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Advanced Rate Design

Smart Electric Power Alliance Grid Evolution Summit

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Different Types of Dynamic Pricing Options

- Time of Use: Set rates that include an off-peak, on-peak and sometimes a shoulder rate; can mean energy charge varies by time of day by period (does not require AMI but AMR)
- Critical Peak Pricing: A TOU price that has a much higher price for a limited number of peak hours. (AMI/AMR)

Different Types of Dynamic Pricing Options

- Variable Peak Pricing: A hybrid of time-of-use and real-time pricing where the different periods for pricing are defined in advance. (Requires AMI/AMR)
- Peak Time Rebates: Where customers are compensated on an incident by incident basis for reducing their load – voluntary program, no penalty for not participating (AMI/AMR)

Different Types of Dynamic Pricing Options

- Real Time Pricing: Rates that may vary as frequently as hourly based on a price signal that is provided to the user on an advanced or forward basis, reflecting the utility's cost of generating and/or purchasing electricity at the wholesale level. When used, usually applies to large customers. Requires Advanced Metering Infrastructure (AMI/AMR)

Key Demand Charge Terms

- Non-Coincident Peak (NCP) Demand Charge: Monthly fee based on highest hour during the billing period.
- Coincident Peak (CP) Demand Charge: Monthly fee based on highest usage during the on-peak hours, e.g. 3 – 6 PM.

Demand Charges May Shift Costs to Occasional Users

- With $10/kW Demand Charge:
  - Use 5 kW for **1 hour** in month: $50
  - Use 5 kW for **720 hours** in month: $50

A NCP Demand Charge in Commercial Rate Can Make Workplace Charging Expensive

Eversource, New Hampshire	
NCP Demand Charge ($/kW)	$13.75
Energy ($/kWh)	$0.12

6.6 kW charger, 200 kWh/month:

$90 Demand + $24 energy = $114 = $0.57/kWh

$5.70/gallon equivalent

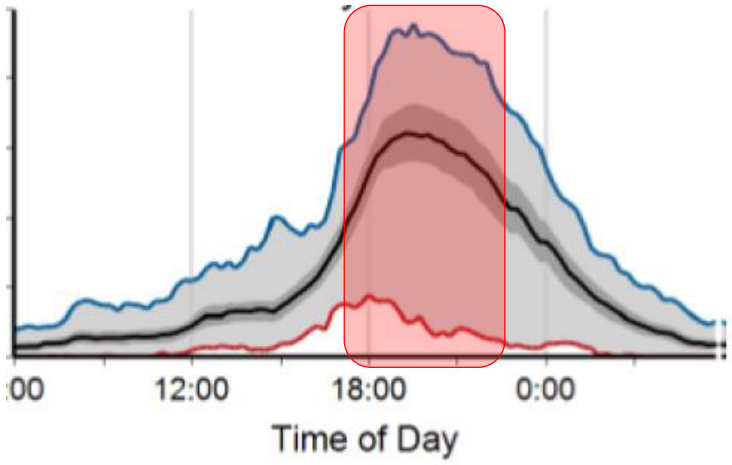
A CP Demand Charge Spreads Impact Charge

Sacramento

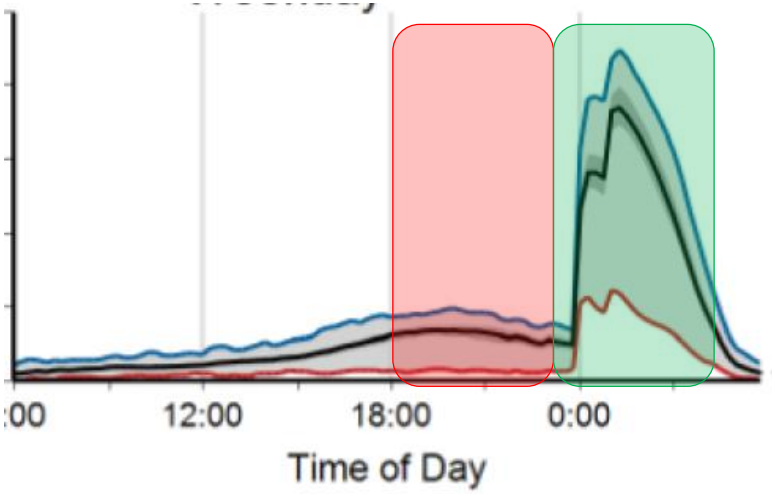
NCP Demand Charge ($/kW)	$2.82
CP Demand (2-8pm) ($/kW)	$6.91
Energy Charges ($/kWh)	
Off-Peak	$0.10
Mid-Peak	$0.13
On-Peak (2-8pm)	$0.19

$18.61 Demand + $23 energy = $42 = $0.21/kWh
$2.10/gallon equivalent

Price Can Influence When EVs Are Charged



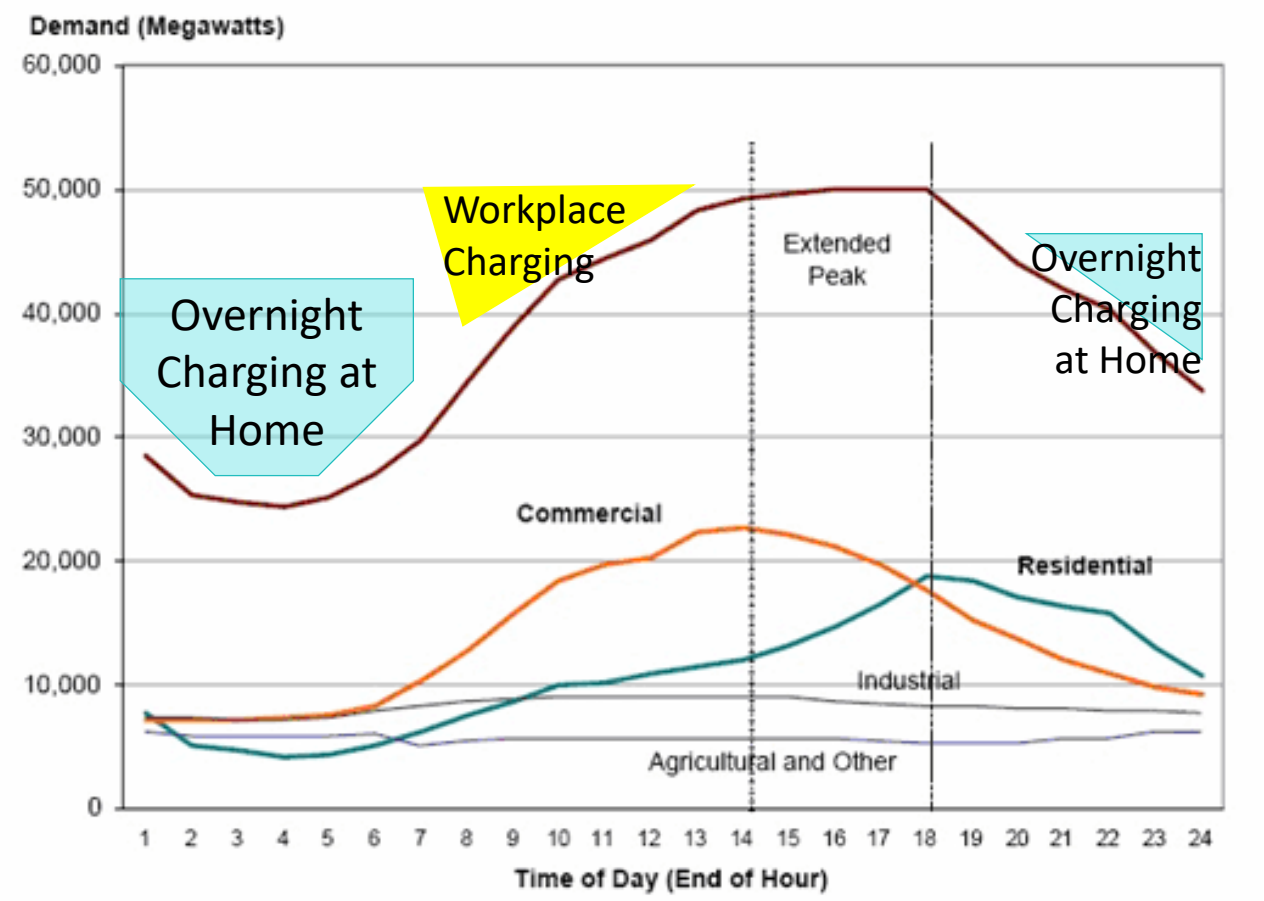
Dallas/Ft Worth
(standard rates)



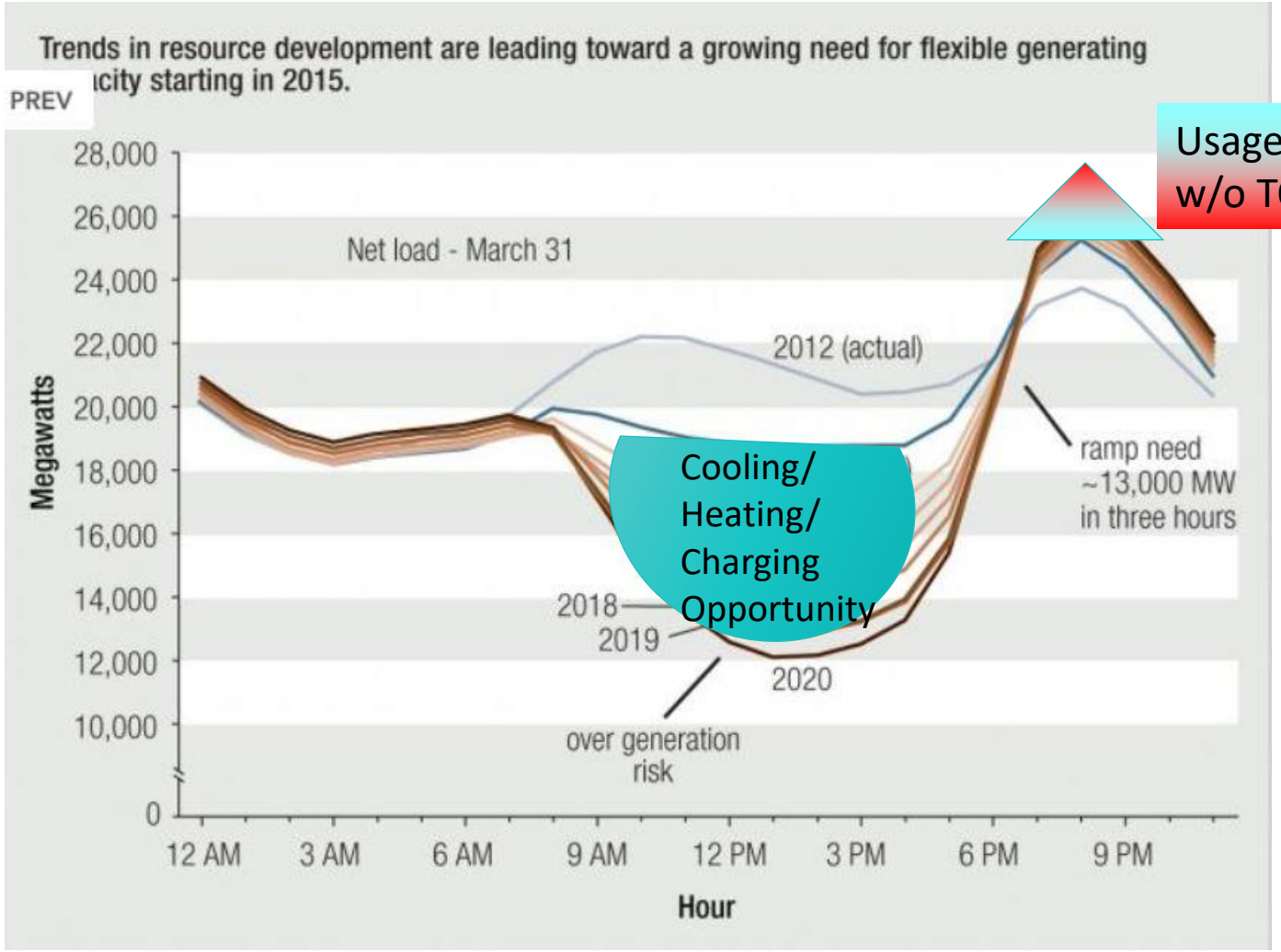
San Diego
(time-of-use rates)

Copied from: M.J. Bradley, 2017

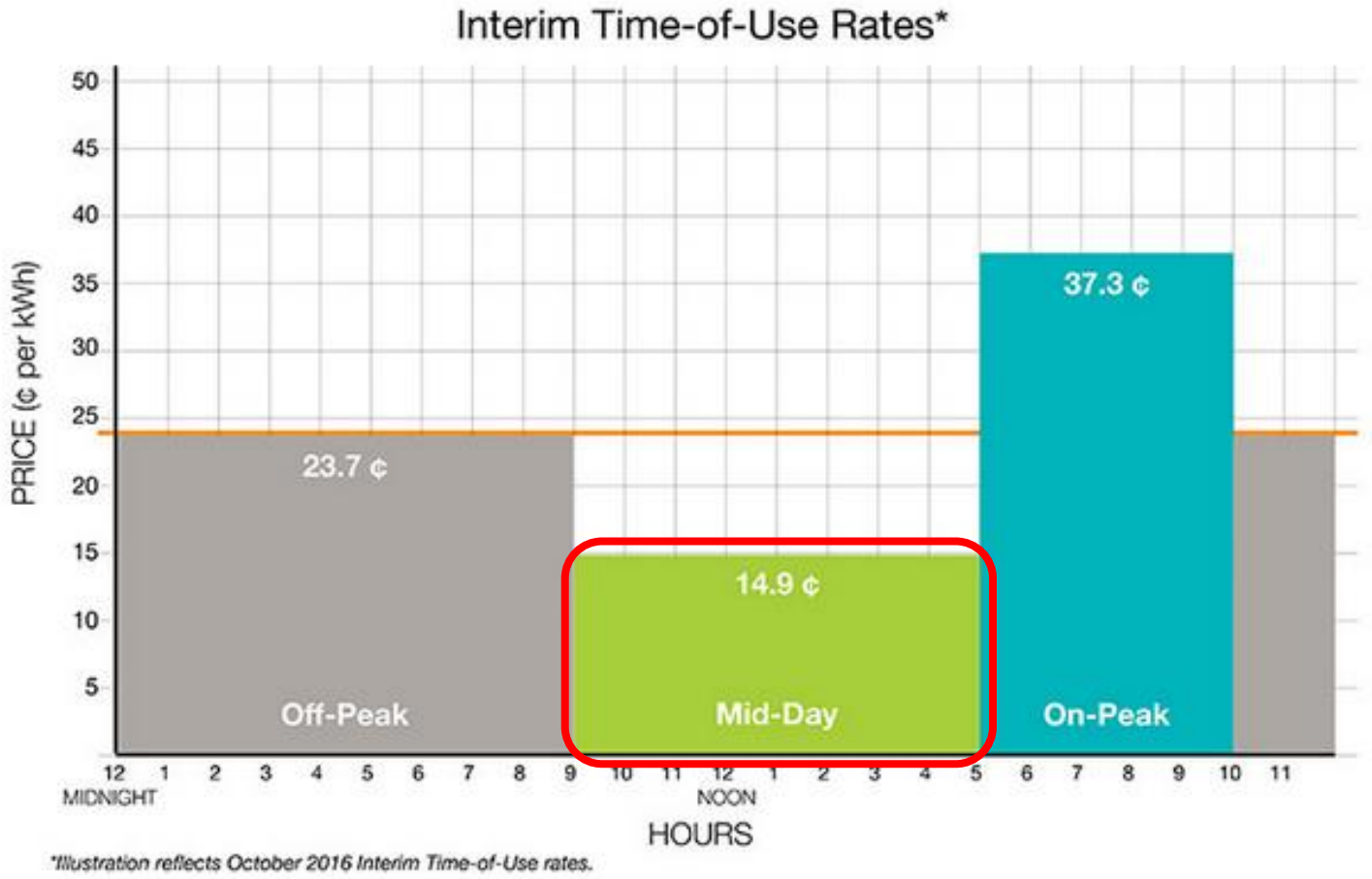
Typical System Load Profile (without solar)



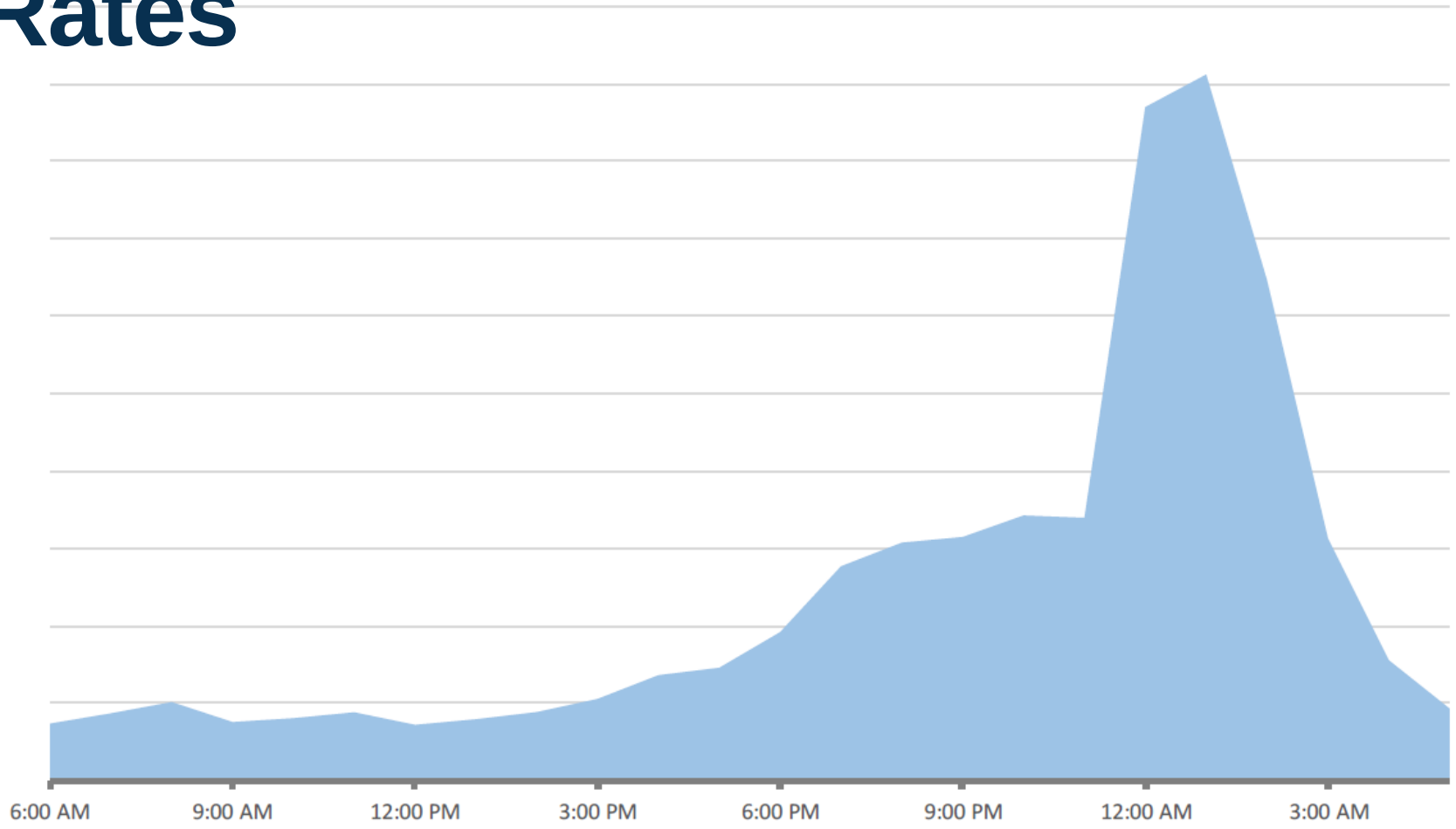
Charging with a Duck Curve



Hawaii Residential TOU Rate Optional

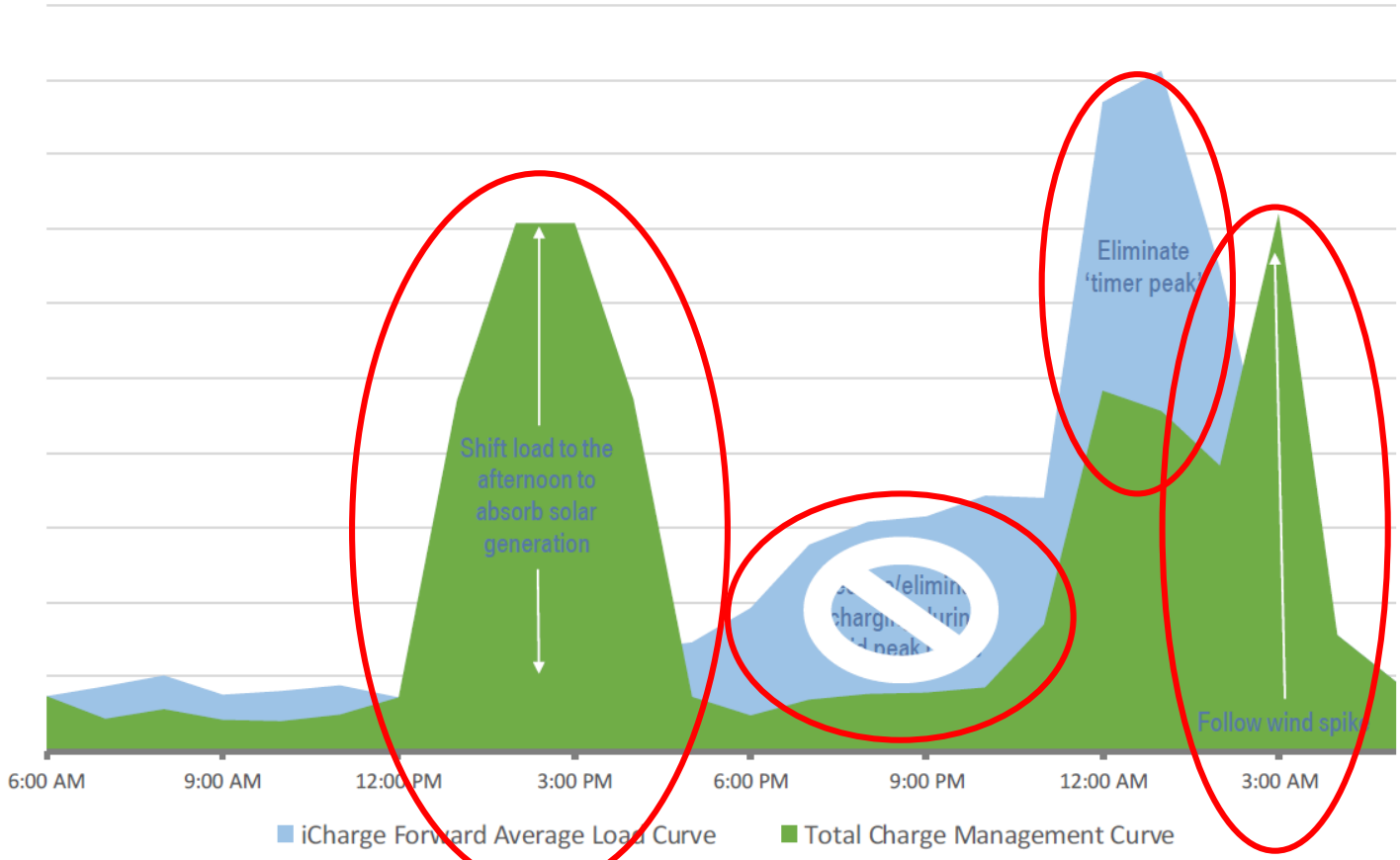


BMW Charge-Forward With TOU Rates



BMW Smart Charging With 40% Under Control

(EXAMPLE ASSUMES 40% CONTROL)



1 Advanced Rate Design SEPA Policy Summit

Appendix: Rate Design Examples

Sample Time of Use with Critical Peak

Rate Element	Based On the Cost Of	Illustrative Amount
Customer Charge	Customer-Specific Costs Only	$7.00/month
Off-Peak Energy	Baseload Resources + transmission and distribution	$.08/kWh
Mid-Peak Energy	Baseload + Intermediate Resources + T&D	$.11/kWh
On-Peak Energy	Baseload, Intermediate, and Peaking Resources + T&D	$.15/kWh
Critical Peak Energy (or PTR)	Demand Response Resources	$.75/kWh

Time of Use (TOU) Rate

Georgia Power (Georgia)	
Customer Charge ($/month)	$10.00
On-Peak ($/kWh) 2–7 PM, Mon-Fri, June–Sept.	$0.2032
Off-Peak ($/kWh)	$0.0464

Plus $0.04 fuel and other tariff riders.

TOU / Seasonal Rate

Tucson Electric (Arizona)		
Customer Charge ($/month)		$11.50
	Summer	Winter
On-Peak ($/kWh)	$0.1175	$0.0897
Off-Peak ($/kWh)	$0.0785	$0.0689

City of Tallahassee (Florida)

	Standard	Optional TOU
Customer Charge	$7.34	$7.34
Energy Charge		
On-Peak	$0.1072	$0.2156
Off-Peak	$0.1072	$0.2156

Key Features:

Moderate Customer Charge

Moderate TOU Rate

Excel Energy (CO)

Customer Charge ($/month)	$7.63
Energy Charge ($/kWh)	
Winter	$0.099
Summer	
First 500 kWh	$0.099
Over 500 kWh	$0.149

Moderate customer charge

Seasonal inclining block rate with summer rate reflecting cost of new, clean energy resources

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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