Beneficial Electrification and EV Rate Design

SC Electric Vehicle Stakeholder Initiative

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Regulatory Assistance Project

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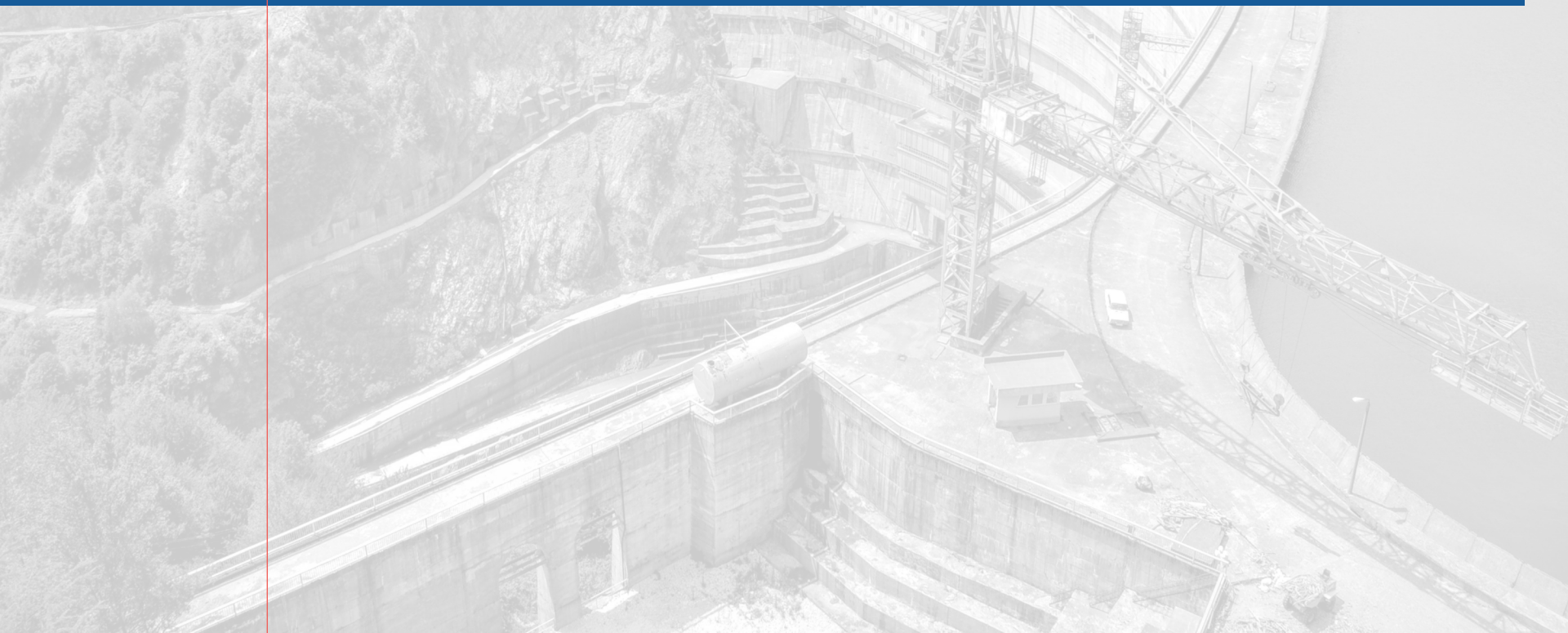
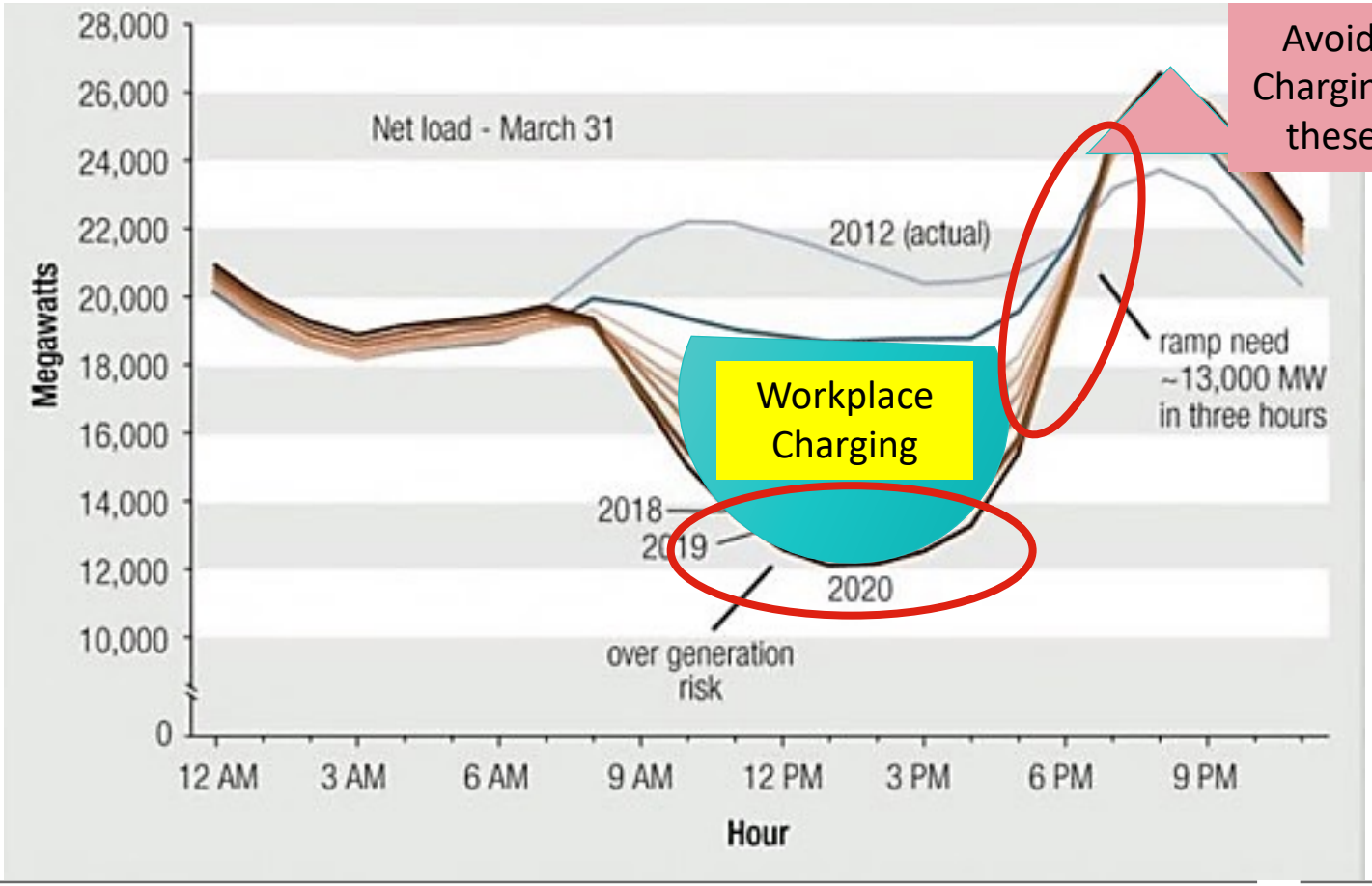
1 Why is Flexibility Such a Big Deal?



Value of Flexibility for Integrating Renewable Energy



Source: California ISO

What Makes Electrification Beneficial?

Three Criteria: Achieve At Least One Without Adversely Impacting The Others

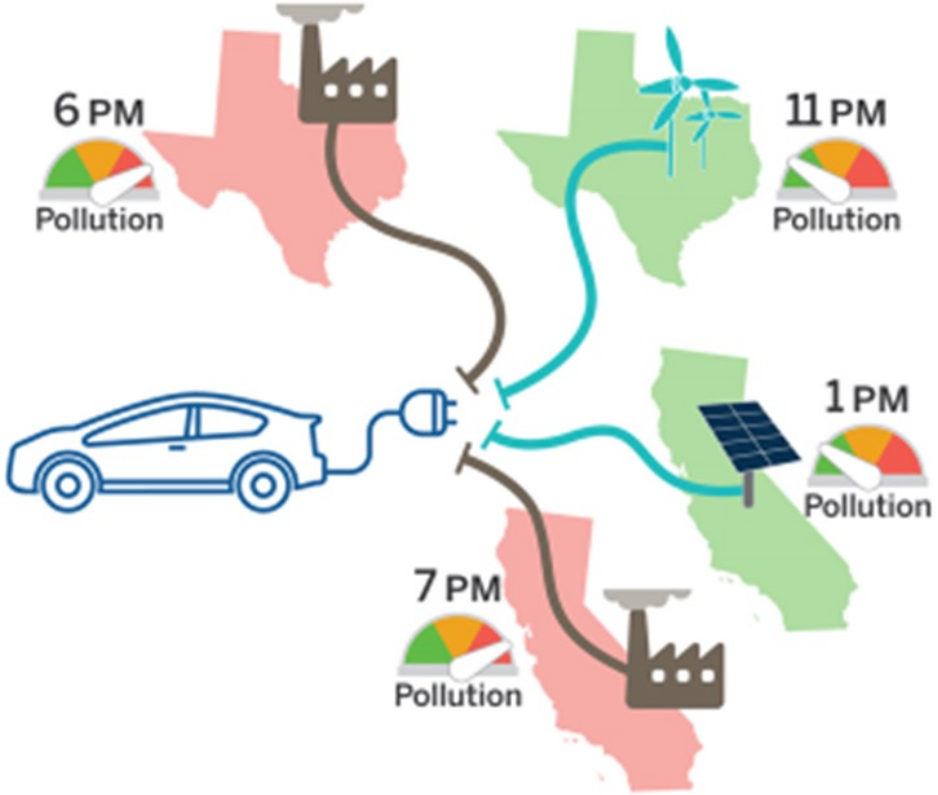
1. Saves Customers Money Long-Term; New Services

2. Reduces Environmental Impacts

3. Enables Better Grid Management

Enables Better Grid Management

3. Understand the Emissions Effects of Changes in Load



Managing Load

EVs can be a **benefit** … or a **problem** for the electric grid.

Draw high amounts of power for short periods of time.

Managing Load

EV load must be managed *effectively, otherwise all ratepayers will share in the expensive costs of upgrading and maintaining the distribution system to accommodate increased load on the system.*

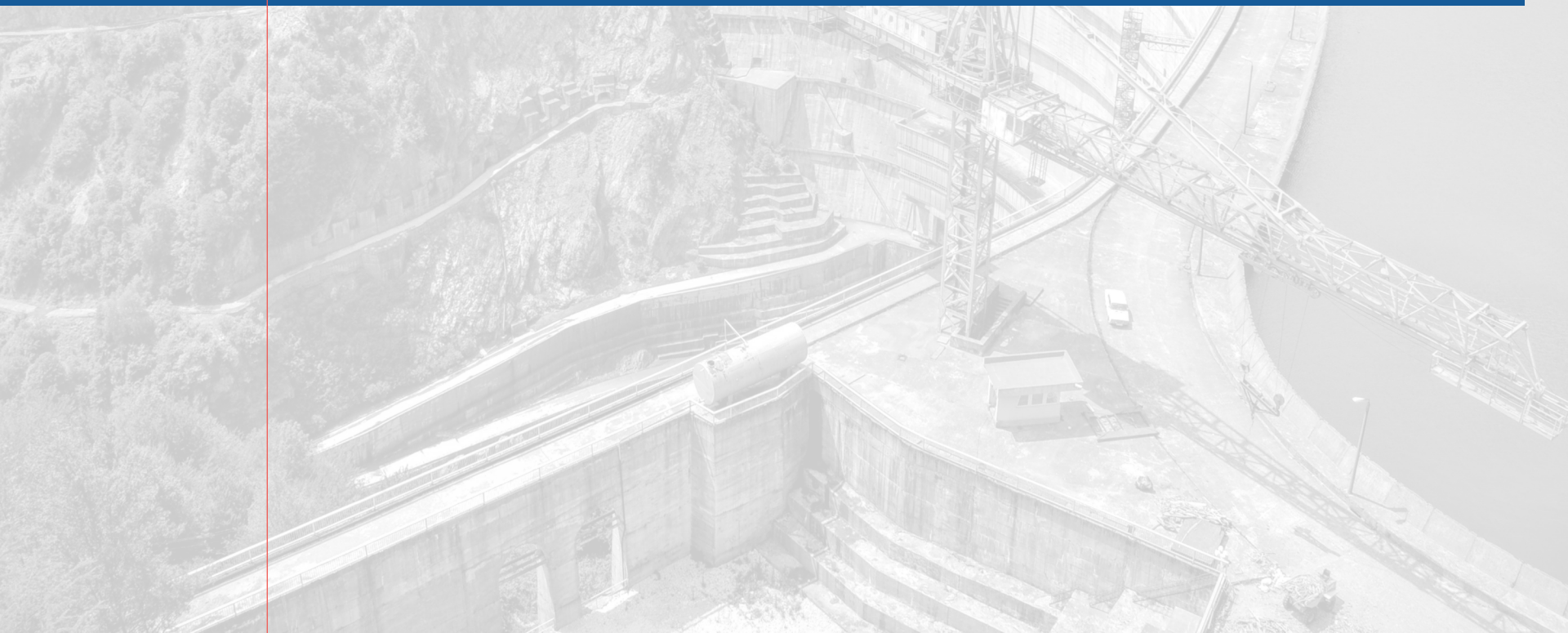
Public Service Commission of Maryland. (2019, January 14). Order No. 88997, In The Matter Of The Petition Of The Electric Vehicle Work Group For Implementation Of A Statewide Electric Vehicle Portfolio, CASE NO. 9478, p. 49.

Managing Load

Pairing EV adoption and EV charging with intelligent rate design can **improve** electric distribution **system utilization** and create **downward pressure on rates** through load management and system peak reduction.

Public Service Commission of Maryland. (2019, January 14). Order No. 88997, In The Matter Of The Petition Of The Electric Vehicle Work Group For Implementation Of A Statewide Electric Vehicle Portfolio, CASE NO. 9478, p. 43-44.

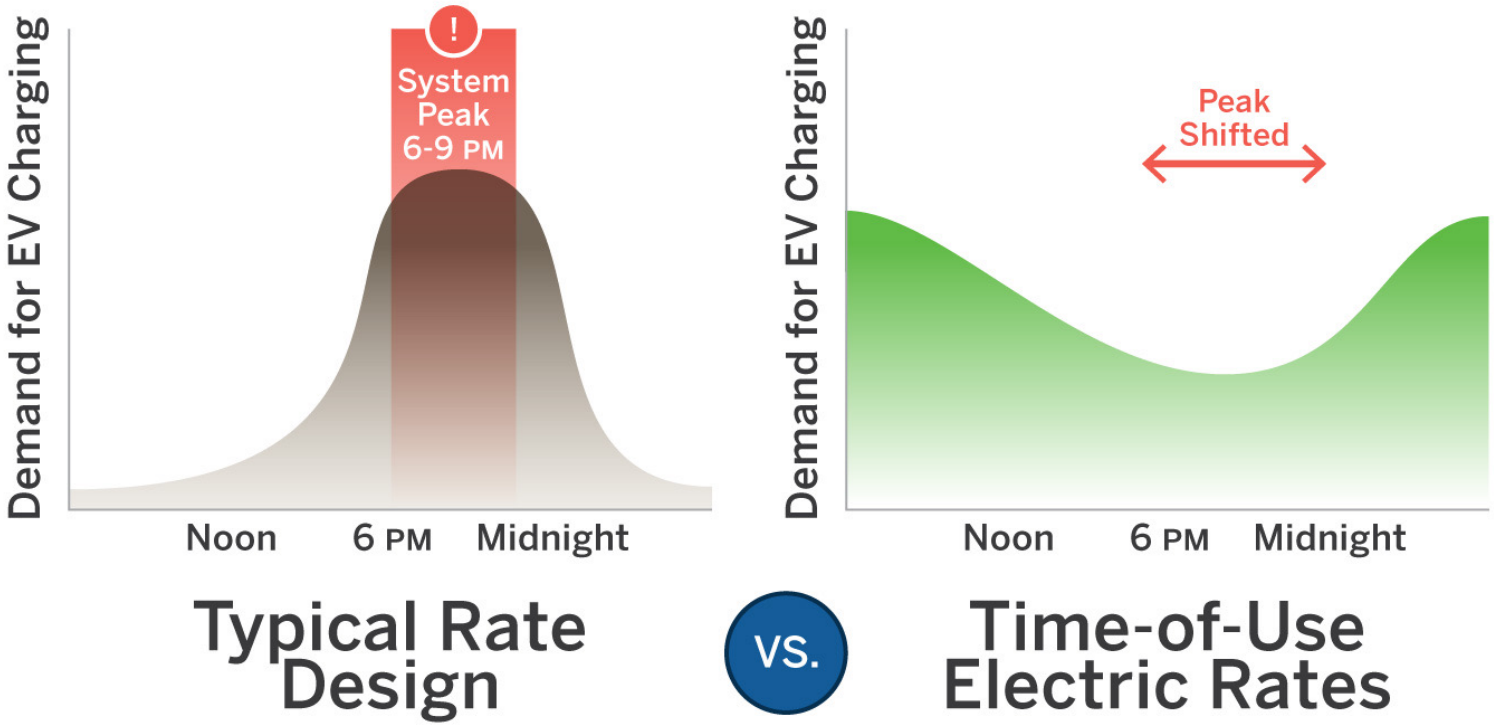
Rate design foundations



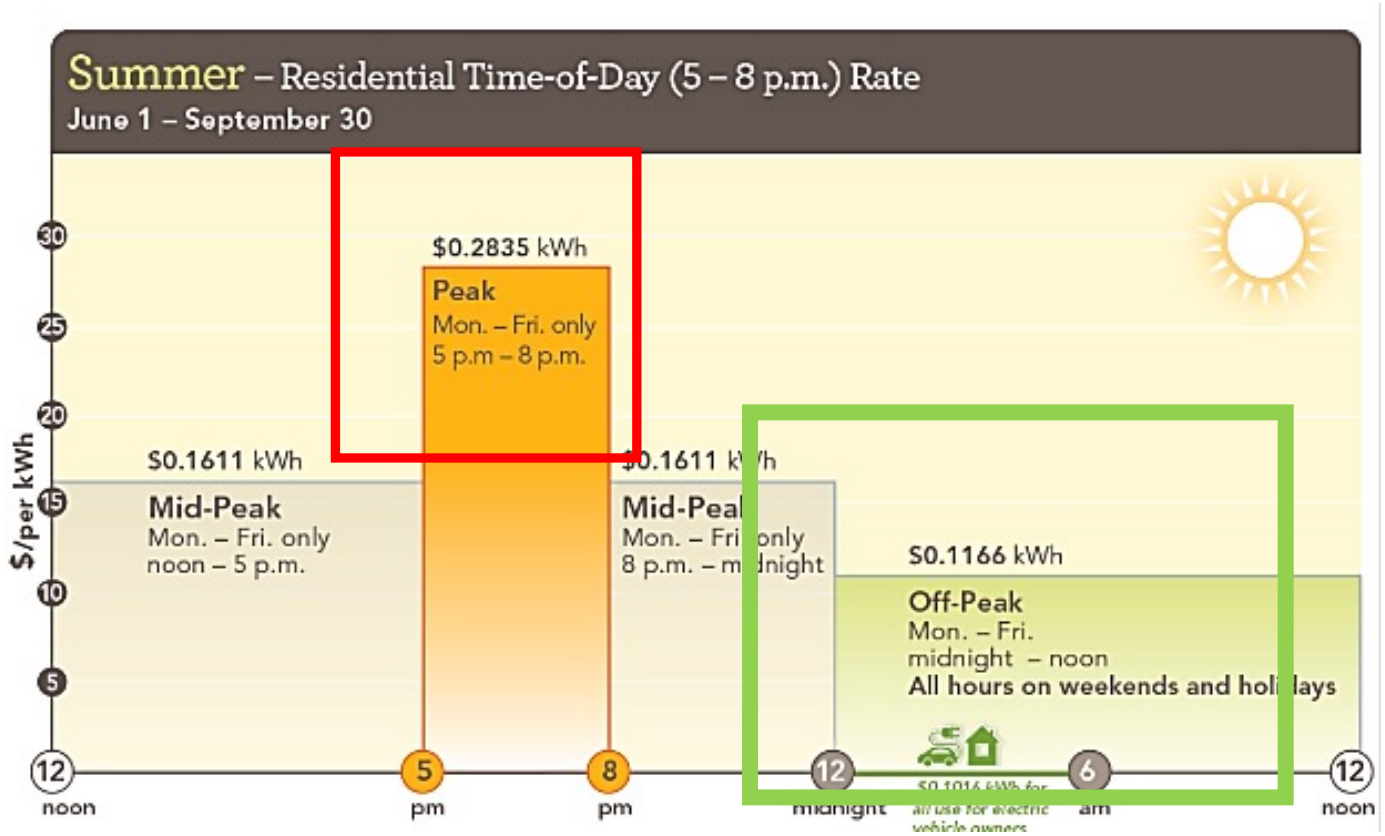
Rate design should make the choices the customer makes to minimize their own bill consistent with the choices they would make to minimize system costs.

What does this rate design tell you?

6. Design Rates to Encourage Beneficial Electrification

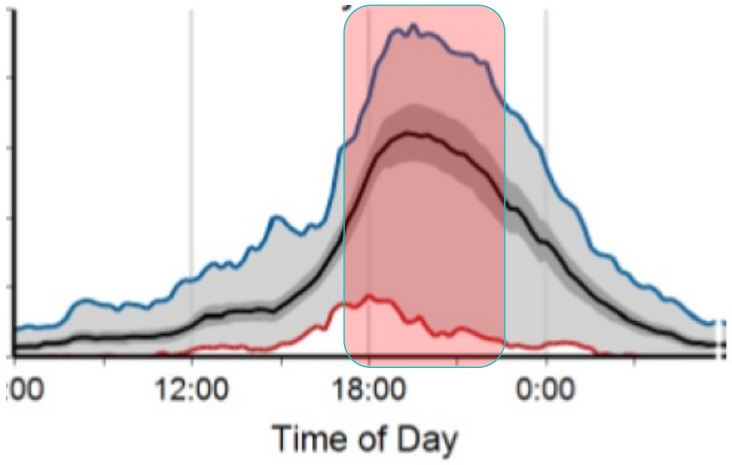


TOU Rates Can Focus on the System Peak Period

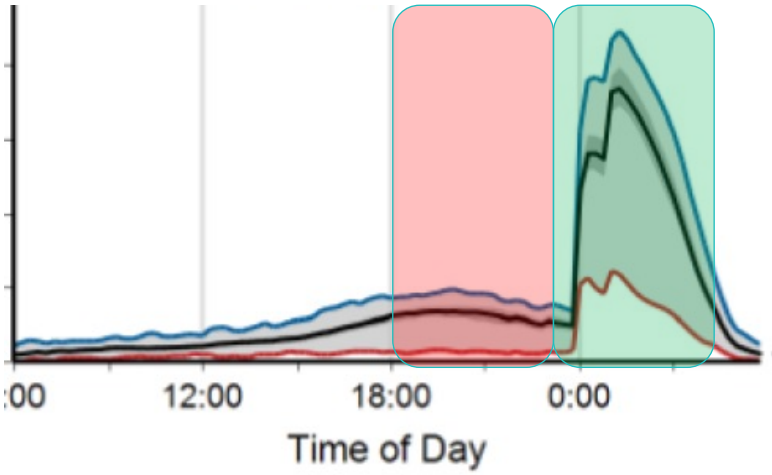


Source: Sacramento Municipal Utility District https://www.smud.org/en/Rate-Information/Time-of-Day-Rates/Time-of-Day-5-8pm-Rate

Price Can Influence When EVs Are Charged



Dallas/Ft Worth
(standard rates)



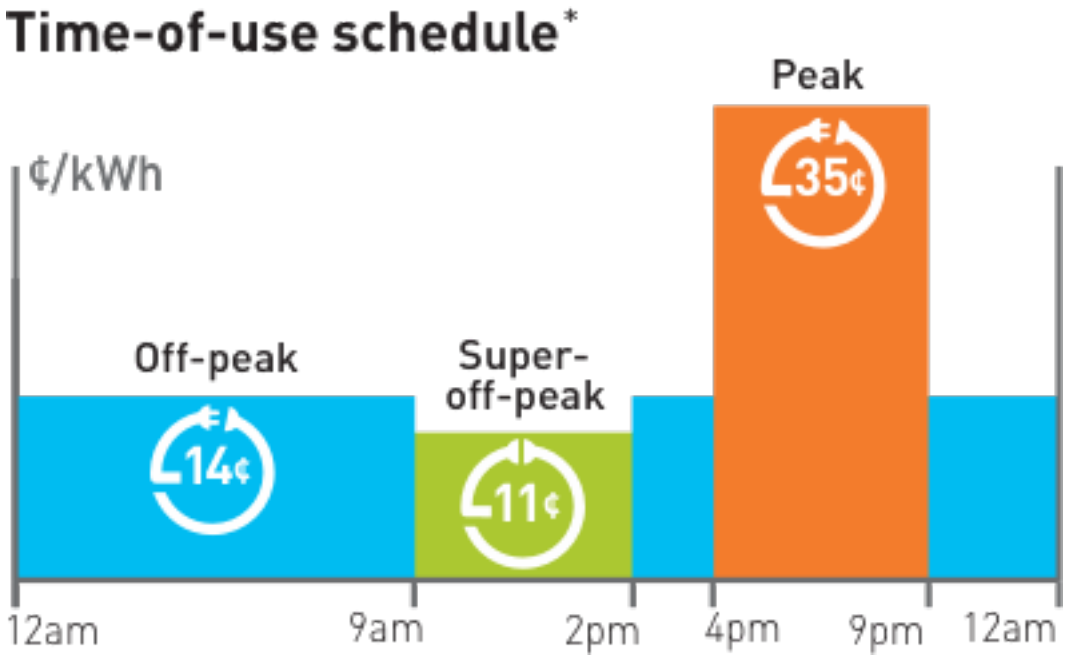
San Diego
(time-of-use rates)

Adapted from: M.J. Bradley, 2017

Burbank Municipal Power Optional TOU for EV Owners

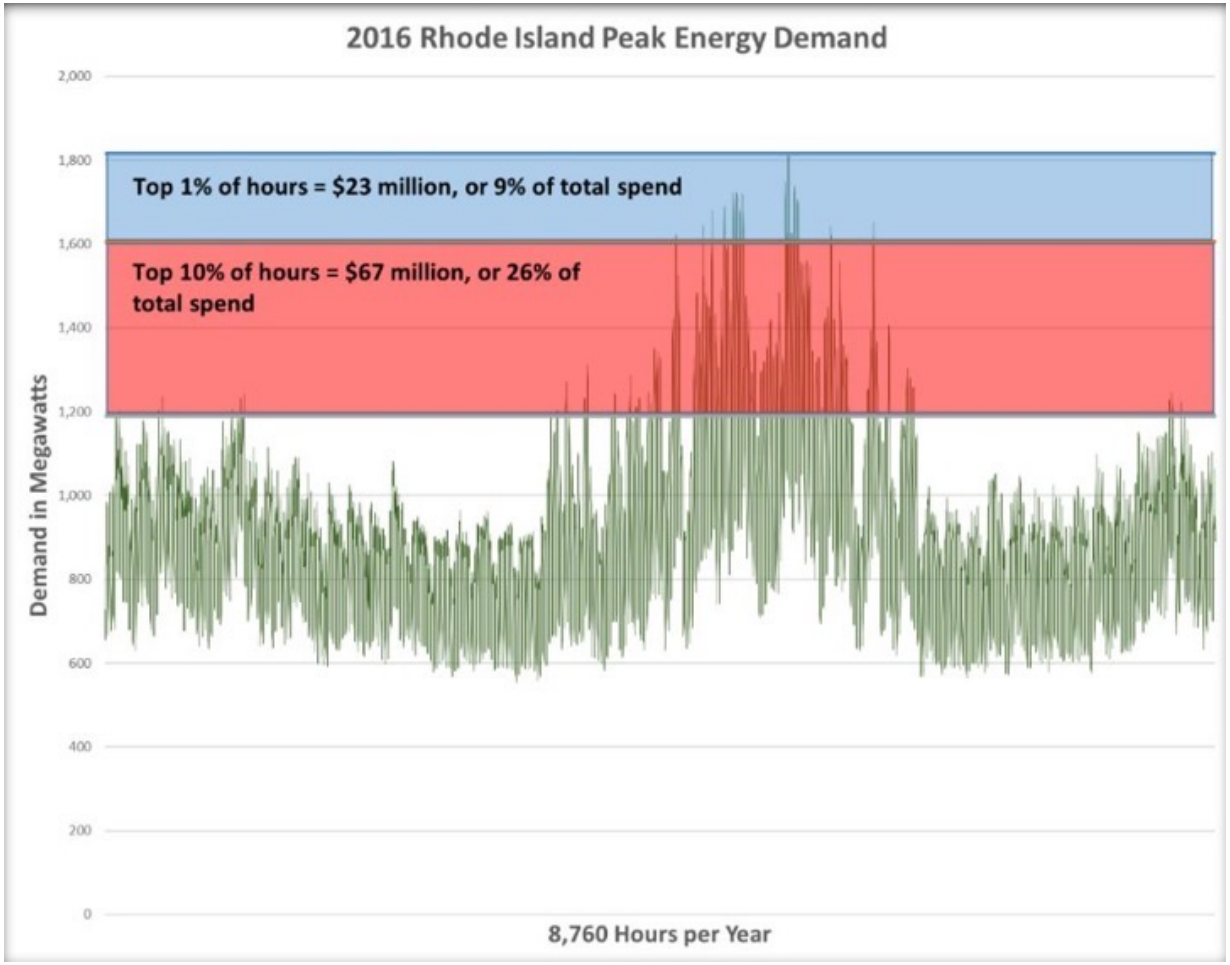
Customer Charge ($/mo.)	$8.99
Site Infrastructure ($/mo.)	Small: $1.37 Medium: $2.76 Large: $8.27
	Summer
Off-peak (cents/kWh)	8.2 cents
Mid-peak (cents/kWh)	16.3 cents
On-peak (cents/kWh)	24.5 cents

New PG&E Commercial EV Rates



Distribution kW subscription of ~$1.20 to $2 per kW

At Least, Avoid High-Cost Hours

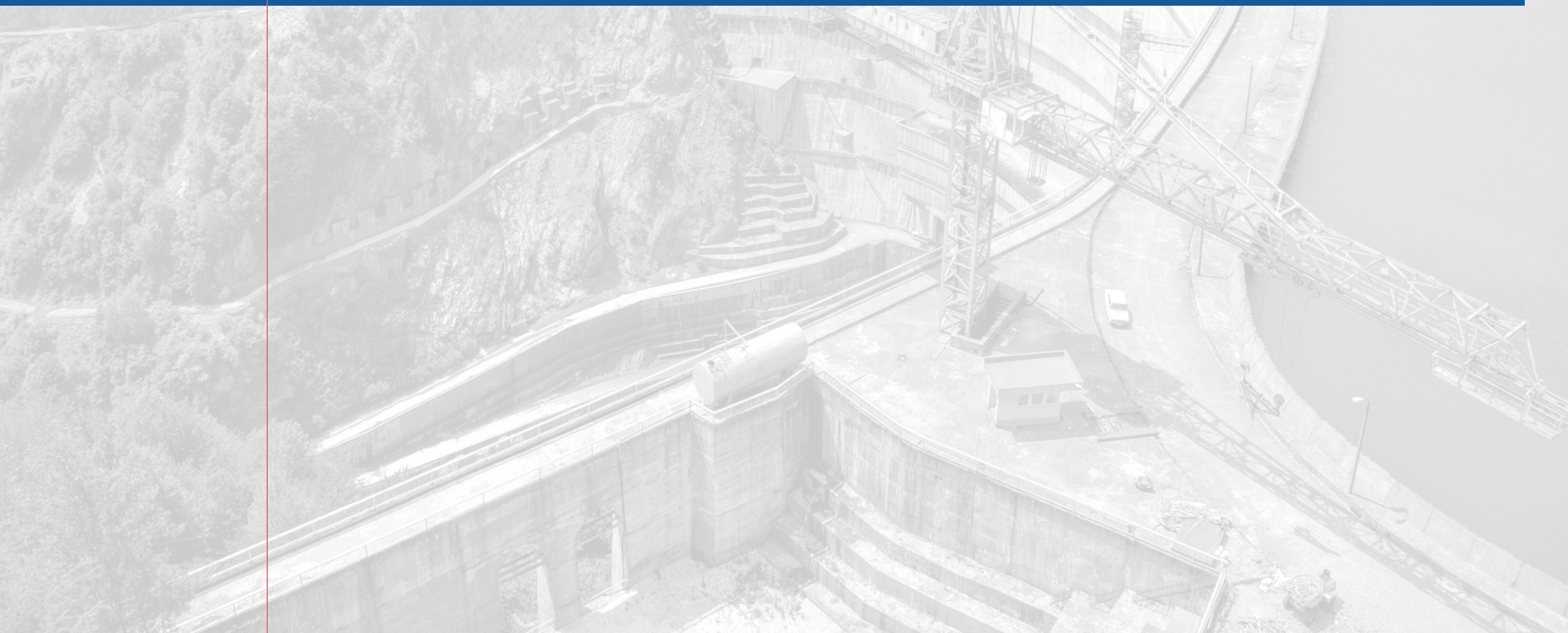


Source: Rhode Island Power Sector Transformation, Phase One Report to Governor Gina M. Raimondo (November 2017)

Recap: Why consider TOU?

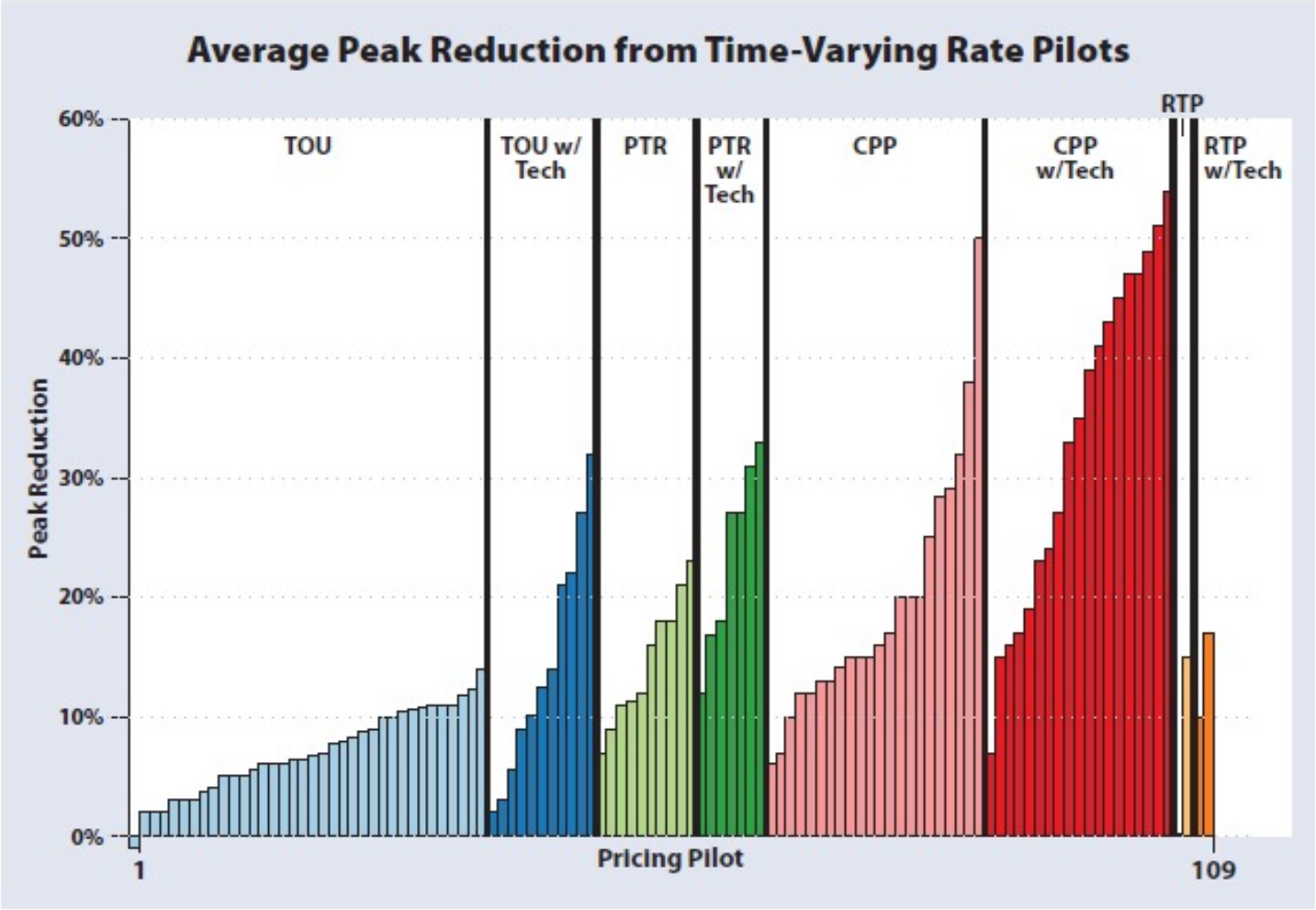
- Managed load away from high-cost hours toward low-cost hours.
- Peak load (and cost) reduction
  - Improved reliability
  - Reduced emissions from power production

3 More rate design considerations



CPP = critical peak price PTR = Peak Time Rebate

TOU Rates



Technology Can Help

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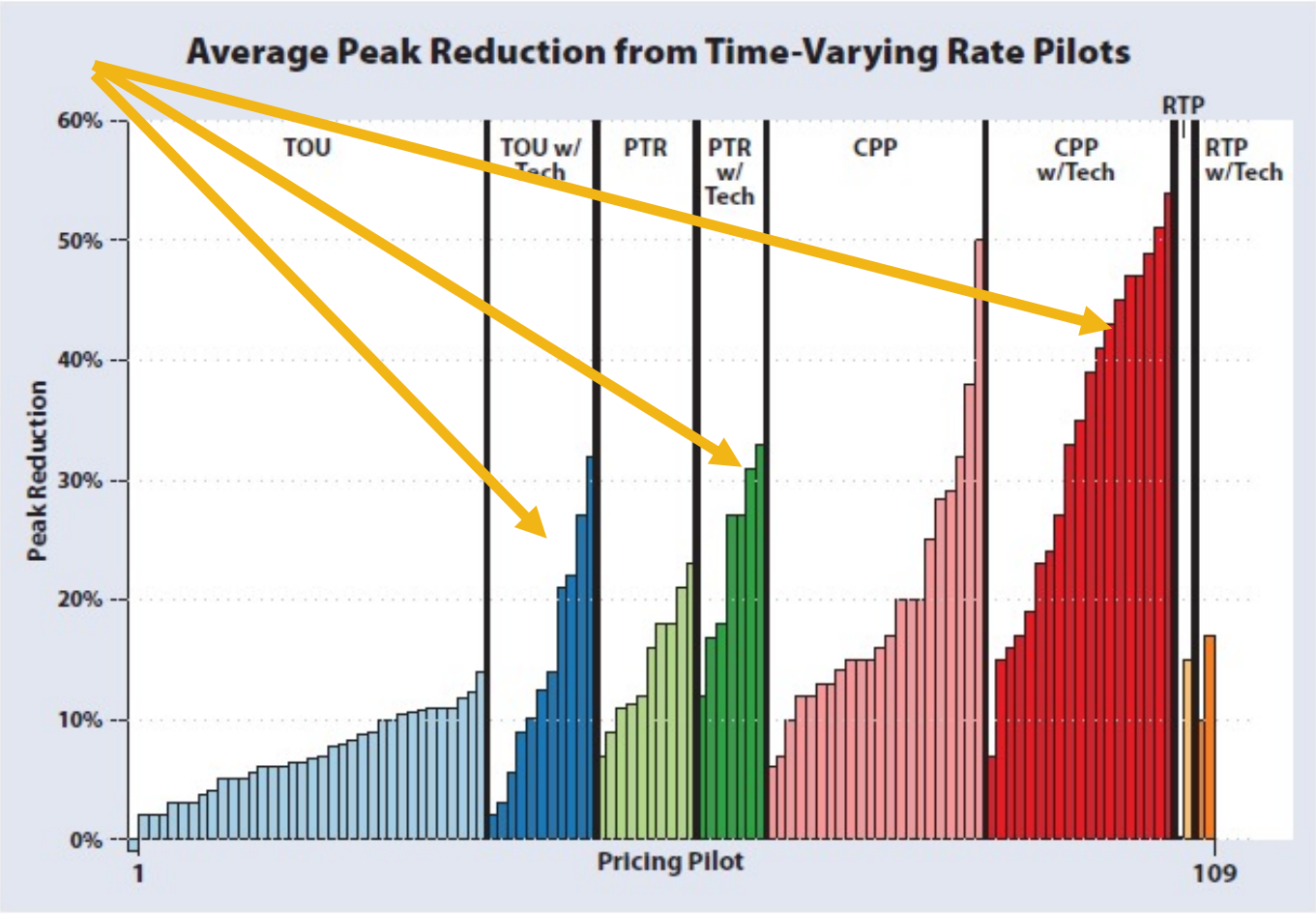

Expected Results

- Beneficial shift of flexible load
  - Depends on ability to avoid high-cost times
- Value proposition:
  - Load management technology
  - Smart charging for EVs
  - Consumer engagement

RAP Resources on Electrification

- Roadmap for Electric Transportation
- Taking First Steps: Insights for States Preparing for Electric Transportation
- Beneficial Electrification: Ensuring Electrification in the Public Interest
- Beneficial Electrification of Transportation
- Getting From Here to There: Regulatory Considerations for Transportation Electrification
- Blog post: *We All Wish We Were More Flexible: Electrification Load as a Grid Flexibility Resource*

RAP Resources on Ratemaking

- Smart Rate Design for a Smart Future
- Demand Charges: What are They Good For?
- Principles of Modern Rate Design
- Smart Non-Residential Rate Design
- Electric Cost Allocation for a New Era: A Manual

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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