

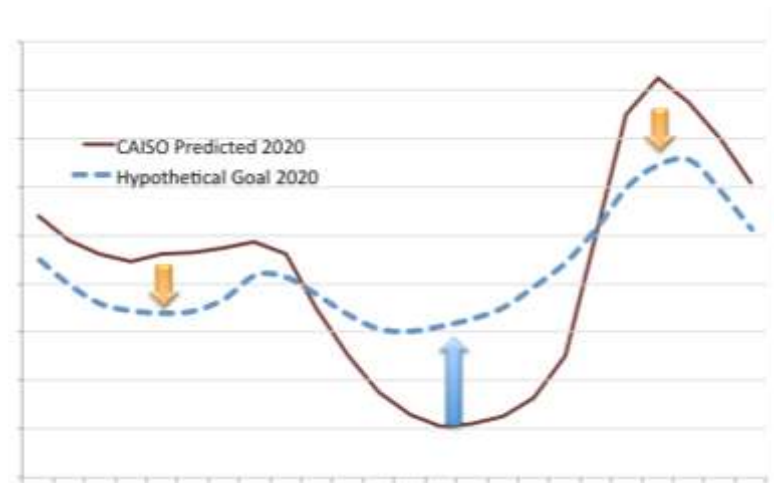
# Changing Behavior with Price

Using retail rates to flatten system loads

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RESEARCH SOLUTIONS

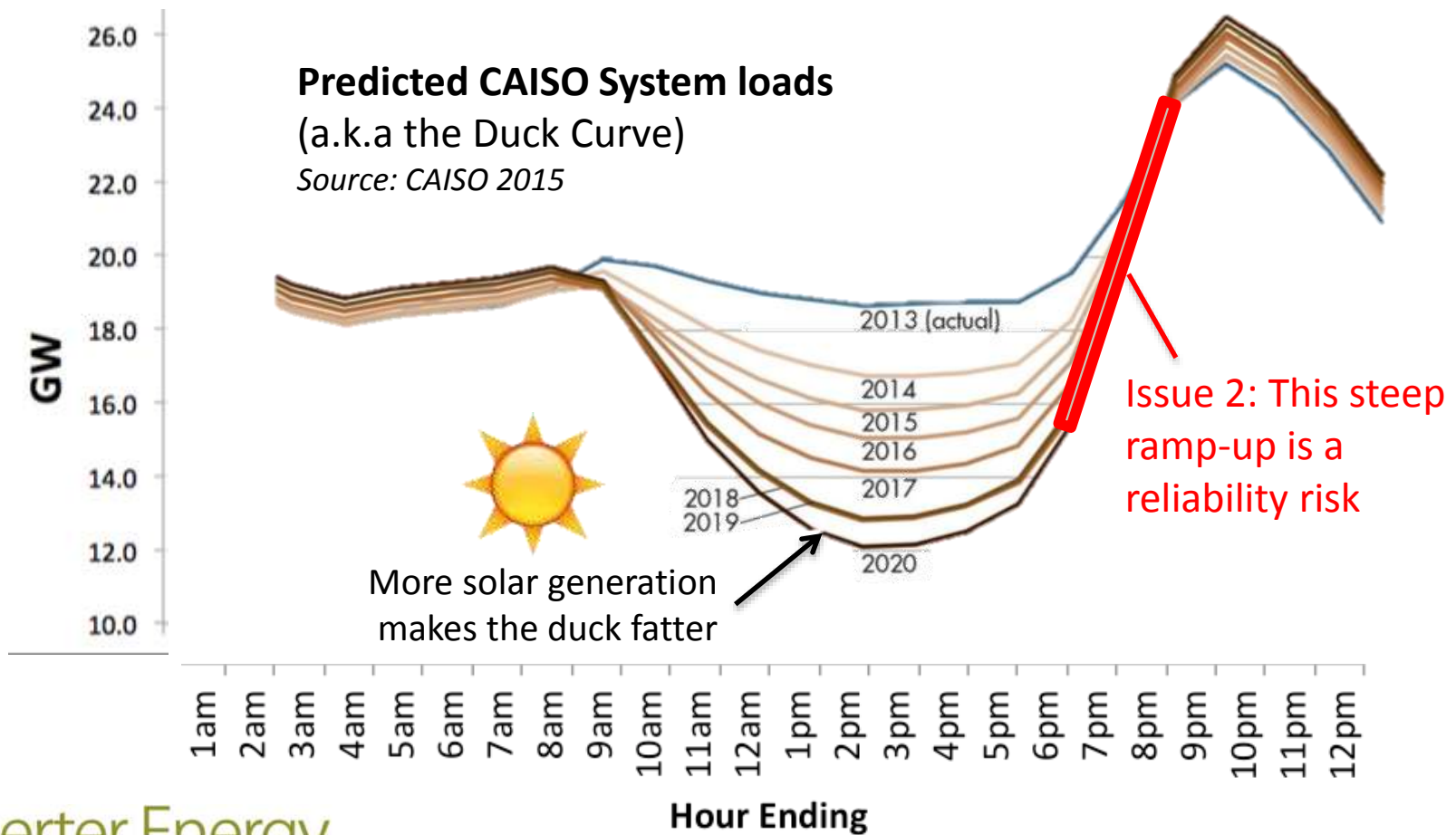
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# Q: Why are rate structures changing in California?

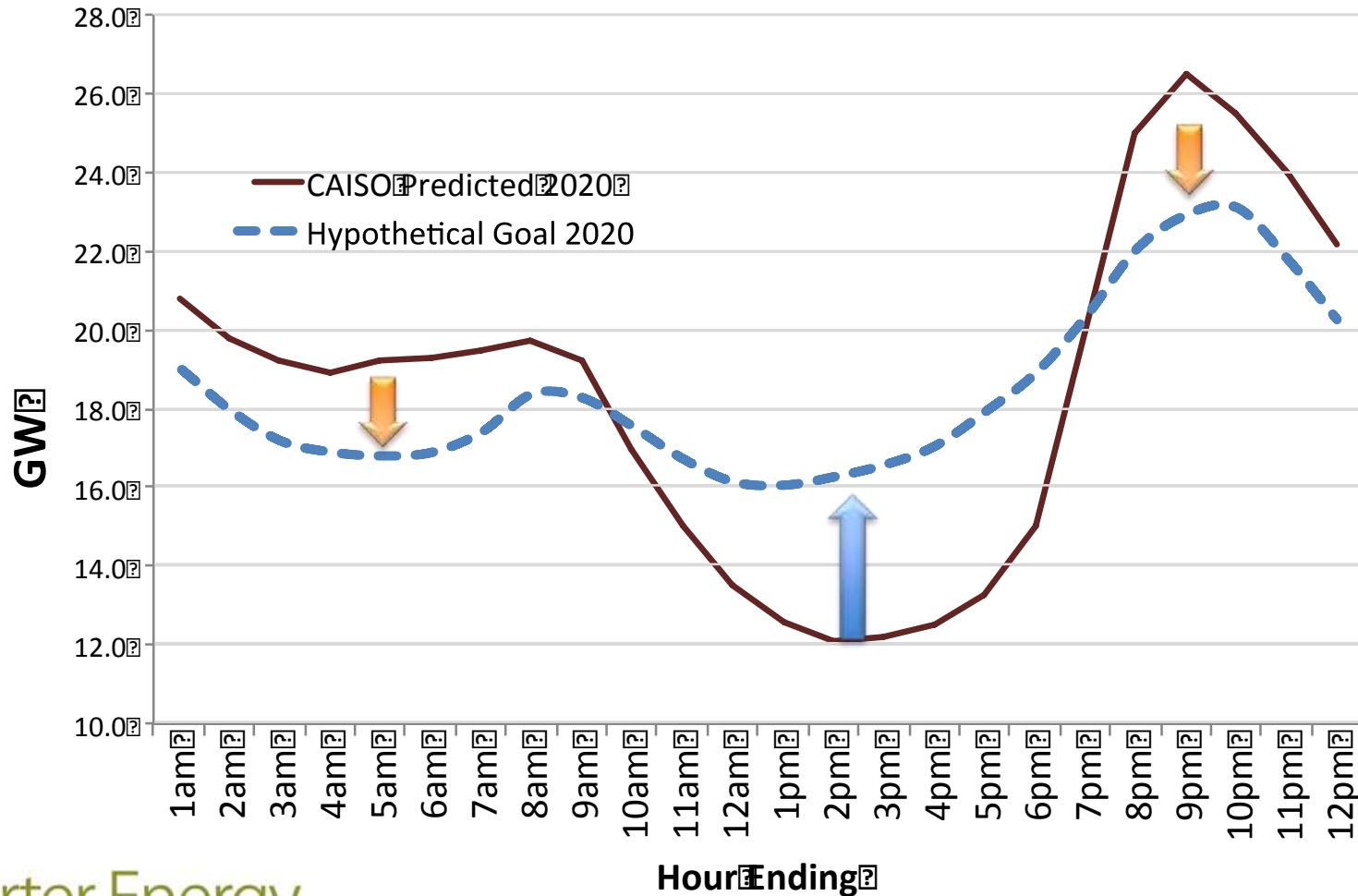
A: To change the undesirable predicted load pattern

Issue 1: High demand → high market prices → high retail rates



# Q: What is the desired outcome?

A: Shift diurnal energy use without increasing consumption



# Q: How can we achieve these goals?

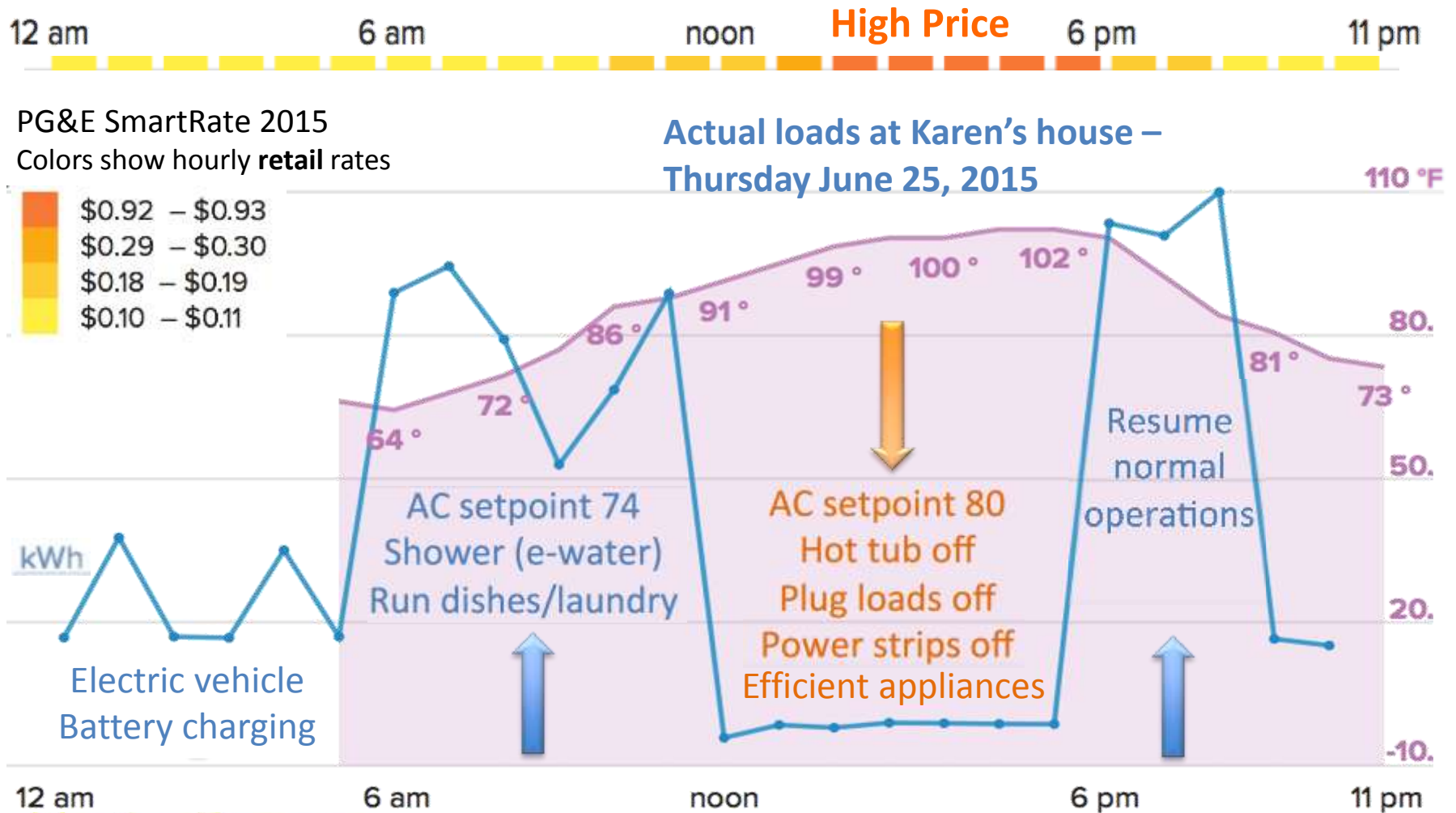
A: Through utility programs and new pricing structures

- **Programs** — pay customers to save or generate electricity as needed
  - Rebates – for efficiency measures, smart home controls, solar, etc.
  - Payments – for demand response, e.g AC load control
- **Pricing** — vary rates with time to encourage daily or peak day changes
  - Tiered – California utilities are abandoning tiered rates in favor of TOU
  - Time-of-use (TOU) – effective at both shifting and reducing loads
  - Critical Peak Pricing (CPP) – TOU + price event notification on peak days
  - Real-Time Pricing (RTP) – mirrors hourly or sub-hourly market costs
    - Requires enabling technology to receive, interpret and act on the price

Note: IOUs get incentives from the state to encourage customers to use less energy. Their profits generally don't depend on how much energy is sold.

# Q: What can customers do to respond to prices?

A: See following real world example for some ideas...



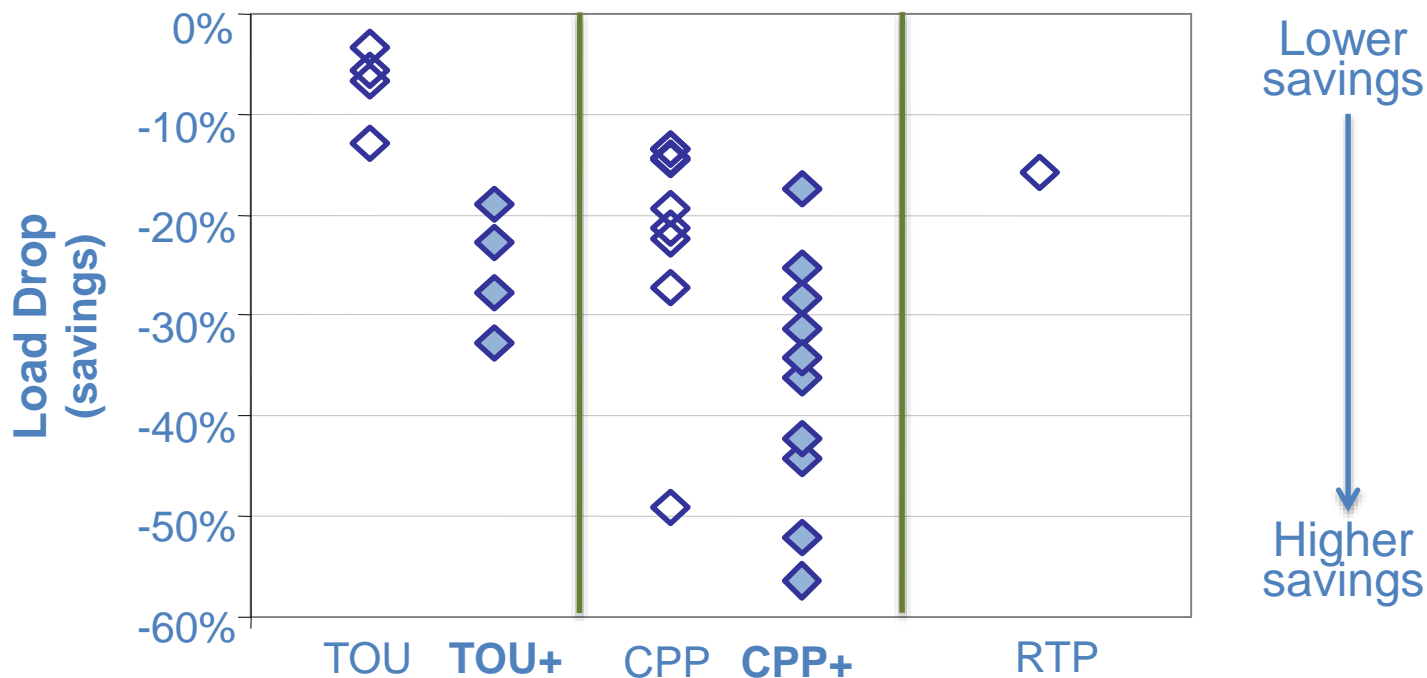
(Yeah... that's great Karen, but you're hardly typical...)

## Q: So... Will the general population respond?

A: Studies indicate that they can and will.

Smart / Connected / Automated thermostats can double the savings

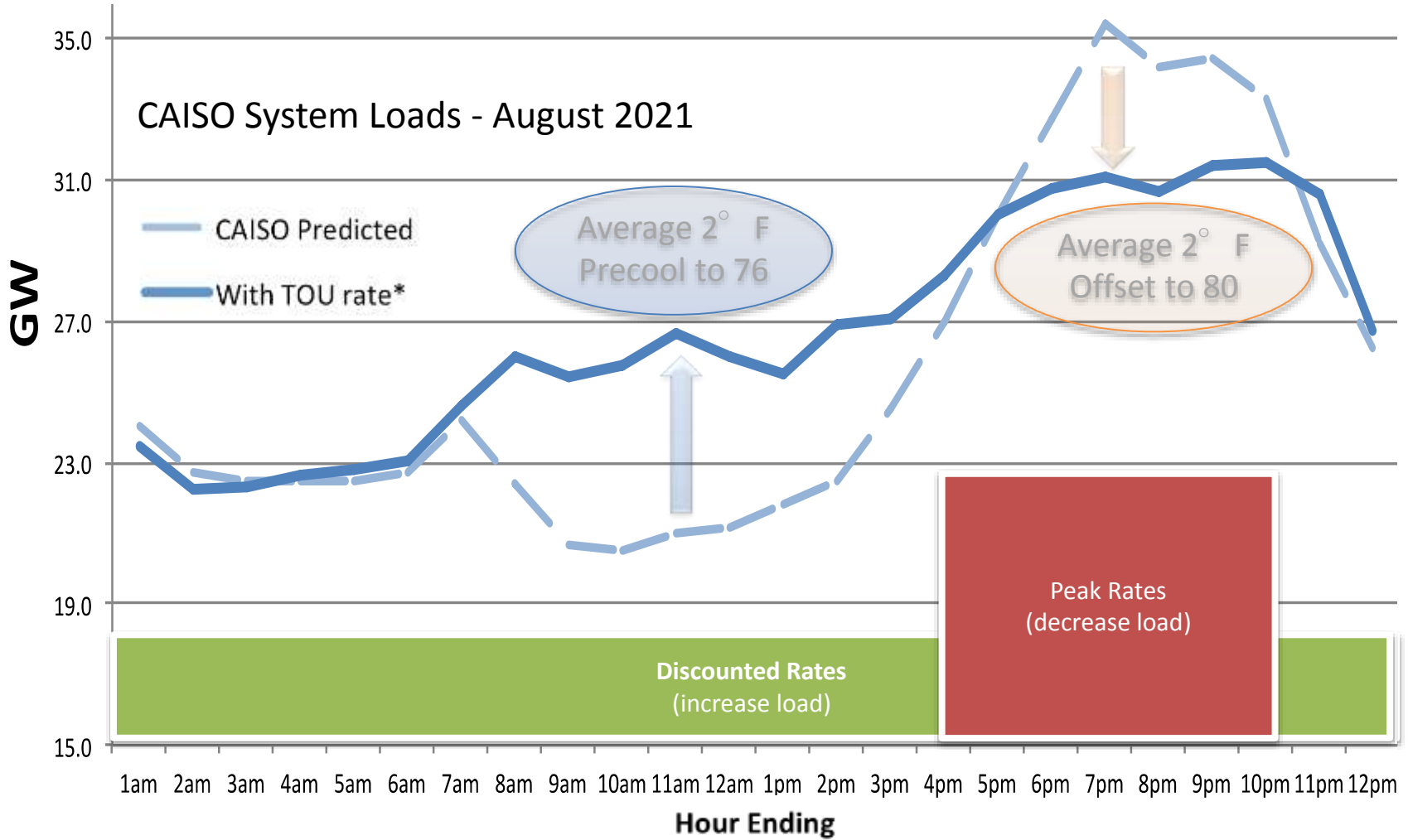
Results of recent residential pricing pilots in the U.S.



+ = enabling technology was available in addition to the rate (mostly smart thermostats)

# How a TOU rate might effect system loads

(based on a true story\*)



\* Estimated impacts based on SMUD residential precooling study (Herter et al. 2014)

# Thank you!

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