



DRIVING TRANSFORMATION

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Co-Convened by

Stanford

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Program Insights from Leveraging CPP & DR for Grid Flexibility

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Convened by:

Load Flexibility & SMUD's 2030 Zero Carbon Plan

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~\$2.5 billion investment

Natural gas generation repurposing
Retire 2 power plants by 2025 and retool remaining 3 to minimize emissions

Proven clean technology
Expand SMUD's renewable and battery storage resources by 3.5x
>3,000 MW of new renewable energy & storage – equivalent to energy needs of more than 600,000 homes
Support customer resources
Growing rooftop solar and batteries

90% reduction of greenhouse gas emissions

~\$2 billion investment

New technology & business models
Pilot & scale new projects and programs
• 2x savings from energy efficiency & building electrification
• Education & demand flexibility
• Virtual power plants & vehicle-to-grid technology
• New grid-scale technologies

Financial
• Pursue grants & partnerships
• Limit rate impacts to rate of inflation

Maximize community benefits

- Keep affordable rates & reliable power
- Improve local air quality & overall community health
- Reduce regional impacts of carbon – drought, wildfires & extreme weather
- Create regional clean tech jobs
- Strengthen all communities
- Support under-resourced communities
- Involve our customers & community in this transition

Goal:
Eliminate CO₂ from SMUD's power supply

CO₂

100%
Zero carbon by 2030

Thousands of new regional clean tech jobs



Critical Peak Pricing

Background

- History of testing similar rates
- Potential alternative to incentives
- Intended to be revenue neutral

Rate Design

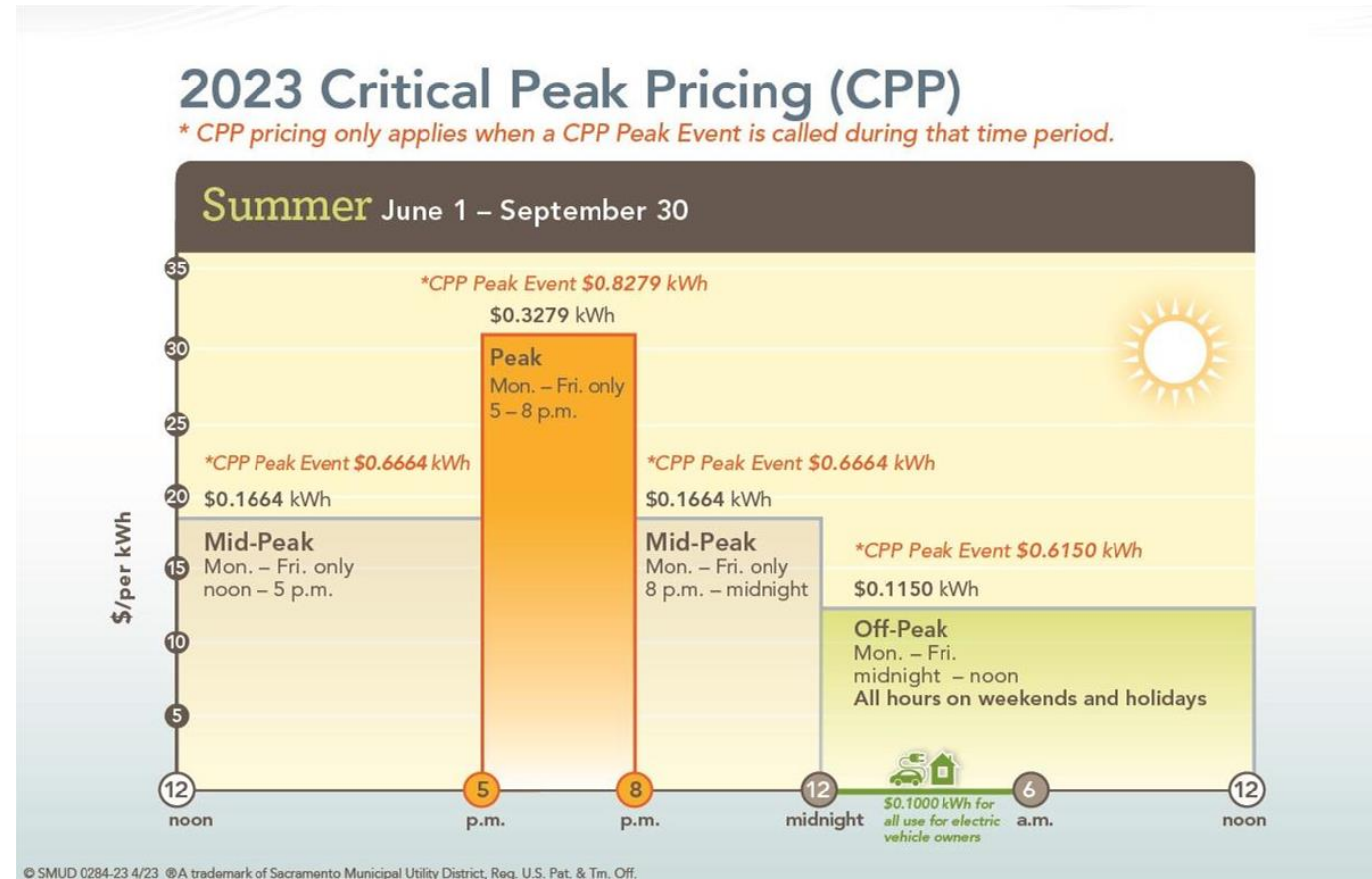
- Summer rate (Jun-Sep)
- Non-event discount
- Peak event charge
- Annual review

Original Intent

- Multiple devices and programs

First Year Implementation

- One program, one device (tstats)



My Energy Optimizer

Program Overview

DR Program Recruitment

- Nest, ecobee, and Sensi devices
- OEM in-app, SMUD Energy Store, and direct customer emails
- Enrollment rebate: \$50 in 2022; decreased to \$25 in Feb. 2023
- Annual end-of-season bonus: \$25

Secondary CPP Recruitment

- By email invitation only, \$25 additional sign-up bonus
- Targeted to “structural winners” in 2022; expanded recruitment pool in 2023
- No end-of-season bonus

Peak Events

- Up to 15 events (50 hours max) from June 1 to September 30
- Event duration: 1-4 hours; no more than 3 event days per week

Peak Event Experience

- DR & CPP customers experience the same event
- Pre-cool home prior to event & manage comfort through event

Communication

- Day-ahead email notifications (except for grid emergencies)
- In-app notifications
- A just-in-time text reminder (optional)
- A post-event performance email
- All communications can be managed by the customer



Overview of Summer 2022

Total
Devices
Enrolled

6,807 DR devices by Sep. 30th
38 DR+CPP devices by Sep. 30th
→ Primary motivation for joining: Incentive (30%)

Events

15 Peak Events totaling 47 hours were delivered

Season

Mid-July through September 30th

Load
Shift

3.71 MW of curtailment, averaged over event hours

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Comparison of the Groups

VS

DR Only

- \$25 per participant annual bonus
- 4,356 devices studied
- Participant – Non-Participant matching
- 3.6% Unenrollment
- 0.86 kW load reduction per participant
- 0.223 kW increase four hours after event
- Bill savings per customer \$2.61

DR + CPP

- Performance based rate
- 38 devices studied
- Pre-period – Period matching
- 2.5% Unenrollment (only 1)
- 0.99 kW load reduction per participant
- 0.314 kW decrease four hours after event
- Bill savings per customer \$76.21



Other Key Learnings:

- **CPP is Complex for the Customer**
 - Understanding trade-offs between DR and DR + CPP is hard
 - Customer confusion around TOU vs CPP
 - Seasonality creates confusion
 - Annual discount changes are difficult for customers to track
- **CPP is Complex for the Utility**
 - CPP is not right for every customer - need to recruit responsibly
 - Recruitment decisions highlight tension between revenue neutrality and customer satisfaction
 - Is it fair to link a whole-house rate to automation of a single load (A/C)?
 - Still figuring out what CPP should look like after this initial test phase



Summer 2023 Overview & Preliminary Results

Key Changes

Recruitment - expanded the pool of eligible customers targeted for CPP
Lowering costs - Enrollment incentive decreased to \$25 in Feb. 2023

20,636 DR devices by Sep. 30th
787 DR+CPP devices by Sep. 30th

Total Devices Enrolled

Events

11 Peak Events totaling 41 hours were delivered over 4 months

Load Shift: 11.7 MW of curtailment, averaged over event hours
Program CSAT: 81% of CPP respondents “satisfied or very satisfied” vs. 69% of DR-only respondents

Prelim. Analysis

More learnings to come!

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