



RAP®

Energy solutions
for a changing world

Hitting the mark on missing money: How to ensure reliability at least cost to consumers

Webinar
25 October 2016

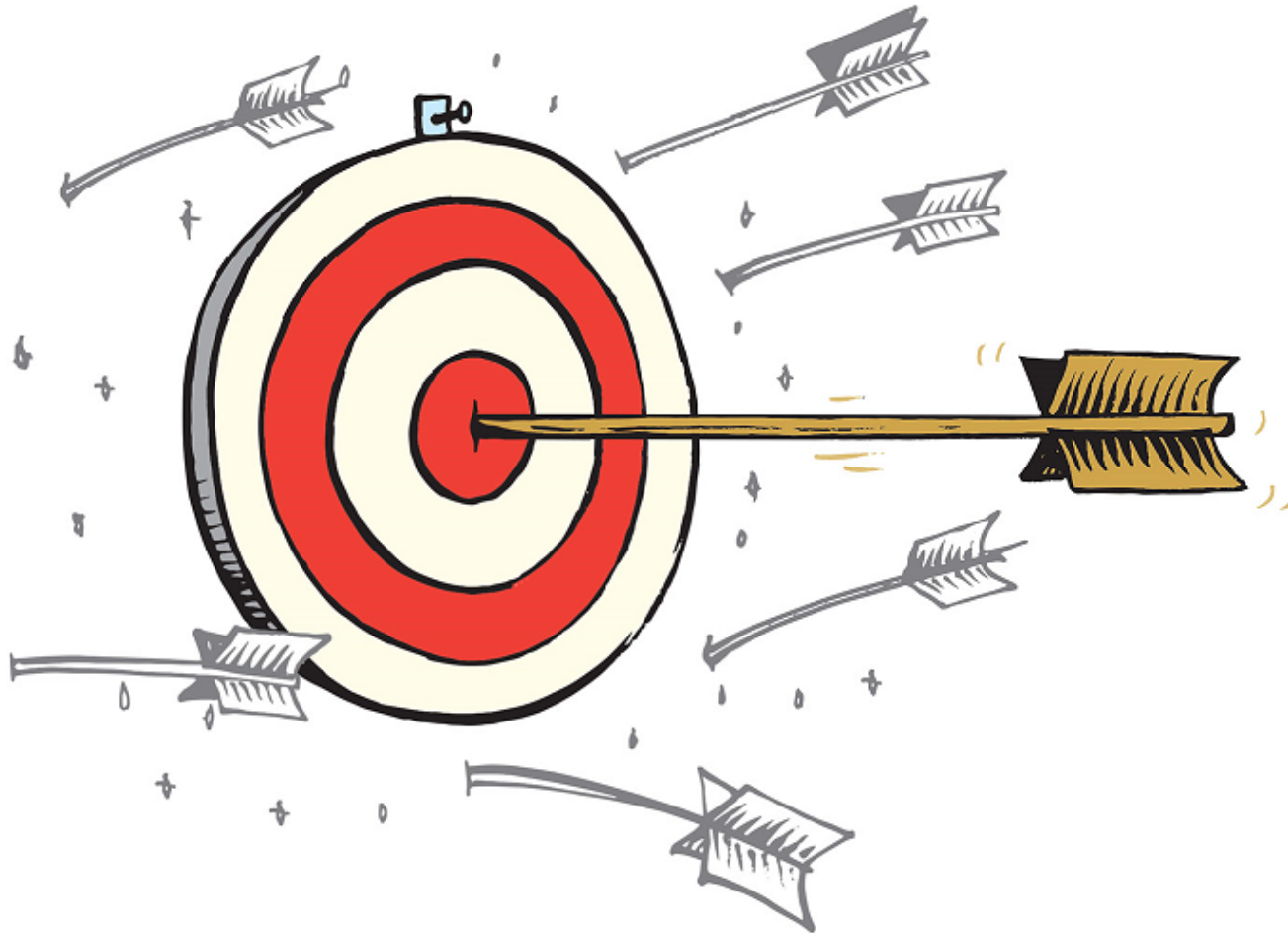
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Michael Hogan, author of

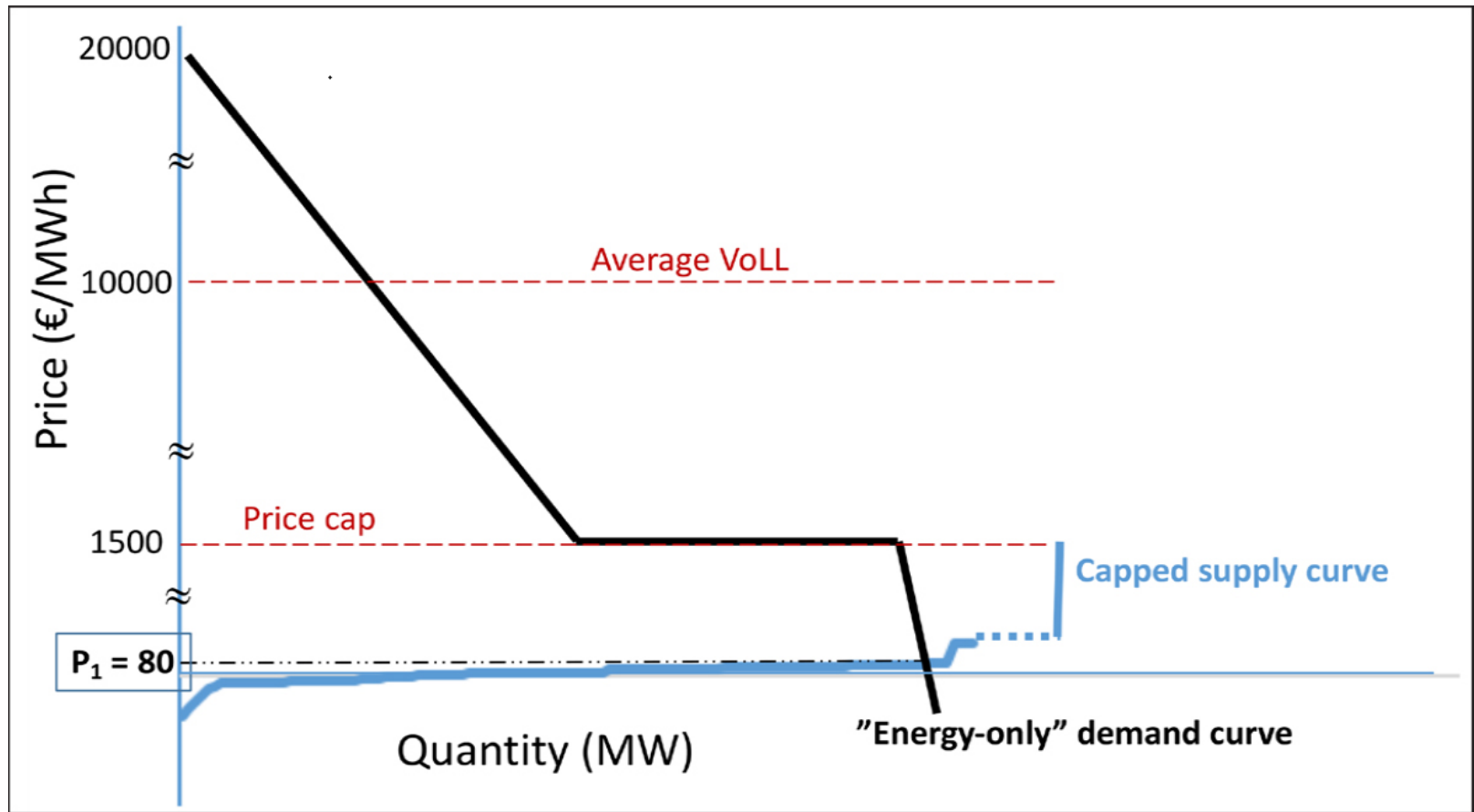
*Hitting the Mark on
Missing Money: How to
Ensure Reliability at
Least Cost to Consumers*





- Lots of ways to ensure resource adequacy...
- ...but how to do so at least cost to consumers?
- Especially in the low-carbon power system?

Legacy: Typical view of “marginal cost pricing”

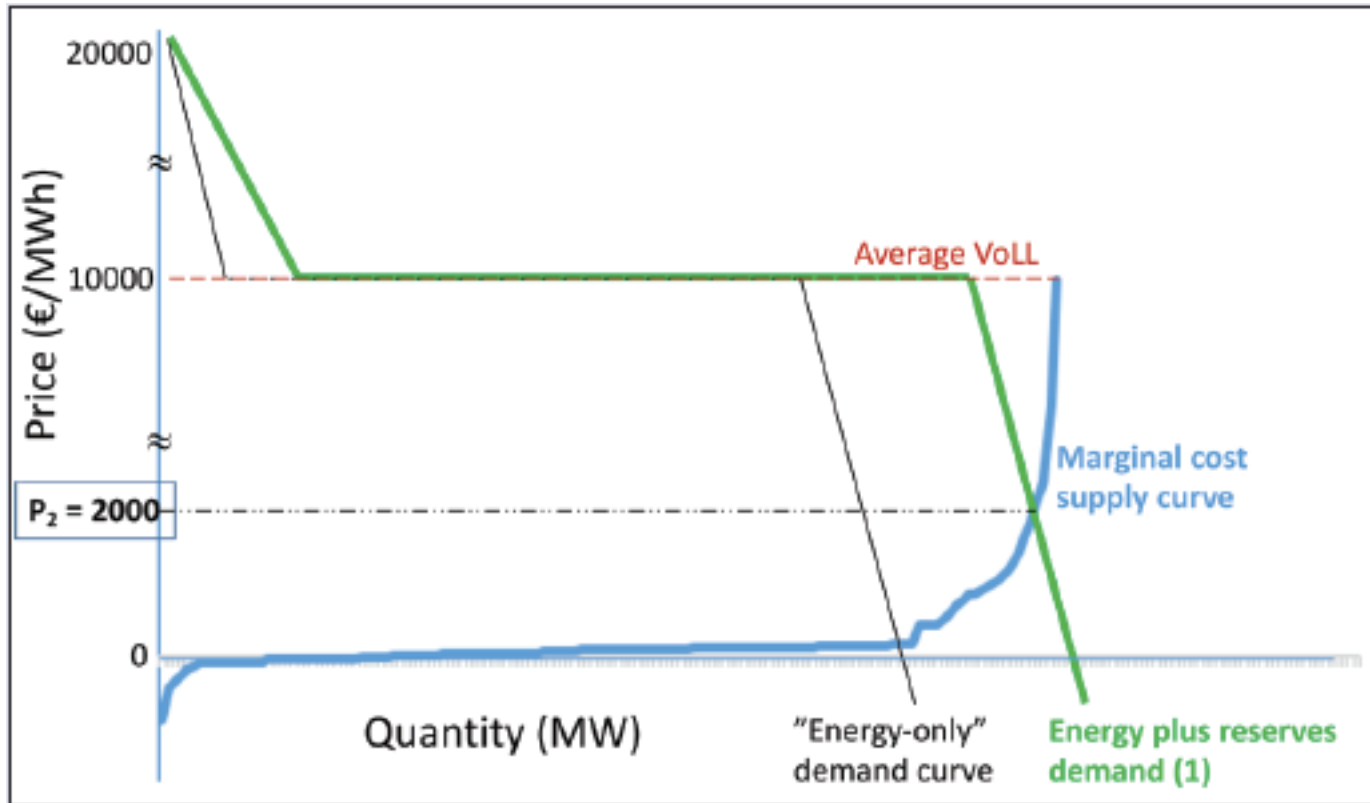


- Demand for reliability (reserves) ignored
- Marginal balancing costs socialized
- Prices capped below stated value to consumers of continuous service

Representative rank order of *actual* marginal costs

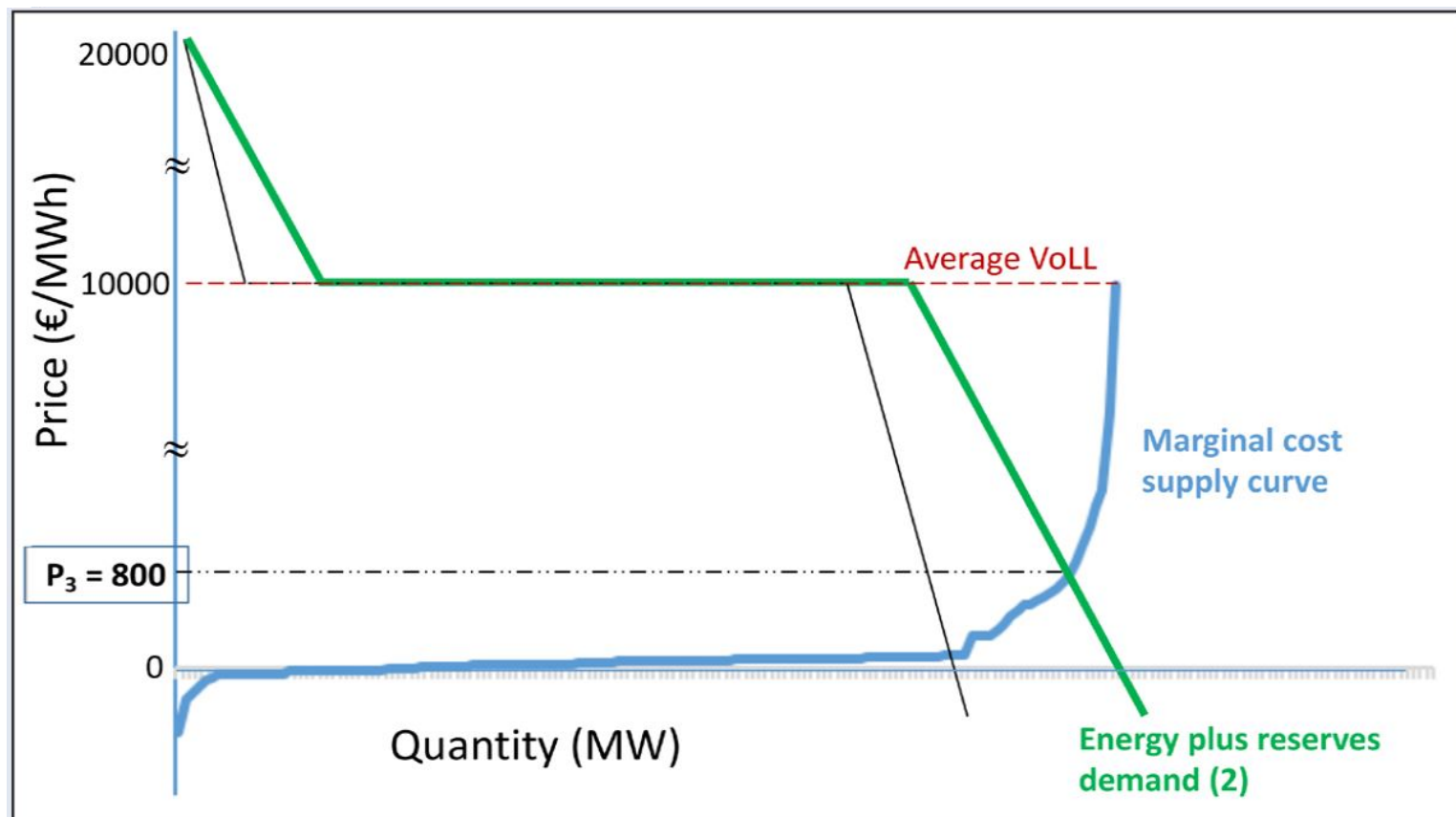
System Resource	Full Marginal Cost (€/MWh)
Generation capacity	20-250
Imports	20-1,000
Secondary (operating) reserves	250-5,000
Emergency generation	500
Primary (regulation) reserves	500-9,000
30-minute responsive back-up	1,400
30-minute controllable demand response	2,400
10-minute controllable demand response	2,600
10-minute responsive back-up	3,700
Emergency load-shedding	9,000

Marginal cost pricing using marginal costs



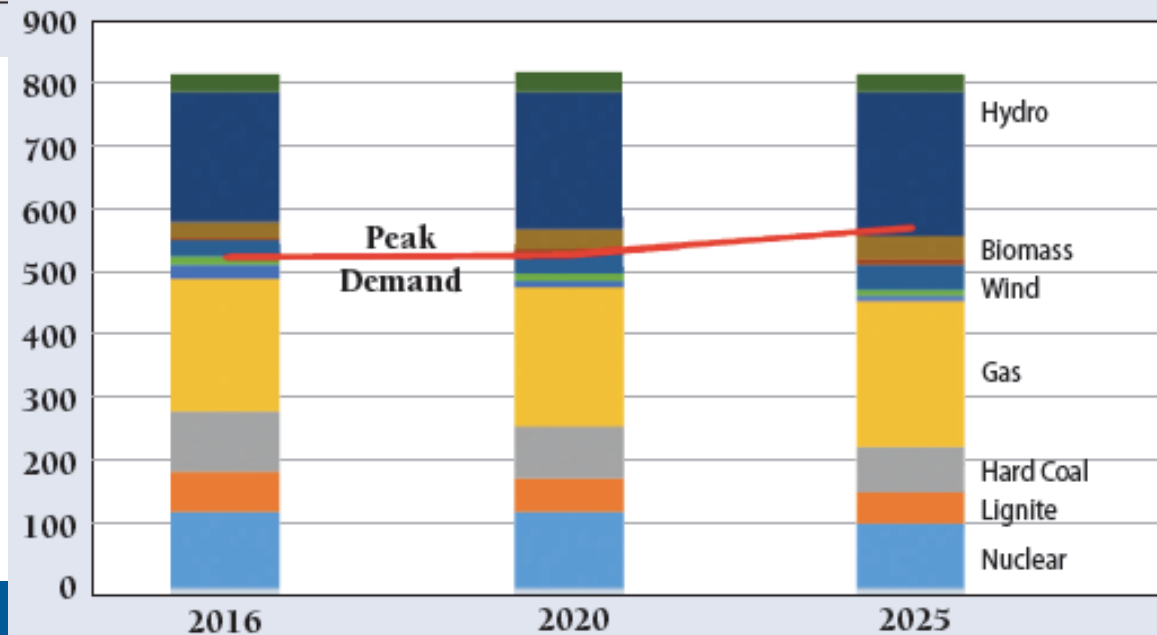
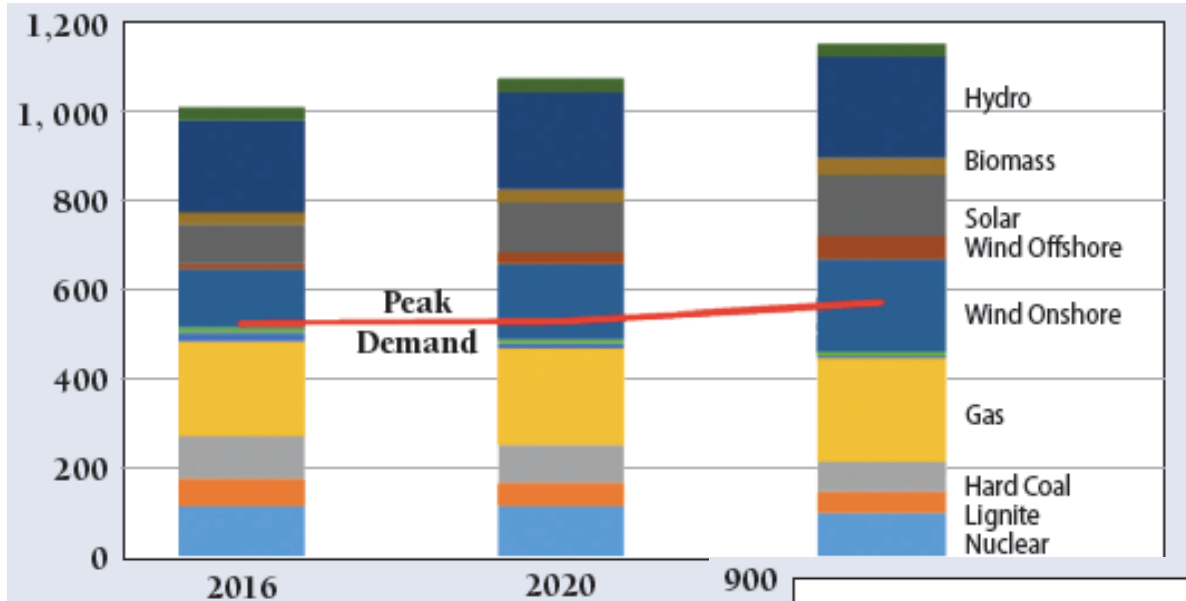
- Price caps relaxed
- Prices clear at actual marginal cost & total demand (energy & reserves)

Empowering flexible demand at lower cost

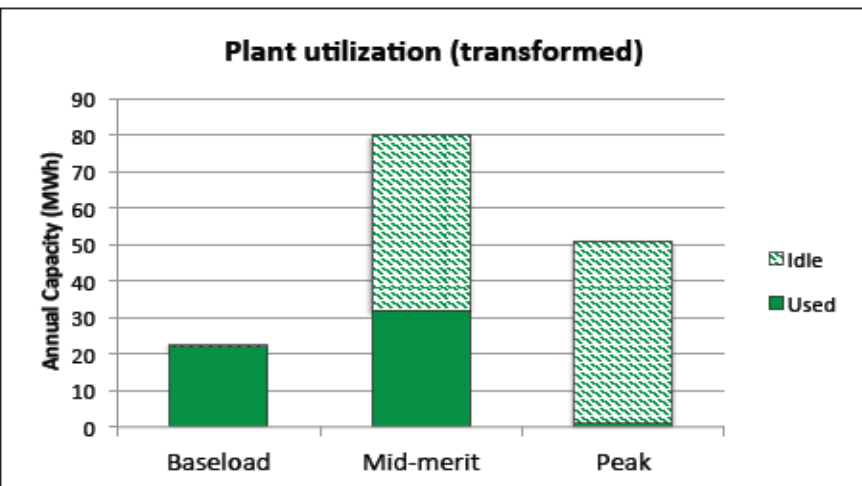
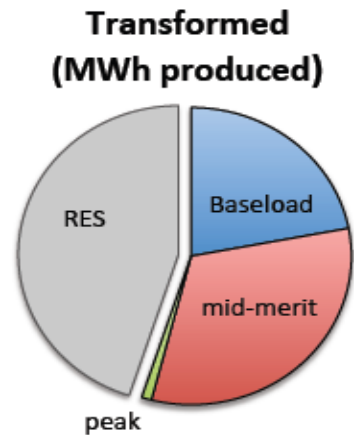
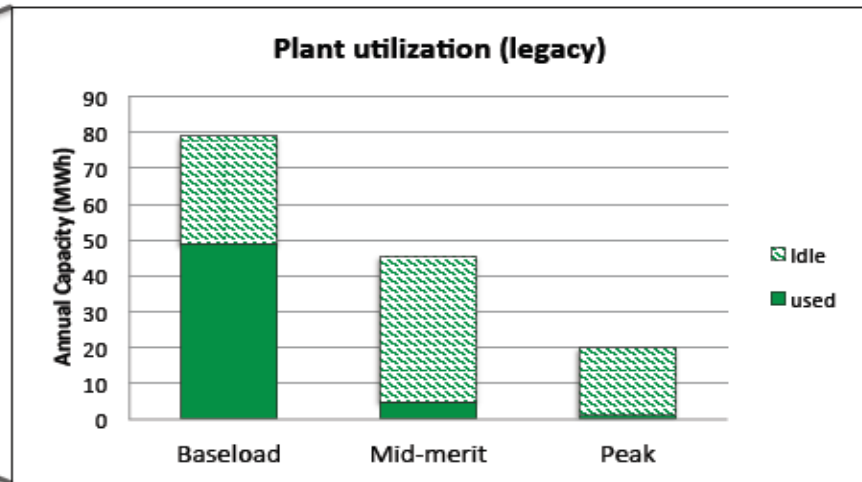
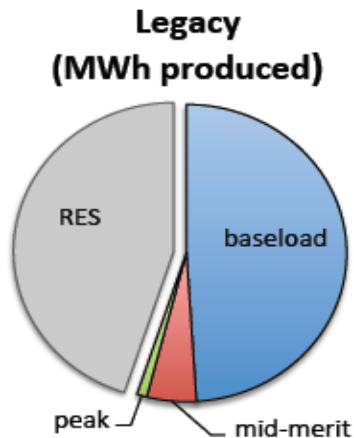


- Price caps relaxed
- Prices reflect actual marginal cost, total demand (energy & reserves)
- ...making visible the value of and opportunity for responsive demand

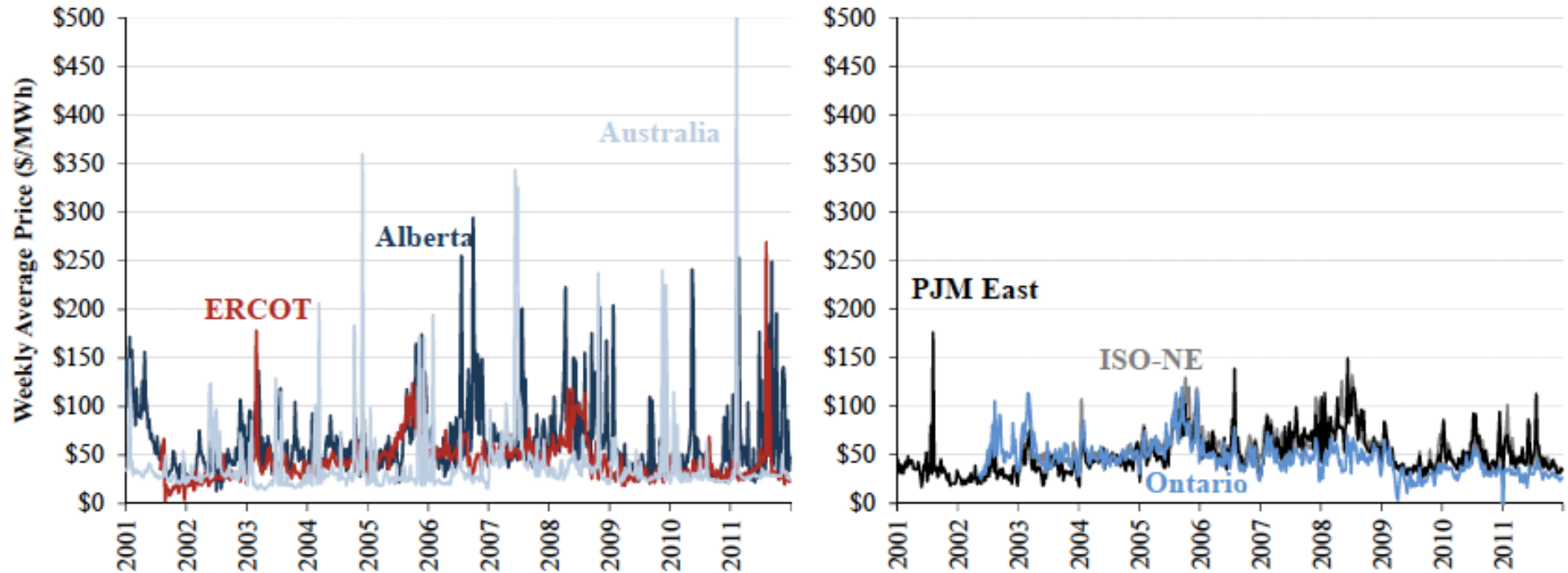
Low prices not the same as missing money



“How much?” depends on “what kind?”

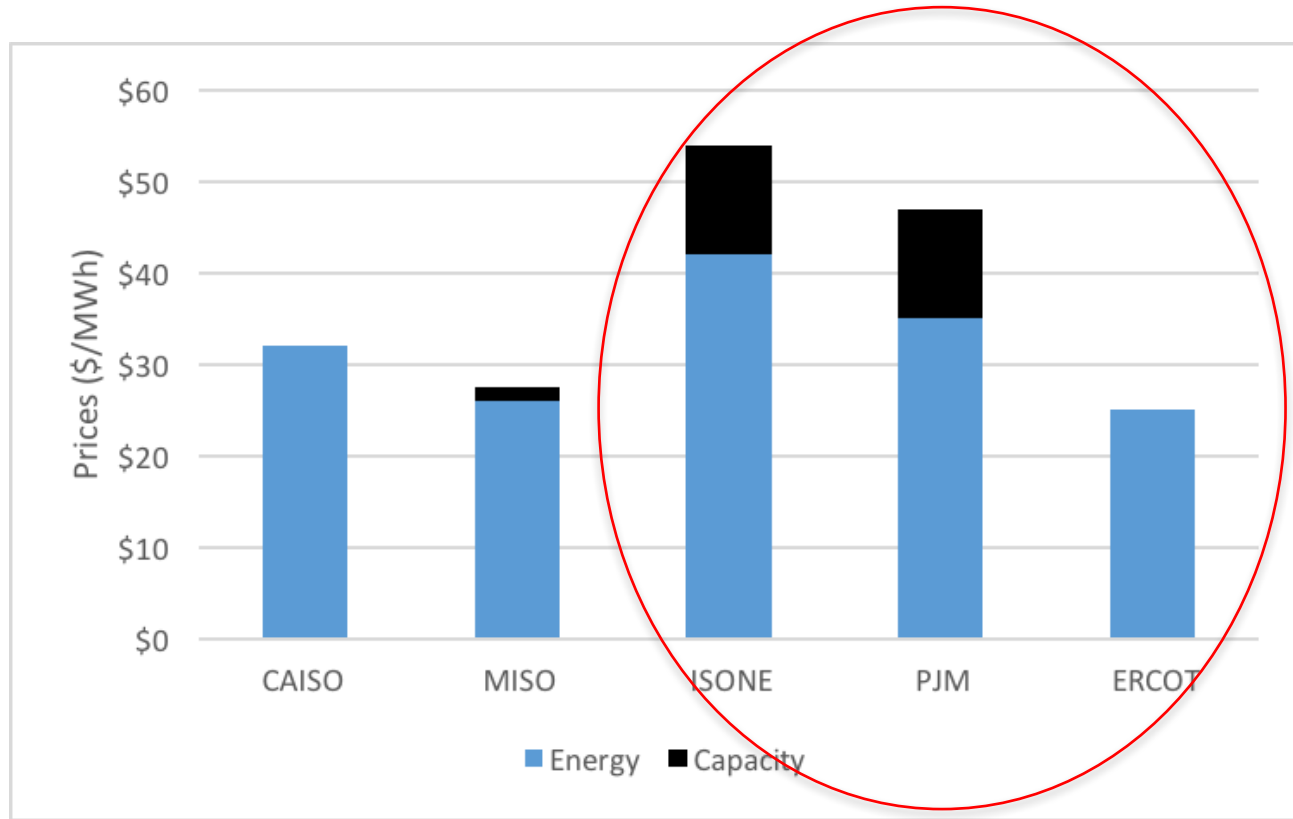


What the value (and benefits) of flexibility look like



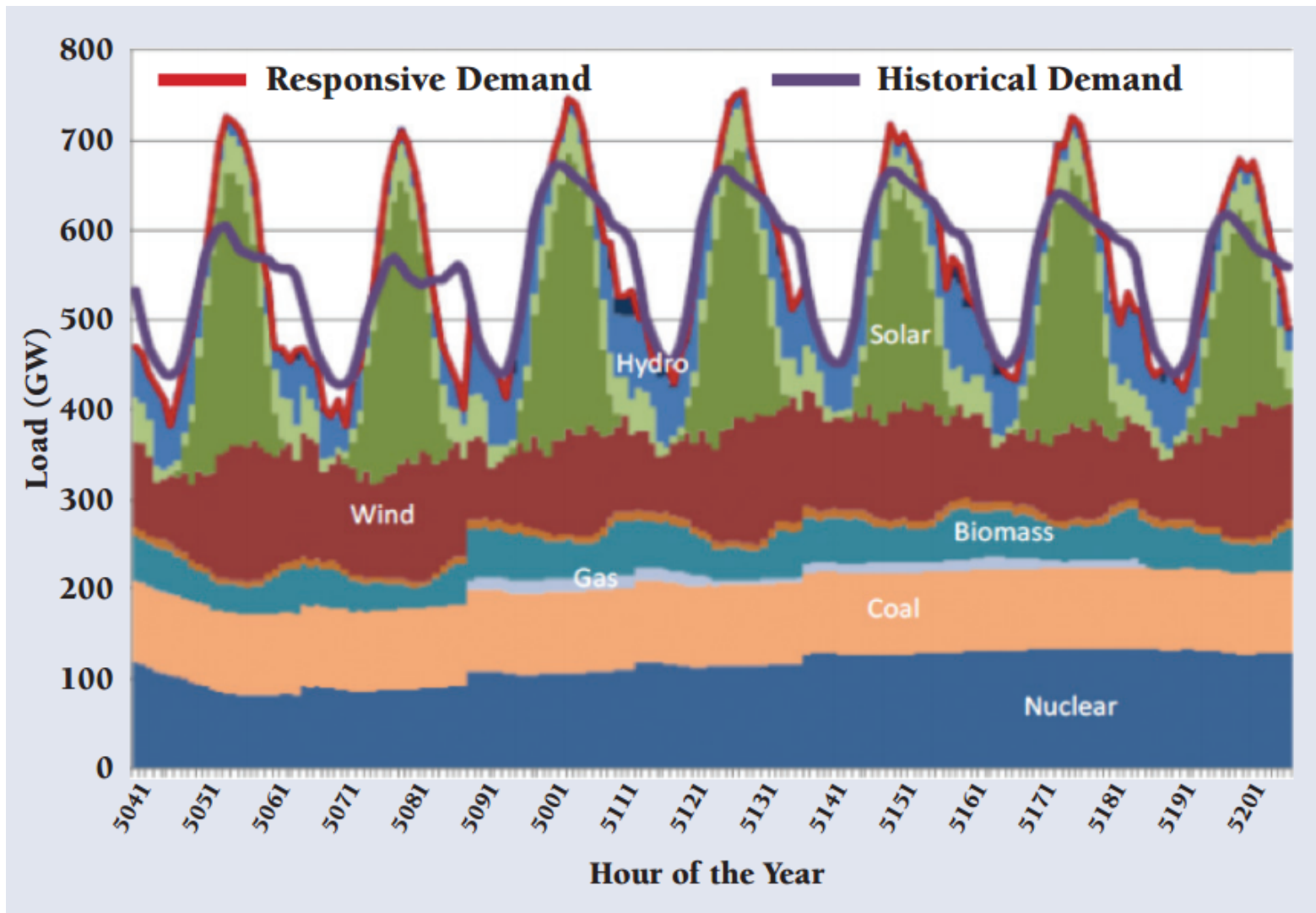
Weekly average wholesale energy prices

What the value (and benefits) of flexibility look like

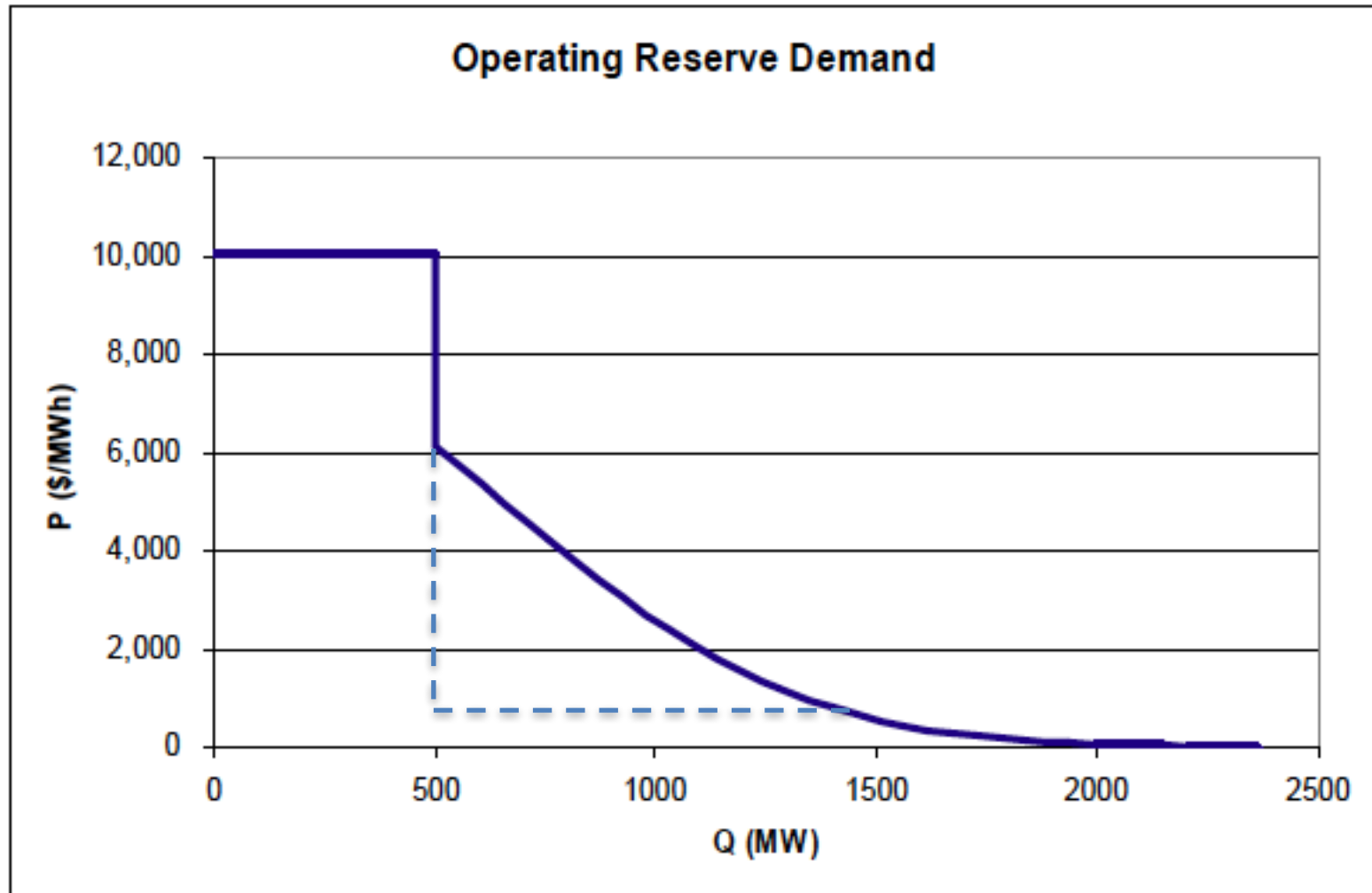


Average annual wholesale prices (2015)

Not your father's demand response

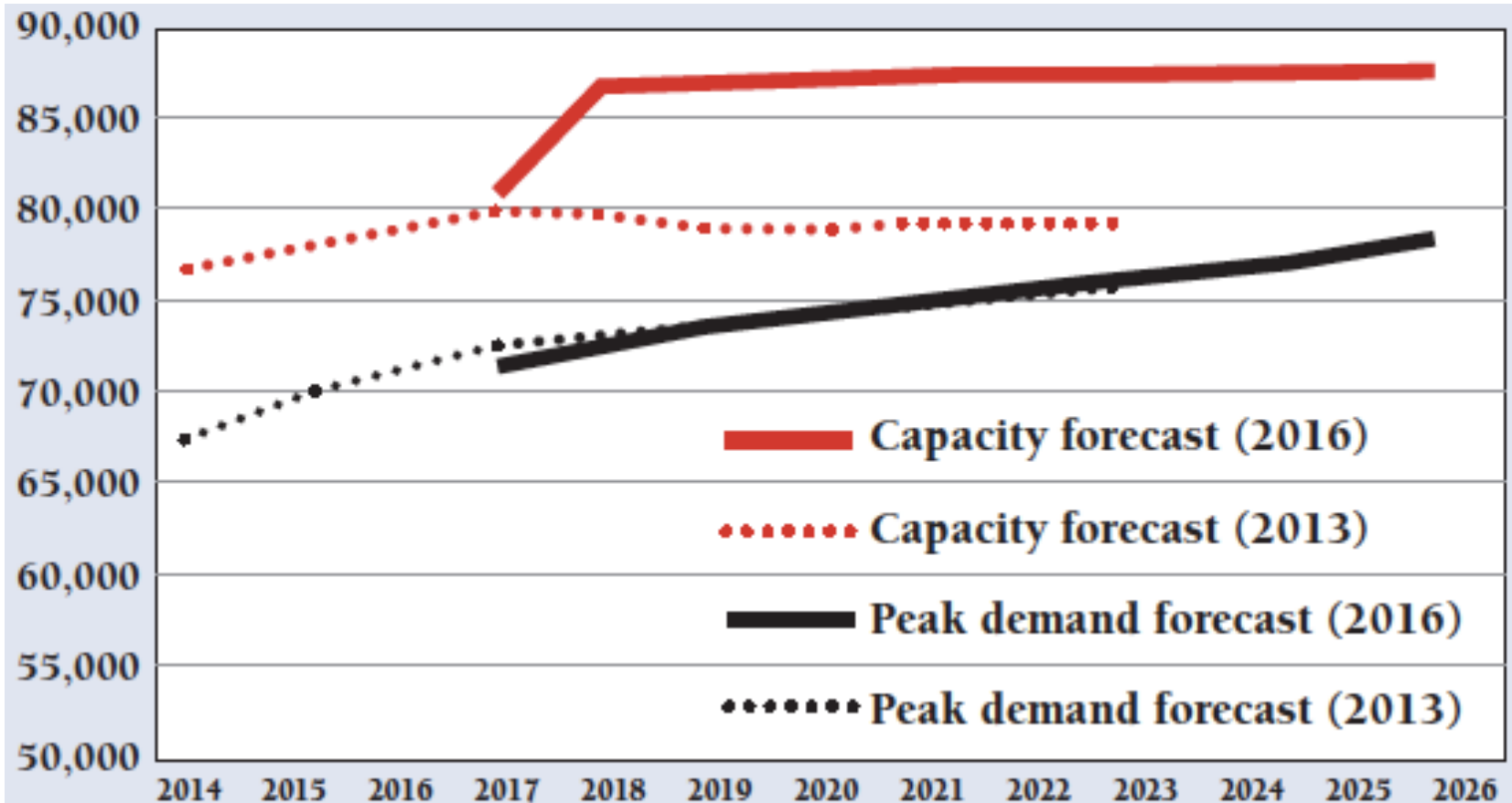


A “CRM” that values flexibility & innovation



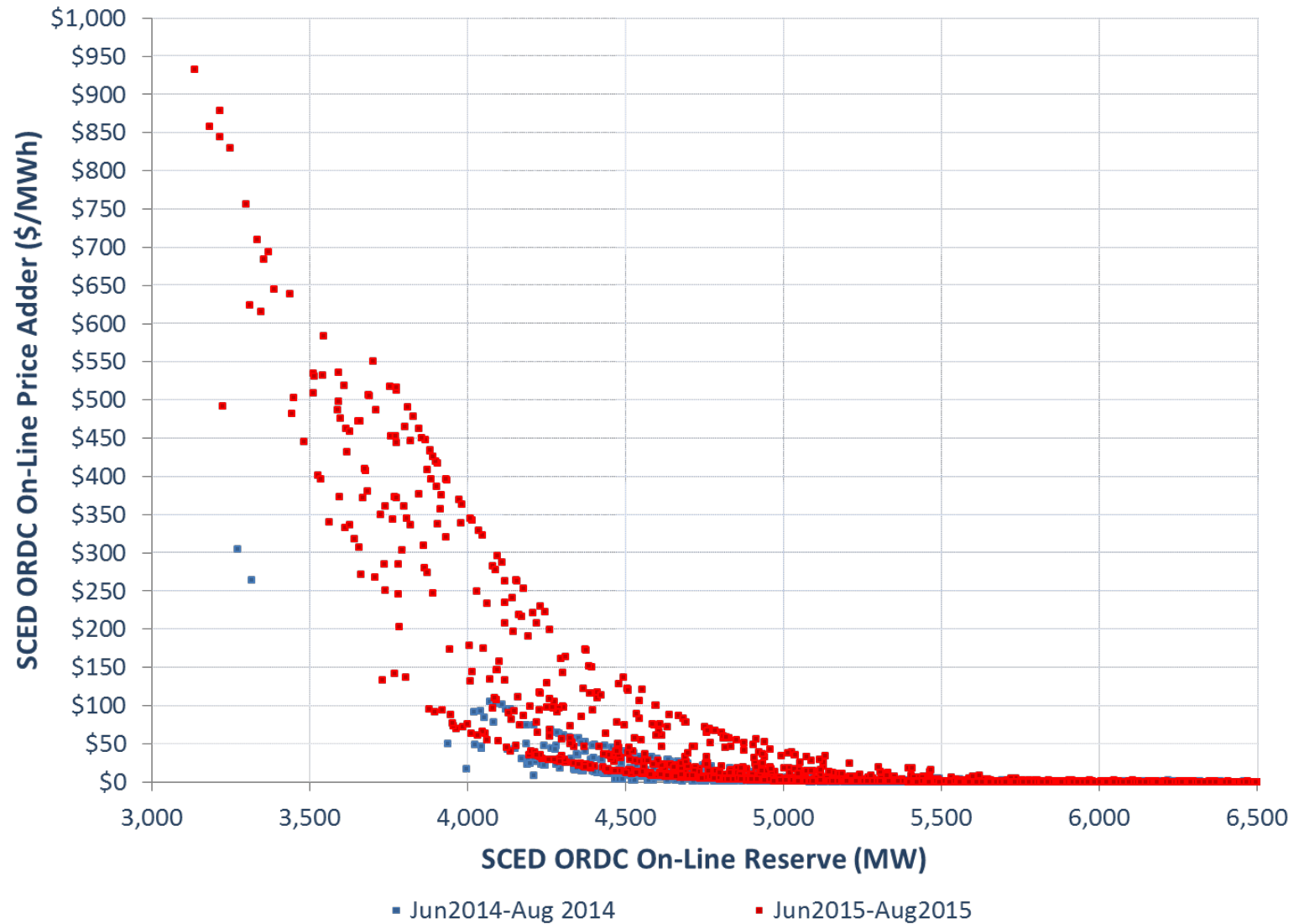
Source: Wm. Hogan, Harvard University, report to ERCOT, *Electricity Scarcity Pricing through Operating Reserves* (1 Nov 2012)

A “CRM” that values flexibility & innovation

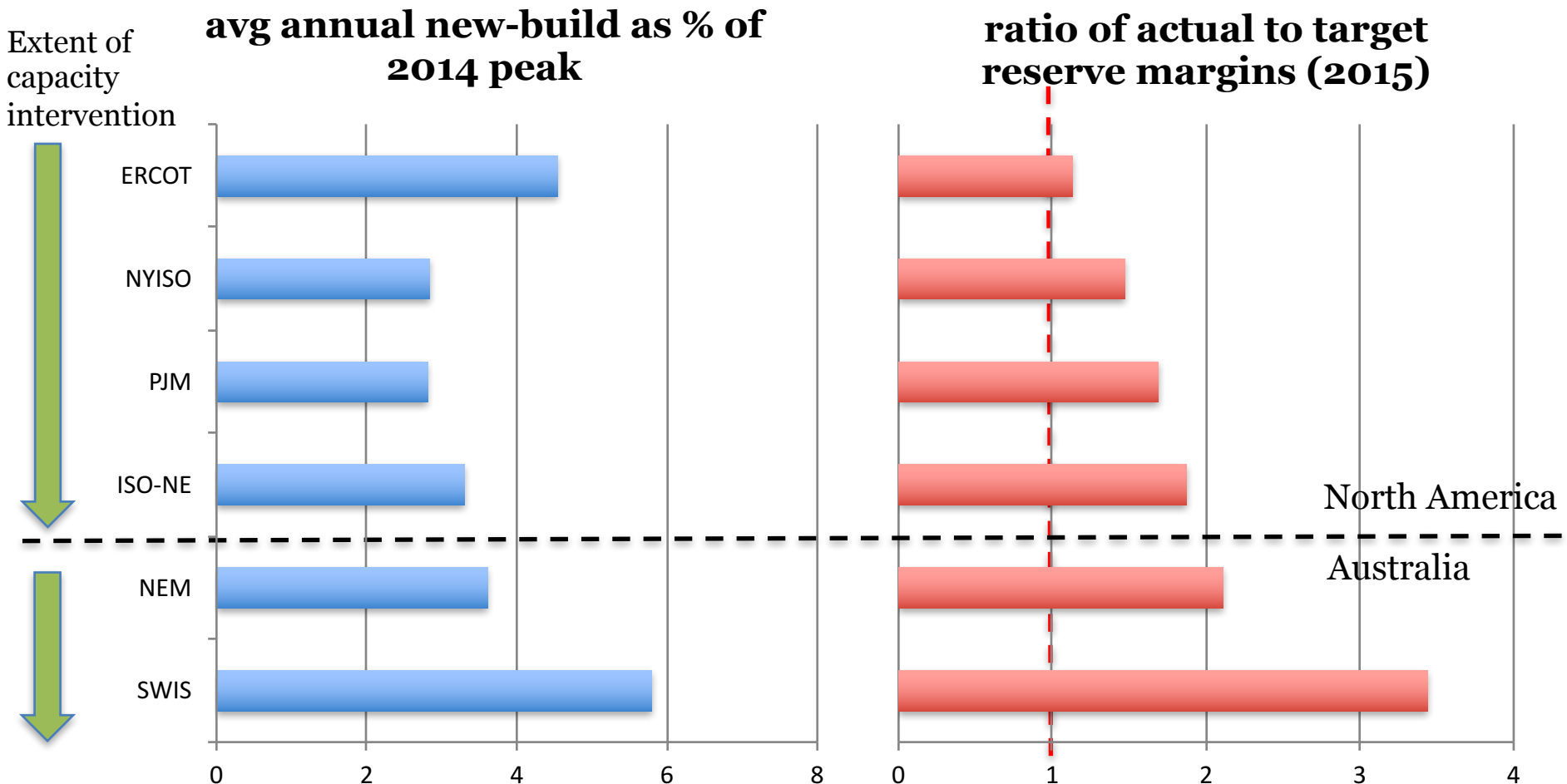


Source: ERCOT (Capacity, Demand, and Reserves Reports, May 2013 and May 2016)

A “CRM” that values flexibility & innovation



Better pricing vs. CRMs: empirical data



Parting thoughts (1)

Money is not missing by design, it's missing because of the various ways, both intentional and unintentional, that market operators fail to account for all demand and all marginal costs.

Parting thoughts (2)

Effective energy and balancing markets are essential to value investments in flexibility and spur innovation; administrative measures should target them, not simply pay for capacity.

Parting thoughts (3)

Policy support for renewables deployment is not only compatible with well-functioning energy markets...they are the key to integrating variable renewables reliably at least cost to consumers.

Hitting the Mark on Missing Money:

How to Ensure Reliability at Least Cost to Consumers

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Policy brief is
available on RAP
website free of charge

<http://www.raponline.org/knowledge-center/hitting-mark-missing-money-ensure-reliability-least-cost-consumers/>



About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power sector. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raonline.org

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