

DOCKETED

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Supporting Flexible Resources at the CPUC

Nate Kinsey

Sr. Regulatory Analyst

Building Decarbonization and Renewable Natural Gas

California Public Utilities Commission (CPUC) - Energy Division



California Public
Utilities Commission

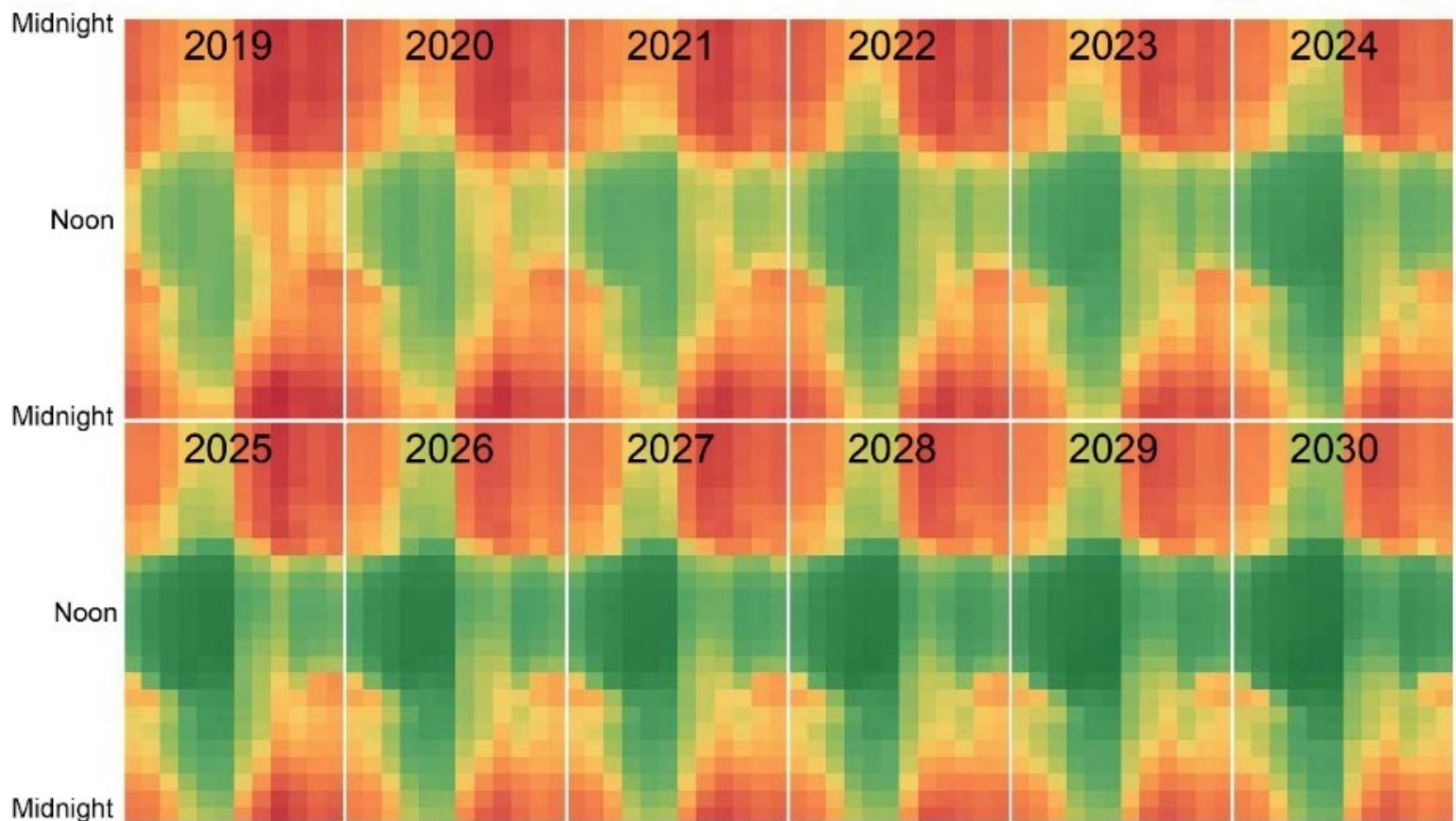
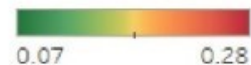
“Buildings account for 75% of U.S. electricity consumption and a comparable share of peak power demand”

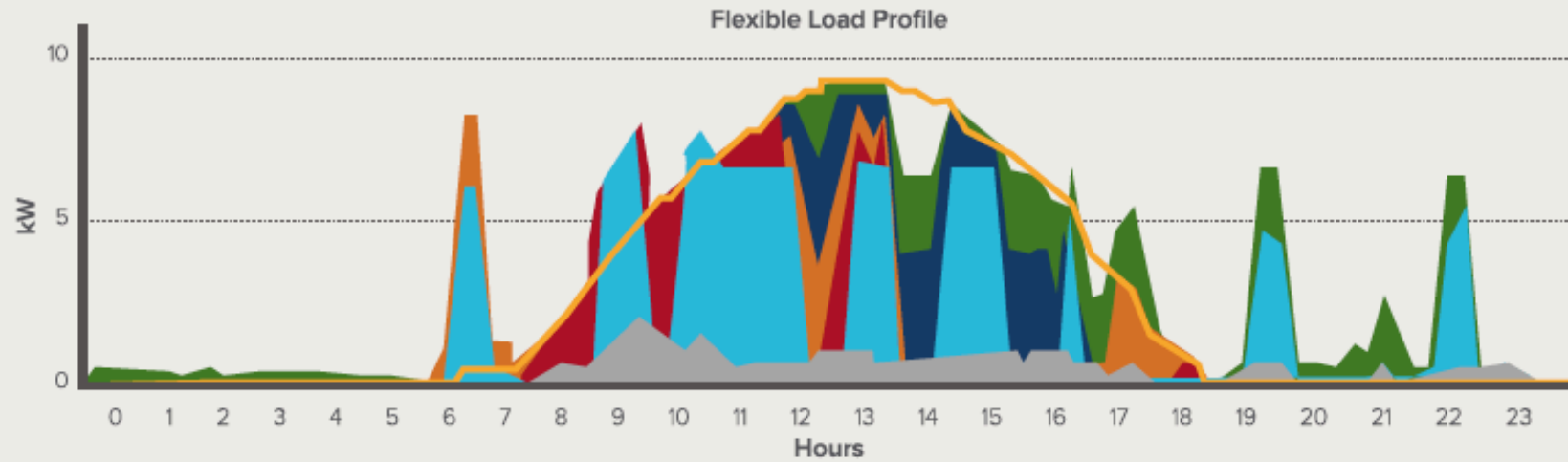
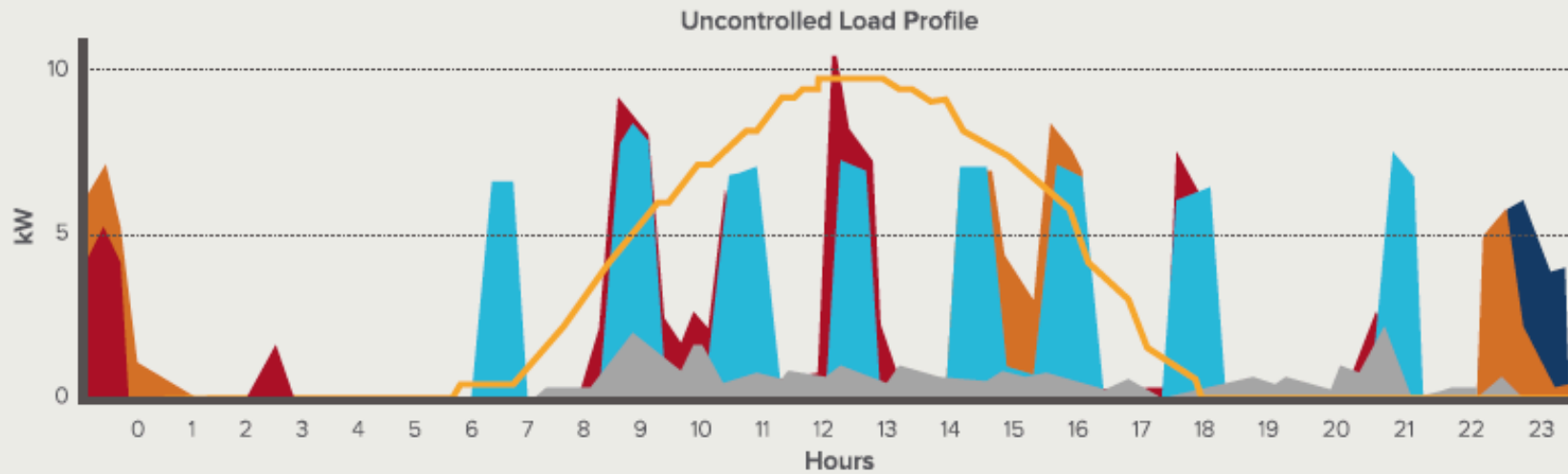
– Performance Assessments of Demand Flexibility
from Grid-Interactive Efficient Buildings:
Issues and Considerations



Electricity CO₂ Intensity

Electric Emissions (Tons/MWh), 2019-2030





- Battery
- Dryer
- Air Conditioning
- Electric Vehicle
- Water Heater
- Other Load

CPUC's Flexible Resource Framework

Enabling Flexible Resources

Programs

Lower costs
Increase adoption
Remove barriers
ME&O

Pricing

TOU Rates
Critical Peak Pricing
(CPP)
EV Rates
SGIP GHG Signal
Real Time Pricing

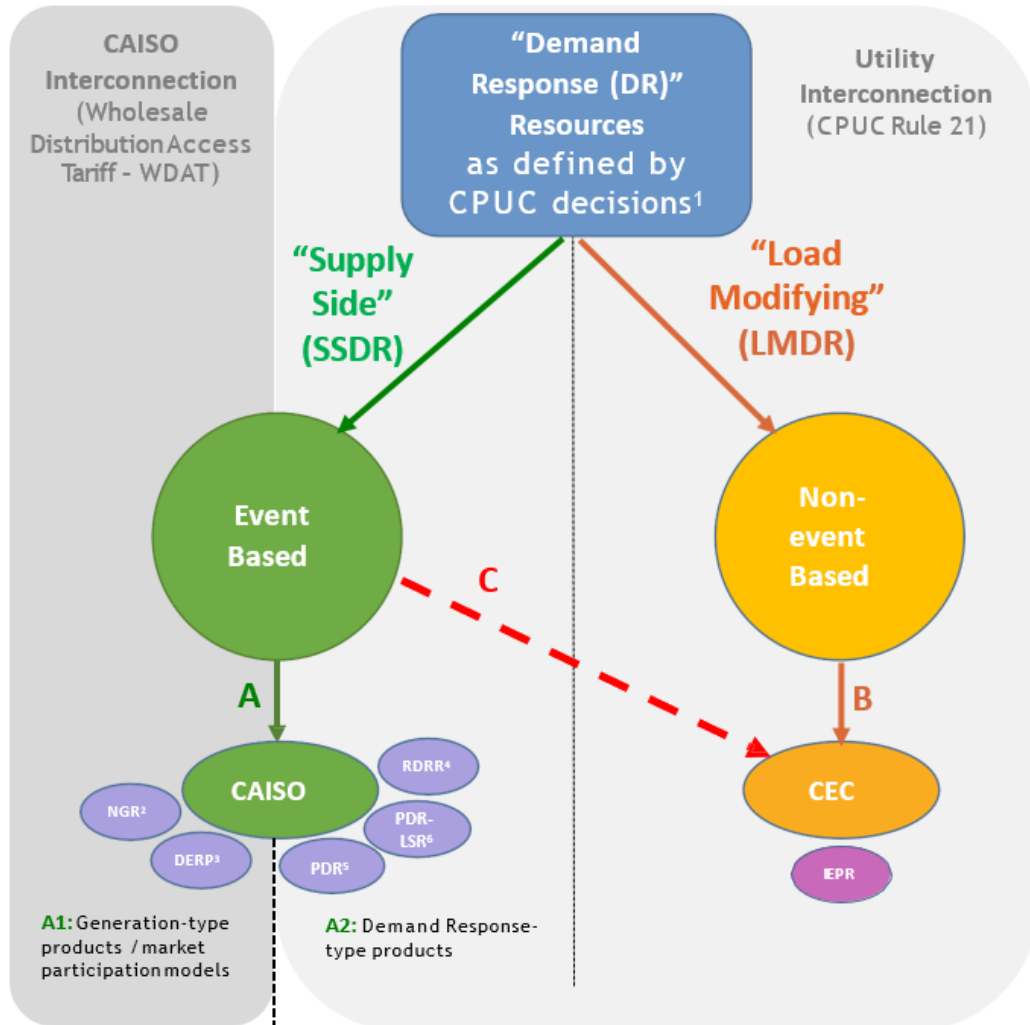
Products

CAISO Dispatch: IOU
DR Programs, DRAM,
LCR contracts
DSO Dispatch: DIDF
contracts

CPUC Programs Enabling Appliance Installations

- Energy Efficiency
- Building Decarbonization (TECH/BUILD)
- Self Generation Incentive Program (SGIP)
- AB 2868 Energy Storage
- San Joaquin Valley Clean Energy Valley Pilots
- Energy Savings Assistance Program

Demand Response Framework



Key Demand Response Definitions:

Load Modifying Resources:

- Daily – Permanent Load Shift (PLS)*/TOU
- Event – CPP
- Hourly – Real Time Pricing

Supply Side

- IOU DR Programs: Capacity Bidding/AC Cycling Programs
- IOU LCR DR Contracts
- DRAM Programs
- LSE Flexible RA DR Contracts

* D.17-12-003 eliminated funding for the PLS programs due to low cost-effectiveness.

Valuing Flexible Resource Benefits

2020 Distributed Energy Resources Avoided Cost
Calculator Documentation

For the California Public Utilities Commission

June 24, 2020
Version 1c

The Avoided Cost Calculator:

- Creates hourly values representing the marginal costs a utility would avoid in any given hour if a DER avoided that provision of energy.
 - Input - DER load shape
 - Output – DER Benefits (Energy, T&D, GHG, etc.)
- Cost-Effectiveness – The ratio of benefits/costs from different perspectives.

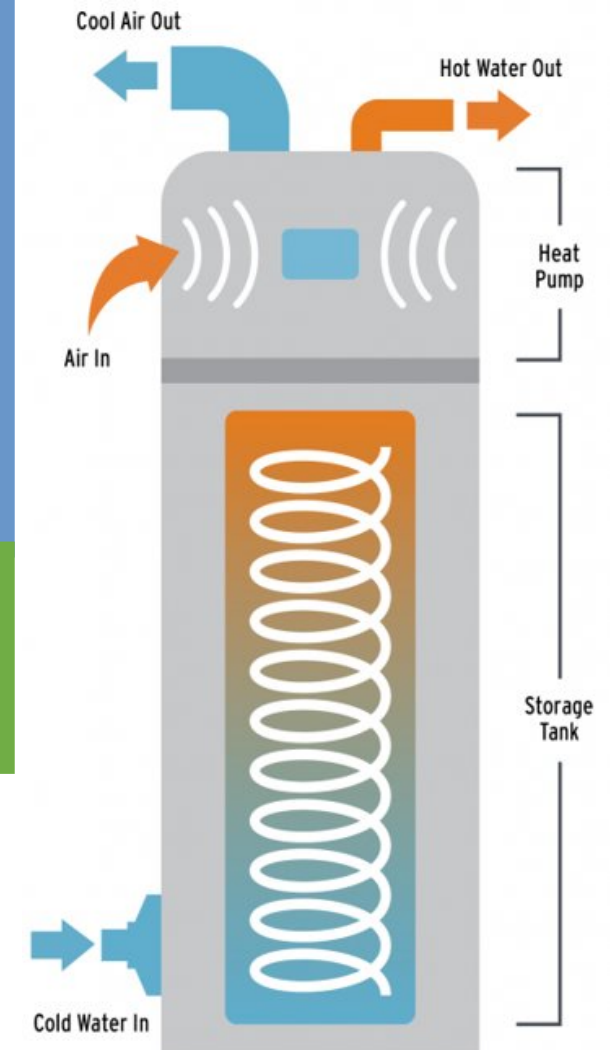
* D.17-12-003 eliminated funding for the PLS programs due to low cost-effectiveness.

Demand Flexible Water Heaters

Shedding, Shifting and Shimmying heat pump and electric resistance water heaters

Programs: Water Heaters As Thermal Energy Storage

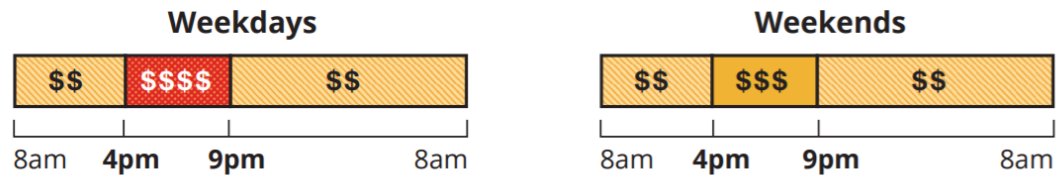
- **San Joaquin Valley Clean Energy Pilots** targeted a minimum of 150 grid interactive HWPBs that use either preset controls or digital communication technologies.
 - **SCE's DR Disadvantaged Communities Pilot** will enroll all available SJV Pilot HPWHs in both load shed and load shift studies.
 - **PG&E's AB 2868 "WaterSaver" Pilot** would install smart controls and communication technologies on existing **electric resistance water heaters** and HPWHs to enable daily load shift.
 - SCE's AB 2868 Application for a **Smart Heat Pump Water Heater Pilot** (HPWHs)
- The **TECH Pilot** implementer will explore kicker incentives for grid interactive HPWHs appliances.
 - **Energy Efficiency** has multiple programs providing incentives HPWHs.
 - **SGIP Pilot** for HPWHs based on their eligibility as thermal energy storage and ability to shift load from peak to off peak periods.



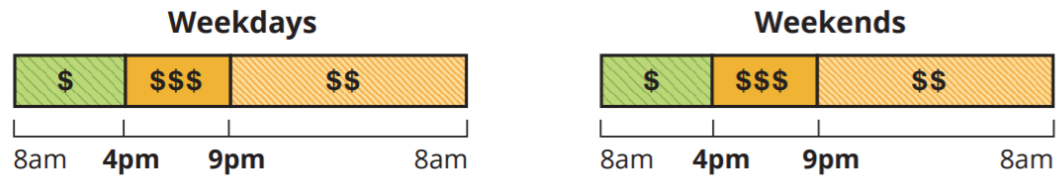
Pricing: Water Heaters As Thermal Energy Storage

- **SCE's TOU-D Prime Rate** – Available to customers who have an EV, a PHEV, a battery, or an electric heat pump.

SUMMER RATES June 1 – September 30 (4 Months)



WINTER RATES October 1 – May 31 (8 Months)



█ Super Off-Peak
 █ Off-Peak
 █ Mid-Peak
 █ On-Peak

Other Pricing Signals include:

- PG&E's and SDG&E's "beneficial electrification rates"
- Energy Division's proposed baseline credit for electric water heating
- Proposed real time energy rates
- Energy Commission's load management standard

Products: Water Heaters As Thermal Energy Storage

- Water heaters are participating in CAISO products but on a very limited basis and mostly on their ability to shed during events.
- Electric water heaters, mostly **electric resistance water heating**, account for less than 10% of the residential water heaters in the state (Approximately 1.3 million)
- There is lots of ongoing research and testing on if, how and at what cost CA's electric water heating be enabled to serve this market?

Current Barriers and Key Questions

Barriers to flexible demand appliances:

- Individual programs providing appliance incentives are bound by individual proceeding rules.
- Industry argues that current policies are barrier to monetization of the full stack of values that could be provided by DERs.

Key Questions:

- How do we ensure equity when developing programs, pricing and products?
- How do CPUC cost-effectiveness calculations need to change when looking at demand flexible appliance?
- What end goal are we developing a standard for? GHG Emissions? Reliability?
- Is there a standard or baseline telemetry? 1-way or 2-way?
- What's the best approach to measuring and reporting appliance response?
- Do certain demand flexible appliances like water heaters fall under MUA rules? Can a water heater shift and shed on the same day?
- Should the Commission revisit its current policy requiring all event-based resources to be market integrated supply side DR resource?

R. 20-11-003 Emergency Reliability

In response to this summer's extreme heat weather events the CPUC recently created a new proceeding to ensure reliability in 2021. The OIR asked:

“12. Are there other opportunities for increasing supply for the summer of 2021 and/or reduce demand that the CPUC has not considered? If so, please provide details of these supply or demand resources and please explain how they can address reliability needs in the timeframe discussed in this OIR



California Public Utilities Commission

Nate Kinsey – nk2@cpuc.ca.gov