

Retail Pricing – A View from the Trenches

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Powering forward.
Together.



Agenda

- Residential Time of Day Rate Experience
- Critical Peak Pricing vs. Programmatic DR
- Dynamic Price to Device – EV Managed Charging
- Dynamic Rate Considerations
 - Dynamic Price to Dynamic Device?
 - Customer Protection
 - Location specific?
- Rates as Operational vs. Investment Signals
- Commercial Battery VPP and Rates

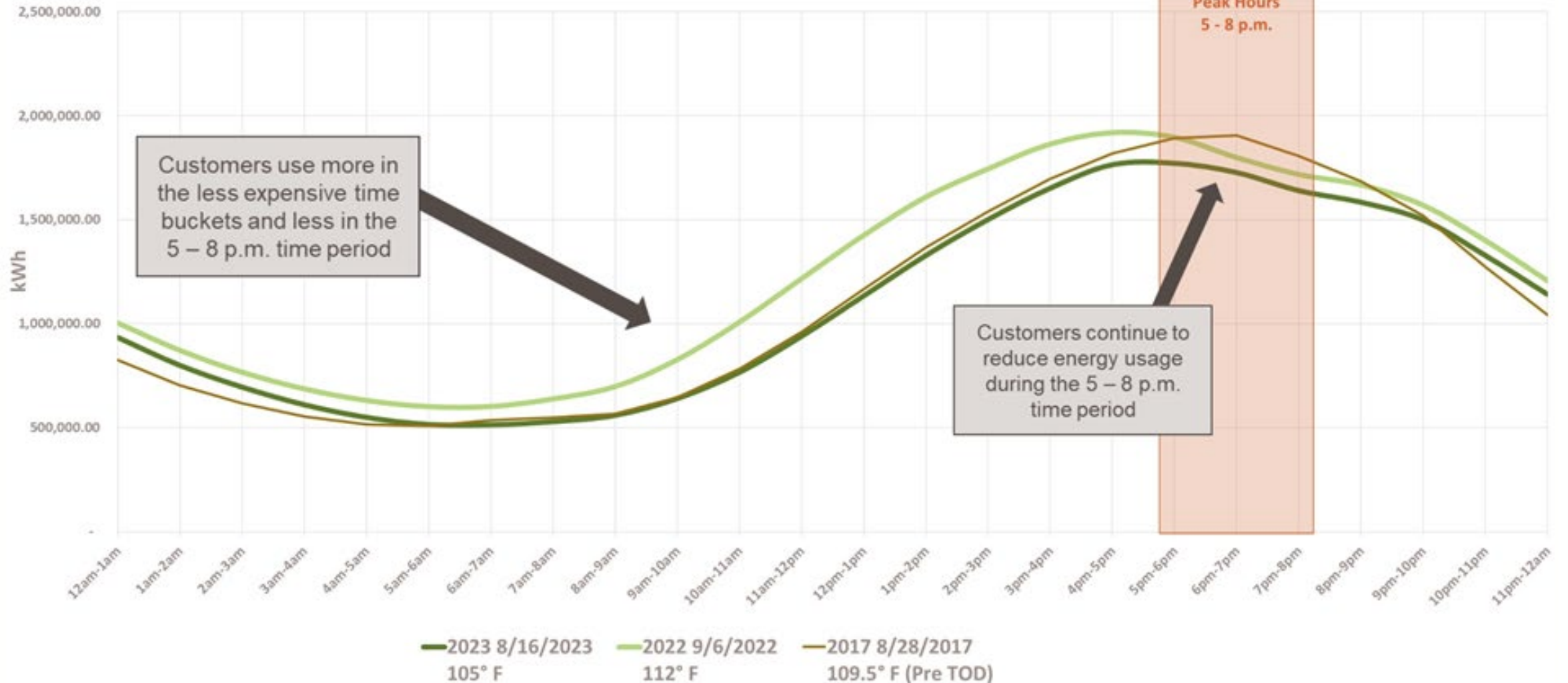


Default Time of Day Rates (2019)

- SMUD defaulted all residential customers onto a ToD rate in 2019
- ~3:1 on peak to offpeak ratio, 3 hour peak window (5-8PM)
- 97% of customers have remained on the rate
- Customers saved 130 MW of demand during hot days (4% of SMUD Peak, 10% of residential demand)
- Offpeak rates (non 5-8 during non-summer – 61% of hours) supportive of electrification 11.8 cents per kWh

TOD Rates Continue to Reduce Residential Peak

Residential Peak Day kWh



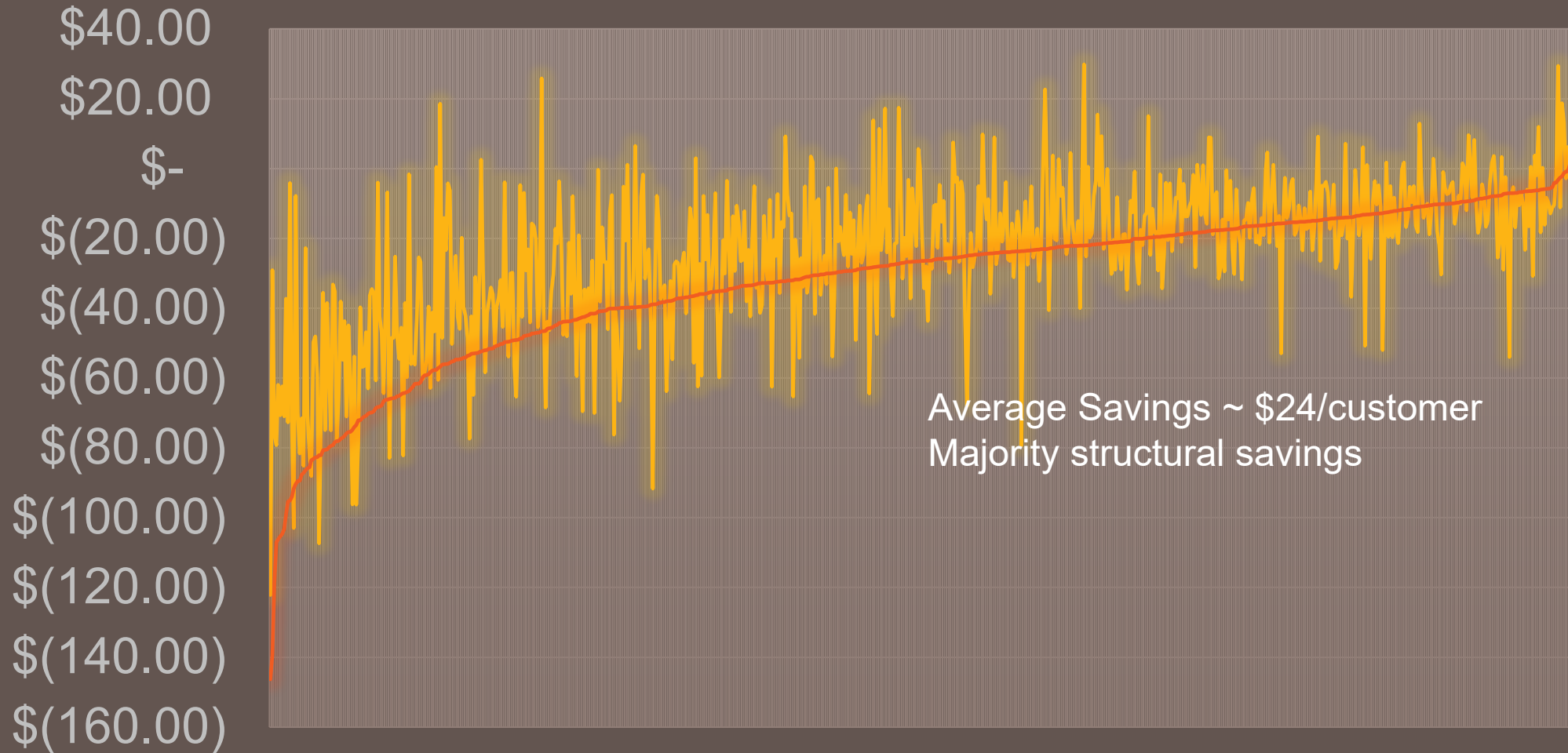


Critical Peak Pricing – Demand Response

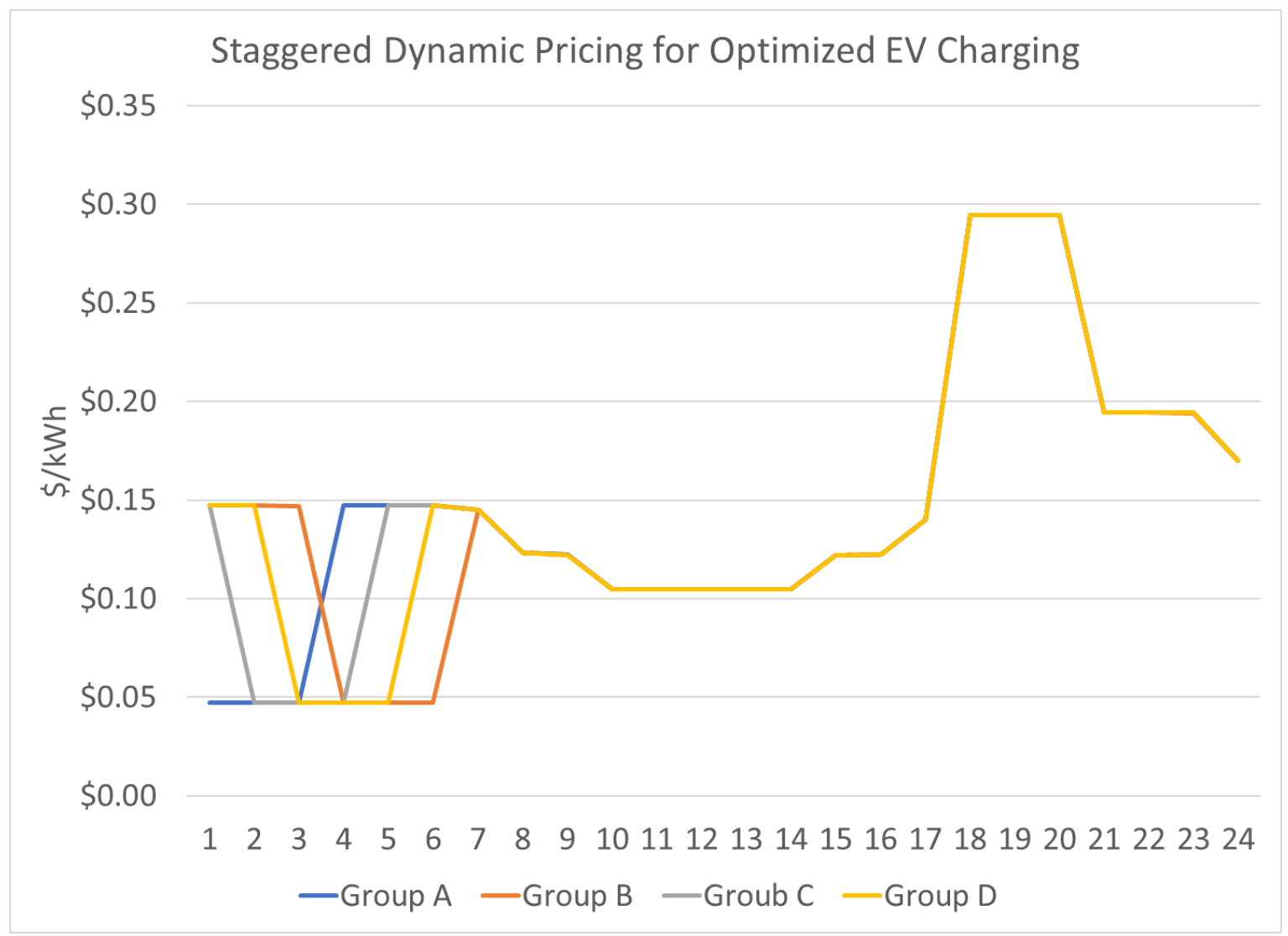
- Piloted Critical Peak Pricing 2012-2017 with free automated response smart T-stats
- Increased Savings vs. Incentive customers
- Pilot with BYOT program in 2022, 2023
- Increased savings, but increased costs relative to incentive program, and, more difficult to recruit customers
 - 20,000 incentive customers
 - 700 CPP customers
- Issues with who to recruit???
 - Some serious structural winners
 - Many structural losers

Critical Peak Pricing – Predicted vs. Actual Savings

— Actual Savings — Predicted Savings



Dynamic Price to Device Charging – EV Managed Charging Pilot



Dynamic Price to Device Charging – EV Managed Charging Pilot

- Preliminary M&V shows significant variation in price responsiveness across OEM's & Optiwatt
- Lengthy learning process
- Vehicles typically plugged in once out of 3 or 4 days – significantly constraining flexibility
 - This has improved somewhat with messaging to customers
- Wholesale dynamic prices need adders and subtractors to really differentiate prices
- Grouping and Price staggering necessary to avoid coordinated charging at the transformer level
 - 5-10 cars with coordinated charging during low-cost times could exceed transformer limits

Dynamic Rate Considerations – Things We’re Wondering About

- Could we offer dynamic prices just for EV Charging? Dynamic Price for Dynamic Device?
 - Metering cost a barrier
 - Diverse set of EVSE’s, many non-communicating
 - Telematics not standardized, don’t account for EVSE and cable losses, may be measured differently depending on OEM – need validation and standardization
 - New AMI deployment of Itron Riva meters can disaggregate with 00’s of cycles per second readings, but costly to deploy for everyone
- How to protect customers from extended high prices?
 - 3 weeks in summer with sustained high prices due to wildfires impacting transmission lines
 - ~5 weeks in winter with sustained high prices (>\$300/MWh) due to unexpected cold snap coupled with gas transmission outage and low working storage
 - Without protection, customers exit rate and likely don’t return
- Could you do location-specific dynamic rates?
 - May create equity issues depending on level of grid topology
 - Can’t account for distribution constraints without location-specific signal
 - 10’s of thousands of constrained transformers, or even just hundreds of distribution substations creates complexity for rate-setting, billing





Rates as Investment Signal vs. Operational Signal

- Customers and 3rd party energy providers frequently treat rates as a long-term investment signal
- Frequent rate changes and/or complex rates can undermine customer willingness to invest – uncertainty around paybacks
- TOU rates, and dynamic rates looked to to create more of an operational signal
- To evolve with the energy system, these rates need to change over time and potentially become more complex (e.g. more prevalent negative daytime pricing)
- With a lot of customer investment, rate changes become more difficult



Current Challenge – Commercial VPP

- Desire for 100% utility control of BTM commercial storage...How to structure incentive and operational agreement to provide customer adequate investment certainty?
- Dispatch may not align to underlying rate structure or demand charge mitigation
- Operational decisions may not match modeled dispatch
- Considering a capacity payment guarantee if arbitrage and demand mitigation don't exceed \$X per year



Thank you!



¹²New Bulk Substation "Station G"