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

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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 may be a high-value combination.
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

*The Smart Grid Consumer Collaborative
Putting the Question to the Subset That Is More Aware…
# 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>Impacts by 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>Depends on end-use</td>
<td>Limited to summer season</td>
<td>Limited to summer season</td>
<td>Frequentl y limited 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-month for capacity +energy payments</td>
<td>Depends on end-use</td>
<td>Limited to summer season</td>
<td>Limited to summer season</td>
<td>Frequentl y limited 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>3</td>
<td>Auto-DR</td>
<td>$10-282$/kW</td>
<td>$200-$400/kW load reduction</td>
<td>$15-$35/kW-month for capacity +energy payments</td>
<td>Limited to summer season</td>
<td>Limited to summer season</td>
<td>Frequentl y limited 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>4</td>
<td>Direct Load Control (A/C switch control)</td>
<td>$70-$150/switch</td>
<td>$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>
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</tr>
</tbody>
</table>

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**Note:**
- Curtailable Load (Day-ahead) pays on a per KW basis.
- Curtailable Load (Day-of) pays on a per KW/month basis.
- Auto-DR pays on a per KW basis.
- Direct Load Control (A/C switch control) pays on a per KW/month basis.
- Resource Magnitude Per Location: Large, Medium, Small.
CVSP Balanced Program-Design Process

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
All Segments Are Not Alike

• 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 some segments thought DR could be reframed in a positive way

• 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 about DR 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, Too
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
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

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What It Looks Like: Strawman Model

Competitive Product with Voluntary Companion Measures

- Participants’ rate based on wholesale solar cost + admin + wires costs
- Keyed to solar capacity “share”
- Plus payments for adding integration value via DR / storage

Solar Project/s with Strategic Design

- Utility pays price set by competitive PPA; specifying design; likely buyout
- Siting/design for value-added wholesale solar
- Fleet expansion expected, with technical and pricing adjustments

*CSVP model; generic to the SMUD proposal