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Tapping the Mother Lode:

The principal value of flexible loads, and how to align incentives to access it

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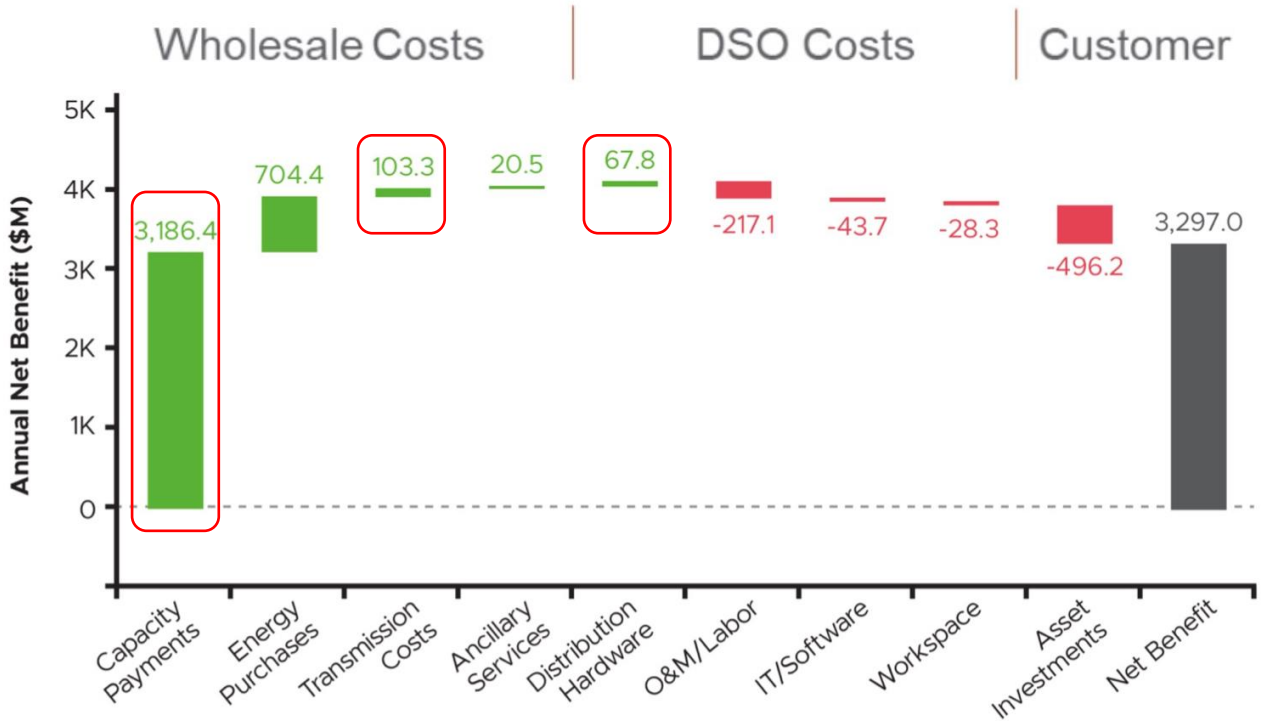
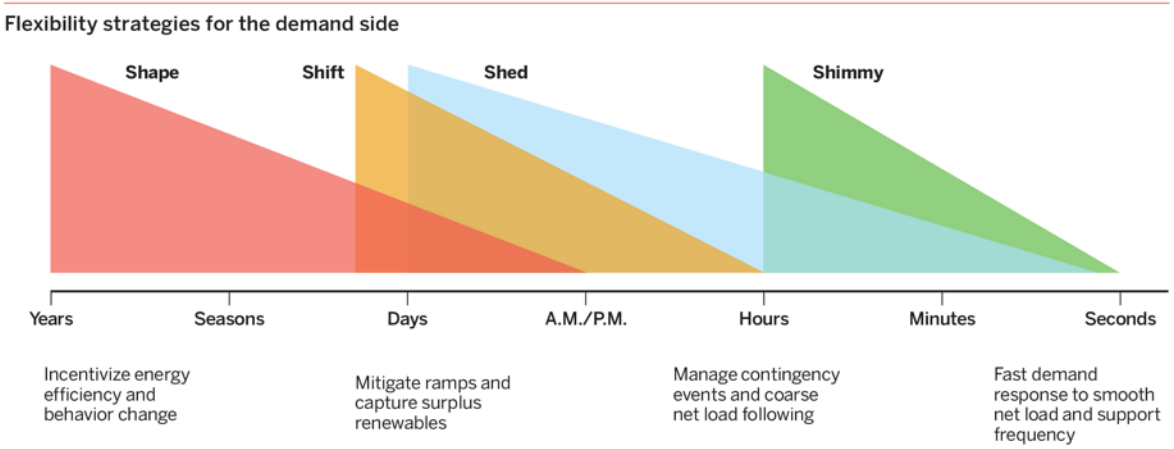
Benefit potential lies overwhelmingly in avoided infrastructure investment



Source: Reeve, H. et al. (PNNL, Jan 2022), *DSO+Transactive Study: Main Report* (Volume 1), pg 56

Most potential beyond the reach of wholesale supply-side markets

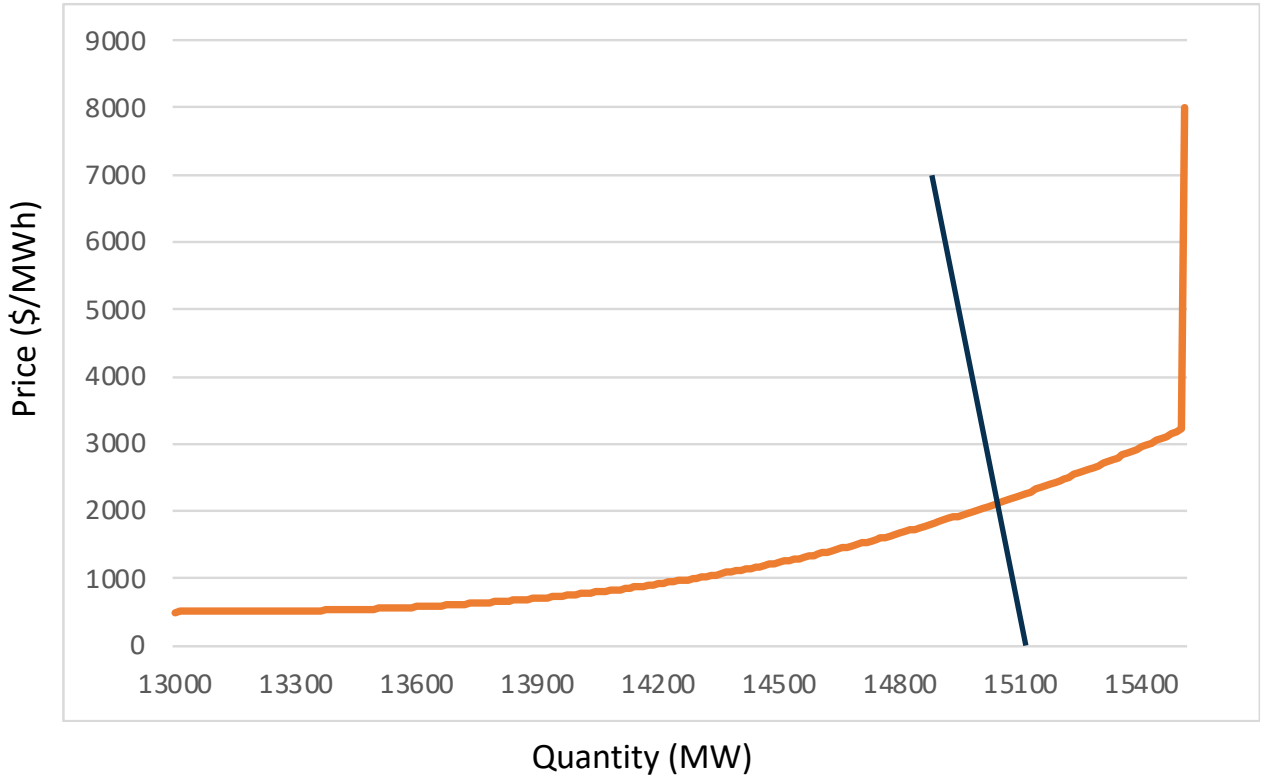


Source: Alstone, P., et al. (2017). *2025 California Demand Response Potential Study — Charting California's Demand Response Future: Final Report on Phase 2 Results*

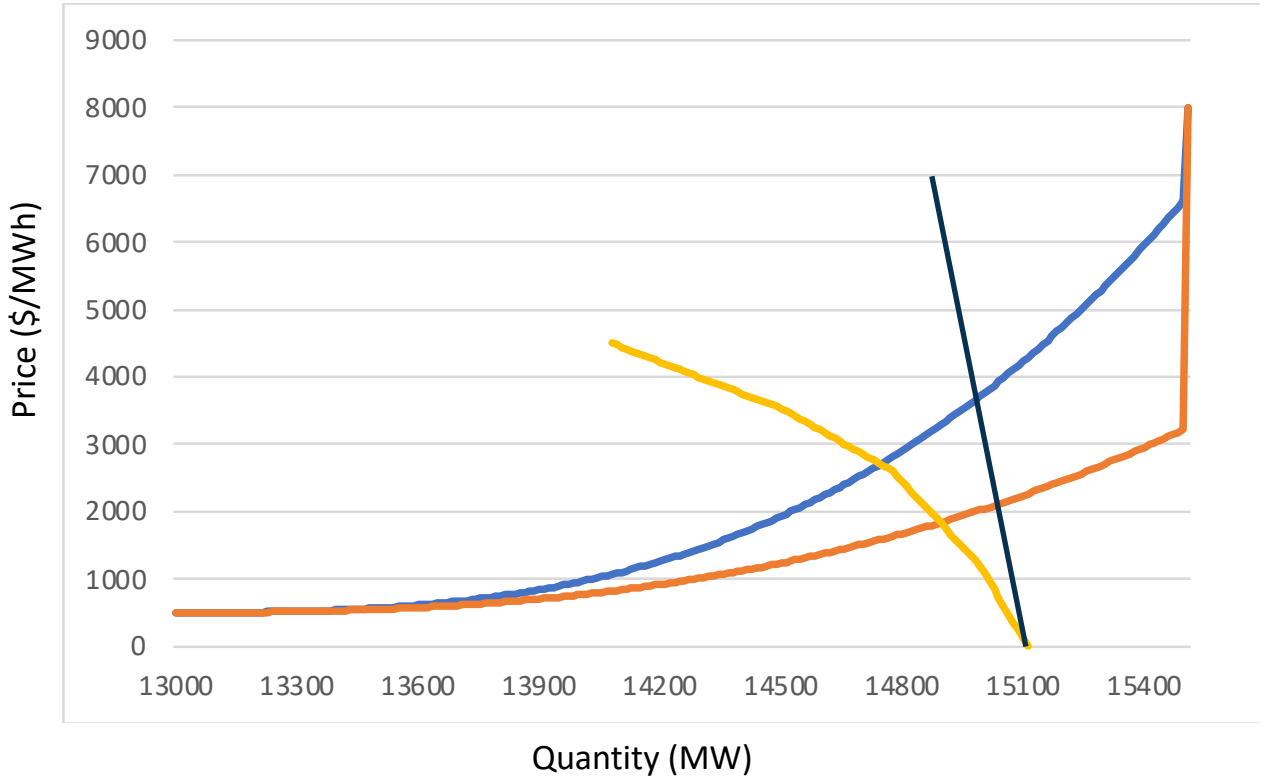
	DR Service Product
Shed	Peak Capacity
	Economic DR
	Contingency Reserve Capacity
	Contingency Reserve Capacity
	Emergency DR
	DR for Distribution System
Shift	Economic DR
	Flexible Ramping Capacity
Shimmy	Load Following
	Regulating Reserve Capacity
Shape	Load modifying DR - Event-based
	Load Modifying DR - Load shaping

= Demand-curve DSF

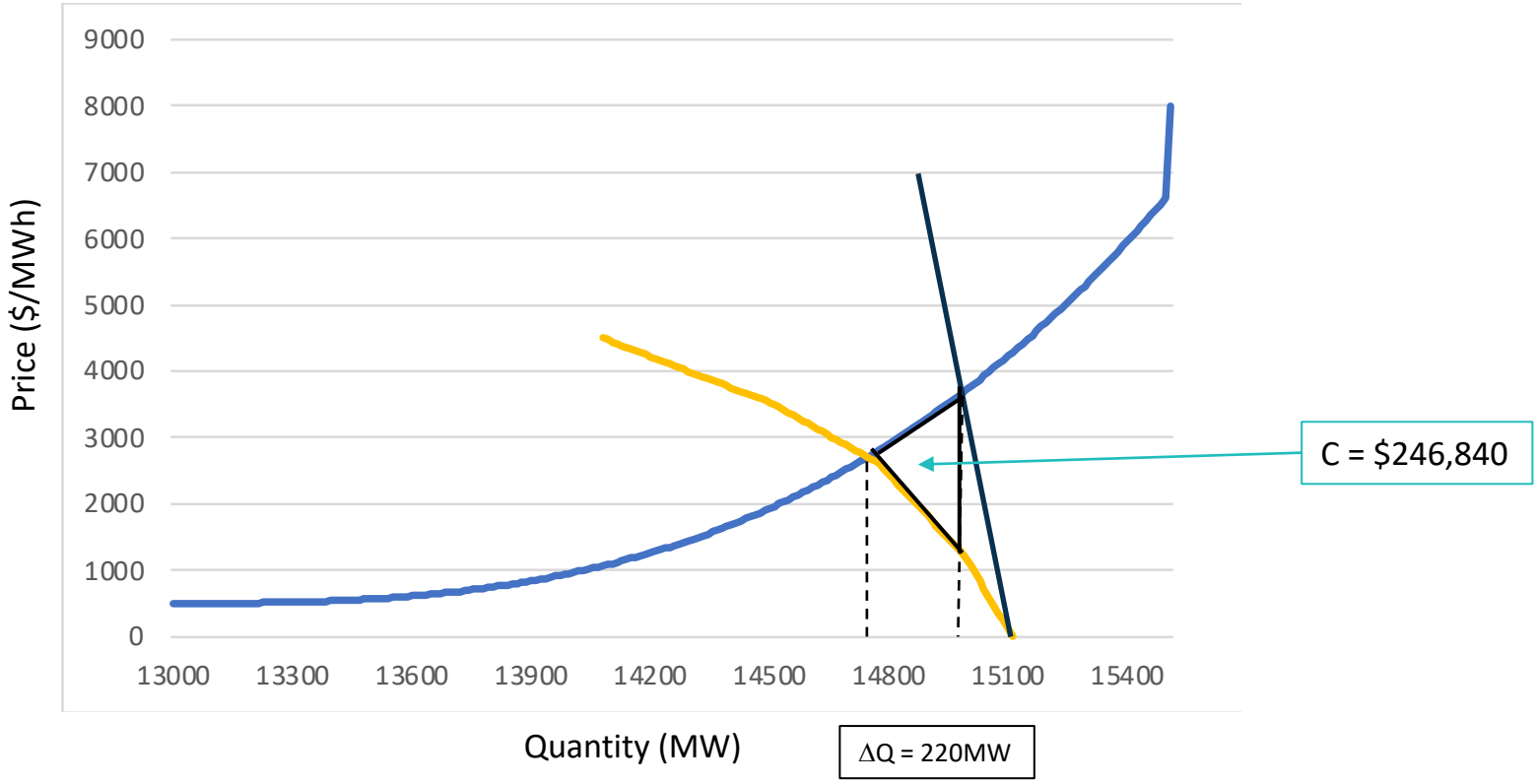
SOP: Very inelastic demand (-0.1), typical supply curve



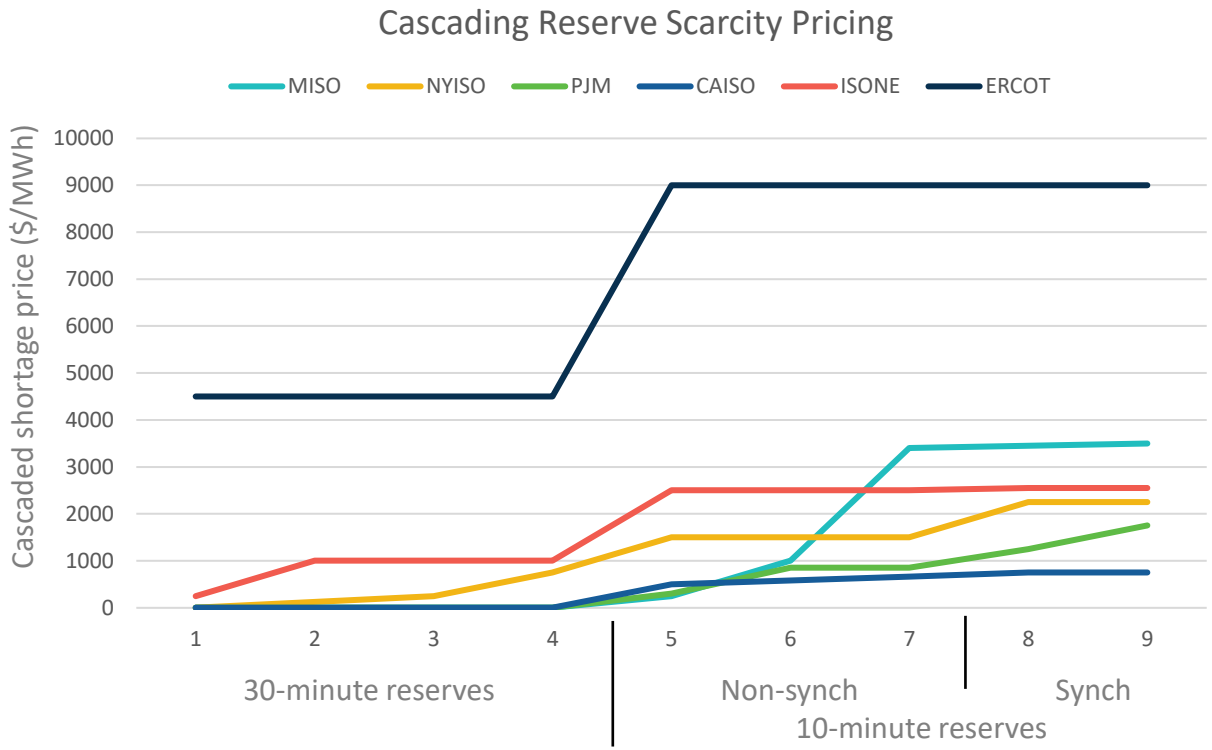
Corrected: More elastic demand, more robust marginal cost supply curve



Welfare gain: From SOP to Best Practice

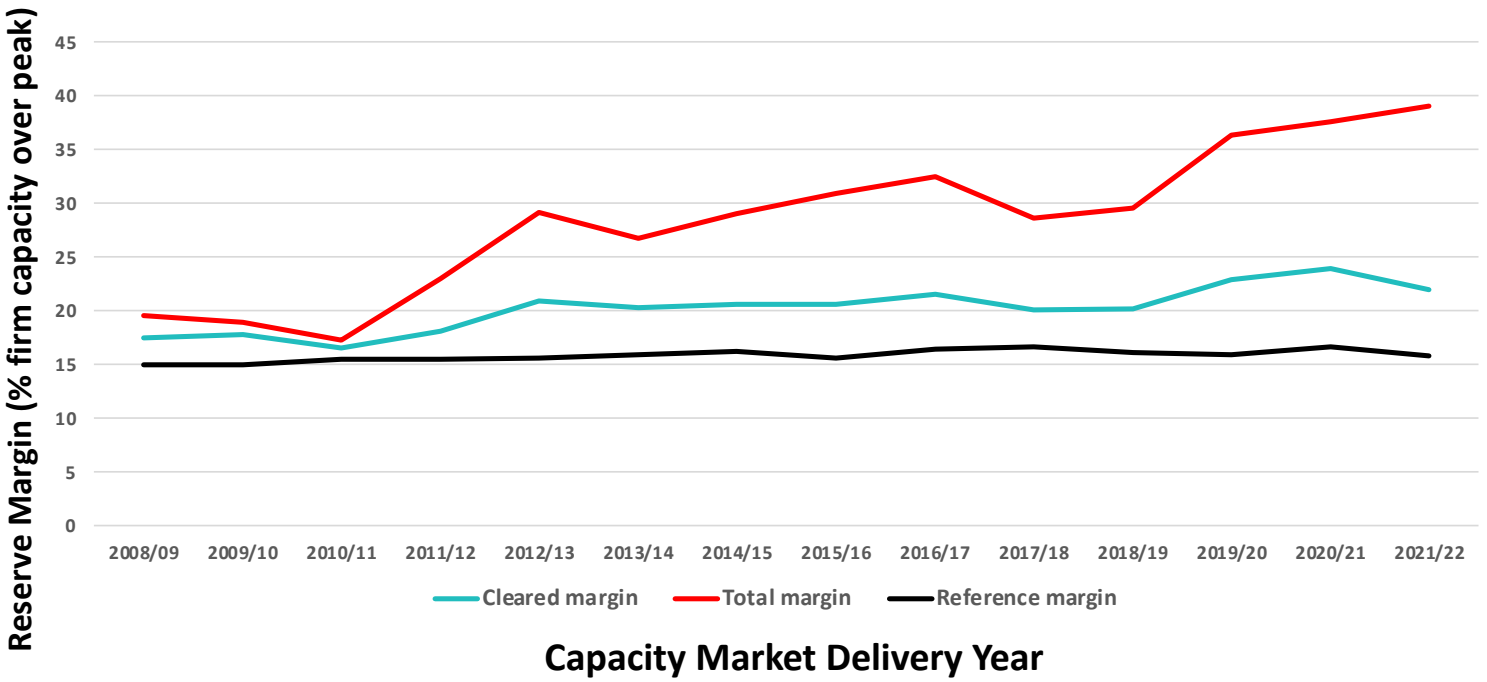


Price discrimination: ISO reserve shortage pricing (vs. capacity valuation in CMs)



Source: PJM staff/stakeholder training presentation, 2018 (rejected PJM ORDC adapted from PJM sources)

Market pre-emption: Long history of capacity over-procurement



Source: Data from annual PJM RPM auction reports

What to do?

Retail-level:

- Create “safe” options for early RTP adoption (see CPUC staff CalFUSE load profile pre-purchase as a good example)
- Dynamic, volumetric capacity shortage (congestion) distribution prices for flexible loads to organize grid-edge responses to nodal market signals
- Dynamic transmission charges for flexible consumers, enabling bill savings for avoiding periods of system stress
- Open access to distribution-level load management by 3rd-party OEMs and service providers to maximize price-driven innovation

What to do? (continued)

Wholesale-level:

- Enhance scarcity pricing to price RT demand for reserves on same basis as demand for capacity is priced in CRMs
- Limit out-of-energy-market support for supply-side solutions (i.e., generation) in capacity markets to 1-year rolling commitments

Whole system (from the meter to the busbar):

- Progressively assess and incorporate demand elasticity into capacity planning, procurement and load forecasting at bulk and distribution system levels

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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