td>
<td>$200-400/kW load reduction</td>
<td>14% of peak load winter; 16% of peak load during summer</td>
<td>N/A</td>
<td>Depends program</td>
<td>N/A</td>
<td>5 min – 1 Hour</td>
<td>Depends on end-use</td>
<td>Medium/Large</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Direct Load Control (A/C switch control)</td>
<td>$70-$150/switch $55/kW/yr</td>
<td>One-time payment (~$100)</td>
<td>0.37 kW (27% cycling); 0.80 kW (50% cycling)</td>
<td>Warm months only</td>
<td>N/A</td>
<td>~100</td>
<td>120 Hours</td>
<td>2-10 min</td>
<td>2-4 Hours</td>
<td>Yes</td>
</tr>
</tbody>
</table>
A Balanced Program-Design Process Can Help

Program Design

Market-Driven Elements:
- Competitive Offer

Utility-Driven Elements:
- Strategic Value

Strategic Value Analysis
The Market-Driven Side of the Equation

- Market Information (Target Segmentation)
- Draft Offer
- Competitive Test
- Delivery Approach
- Customer Engagement
“It's really hard to design products by focus groups. A lot of times, people don't know what they want until you show it to them.”

— Steve Jobs
SMUD Takes a New Approach

- Identify Prizm segments based on customer attributes
- Sketch offers based on targeted-sector headline attributes, e.g., preferred technology, financing, level of engagement
- Rank, based on market potential and benefits of each offer
- Complete the draft offer to suit the targeted sector/s, including site location, bundled services, pricing/terms, messaging, and outreach based on the sector’s values and preferences

Sours: Shah, 2015
For Example

- SMUD-specific research indicated that overall ... community solar is a top “star” idea; remote utility management of customer equipment is the opposite—yielding a strong negative response.
- Previous studies concurred that there were 2 drivers for community solar: that it is the right thing to do, and that participating could save money... but not all segments favored both equally.
- *Particular* target segments thought differently, and regarding DR concepts, some thought very differently.
- A few segments are favorable toward DR when they have some control, including (but not exclusively) via mobile device.
- Results from evaluations of SMUD’s PowerStat AC load-control program confirmed how effective communications can turn wary preconceptions into strong support.
Not Done Yet!

- Also consult available Utility CIS, county-data, JD Power survey, additional studies (e.g., BrandDelphi), past program evaluations
- Zero in with survey or focus group questions specific to your offer, your target sectors
- Include a Competitive Test against other offers or alternative actions
By Using Segmentation, Outreach/Engagement is Simplified
Imagine Growing Fleets of Community Solar-Plus Projects, Leading to Widespread Use of DR + Storage Integration Strategies

88% of utility execs ranked distributed energy resources as their greatest opportunity, but 63% weren’t sure how to build a good business around it*

* Utility Dive, 2014 Annual Survey
About the Project and the Presenter

The Community Solar Value Project is focused on improving community-solar program value, through solar + storage + demand-response and other strategies, at electric utilities in Sacramento and beyond. It is led by Extensible Energy, LLC, and draws on expertise from three energy consulting firms. See www.communitysolarvalueproject.com

Jill K. Cliburn is Program Manager of the CSVP. She brings long experience in the utility industry, including work in solar and wind market development, solar program and policy consulting, utility integrated resource planning, and DSM and load management program design. Contact: jkcliburn@cliburnenergy.com.

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Supplementary Slides
Utility pays price set by competitive PPA; specifying design; likely buyout

Participants' rate based on wholesale solar cost + admin + wires costs

Keyed to solar capacity “share”

*Plus payments for adding integration value via DR / storage

Siting/design for value-added wholesale solar

Utility pays price set by competitive PPA; specifying design; likely buyout

Fleet expansion expected, with technical and pricing adjustments

*CSVP model; generic to the SMUD proposal

What It Looks Like: Strawman Model