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# NextGen Wholesale Markets: What objectives? What challenges? What solutions?

## IEA/ESAP Workshop: What is Next for Our Electricity Markets?


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# Summary recommendations:

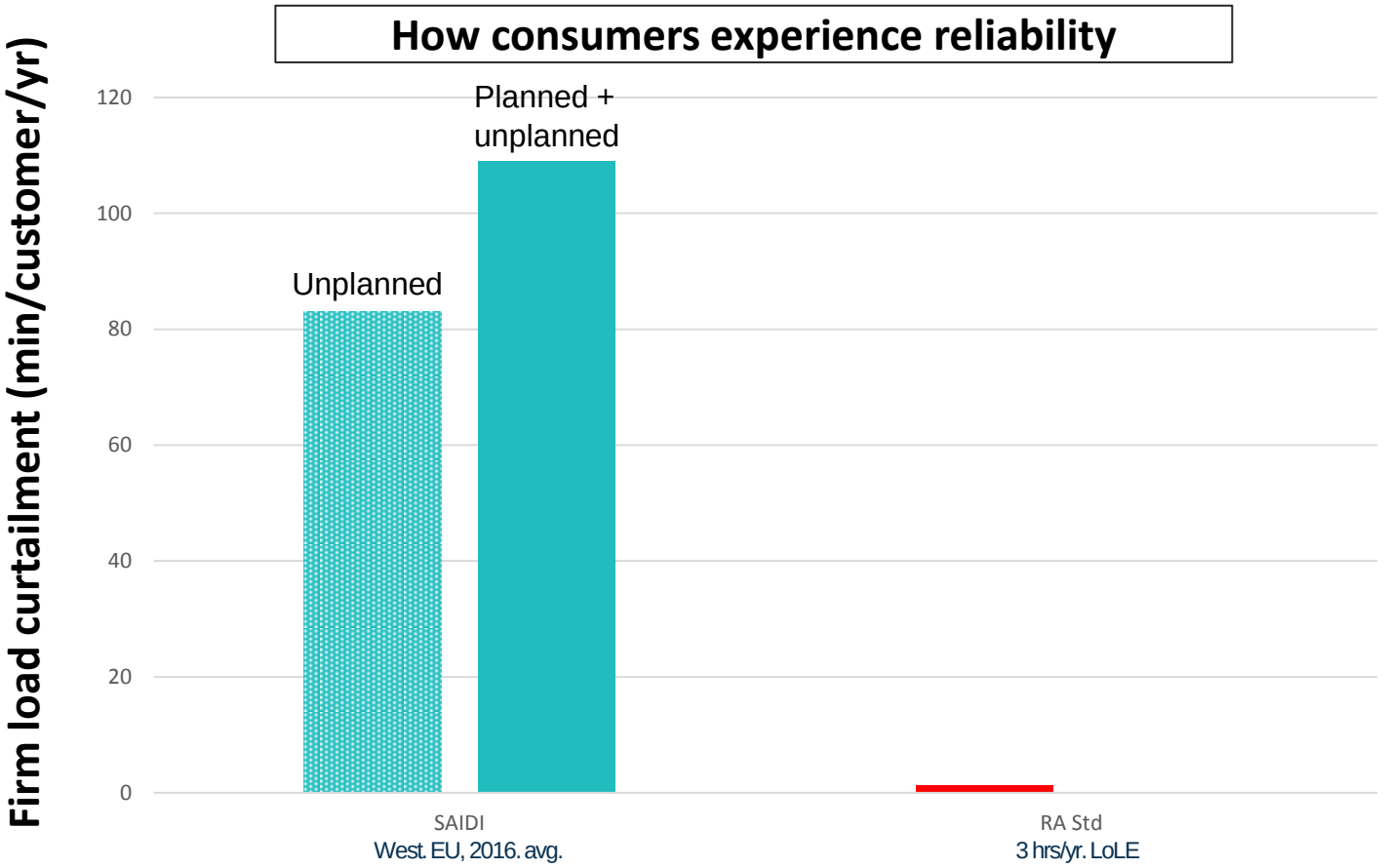
- Fast, reliable, affordable decarbonization: Markets must access and adequately compensate the lowest cost sources of flexibility
- Centrally administered fwd procurement excludes most low-cost distributed flexibility, mis-prices flexibility, over-procures capacity
- Flexible demand (active *and* passive) is often the lowest cost source of flexibility services
- Energy market provides near-universal access and pays for what customers actually need and use (energy plus services)
- Administrative valuation of reliability services still needed, but through energy market, not around it
- Energy price formation (LMP) must reflect combined demand for energy & services, opportunity cost of reserve shortages

# 1 Reliability matters – so let's be clear what we're talking about

Resource "adequacy" by the numbers

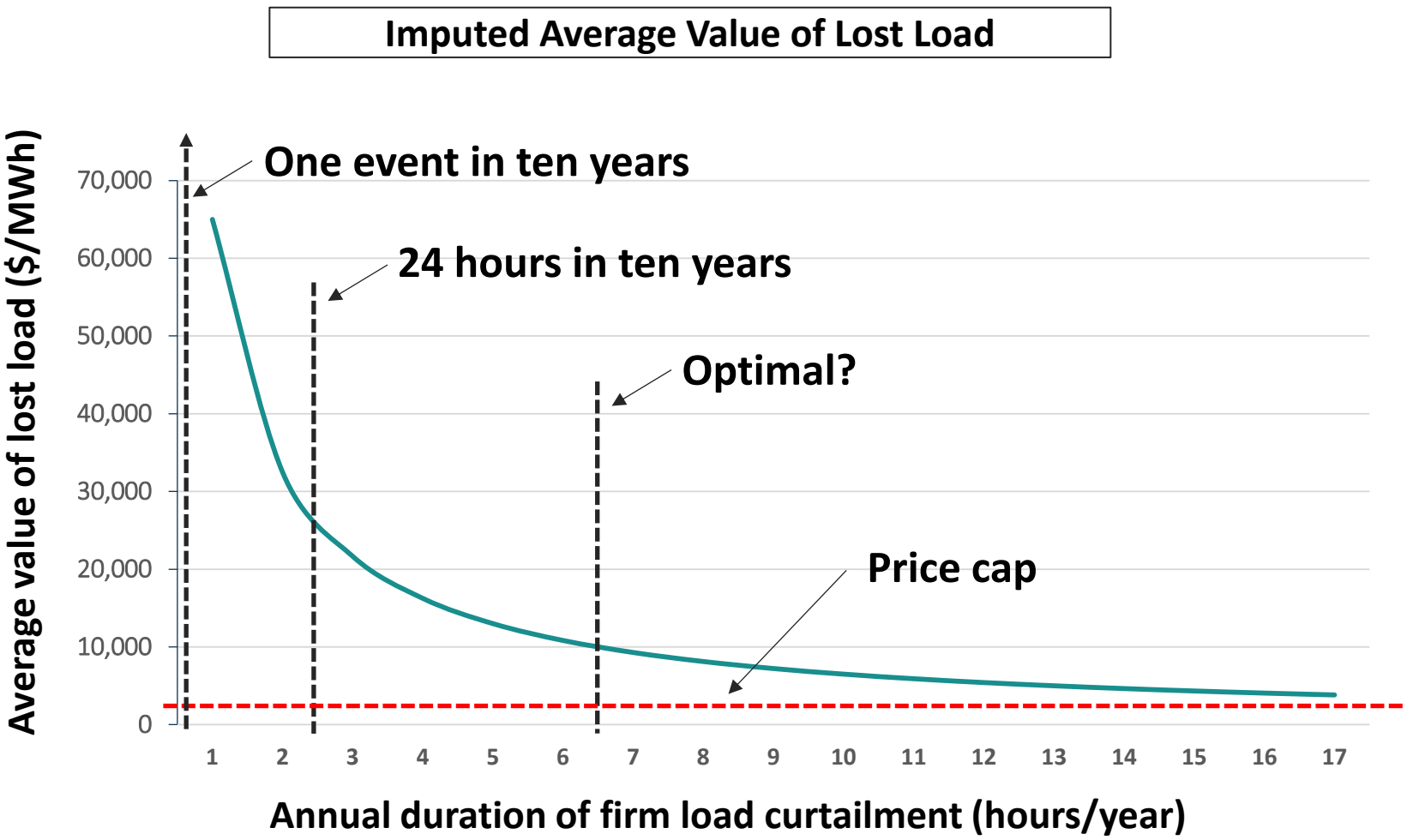


# It's *all* about the consumer




Source (SAIDI data): Council of European Energy Regulators, "Benchmarking Report 6.1 on Continuity of Electric and Gas Supply, Data Update 2015/2016" (26 July 2018).

# Resource adequacy, objectively






Source: W. Hogan, Harvard University, Kennedy School of Government.

# Is there a different way to look at this?

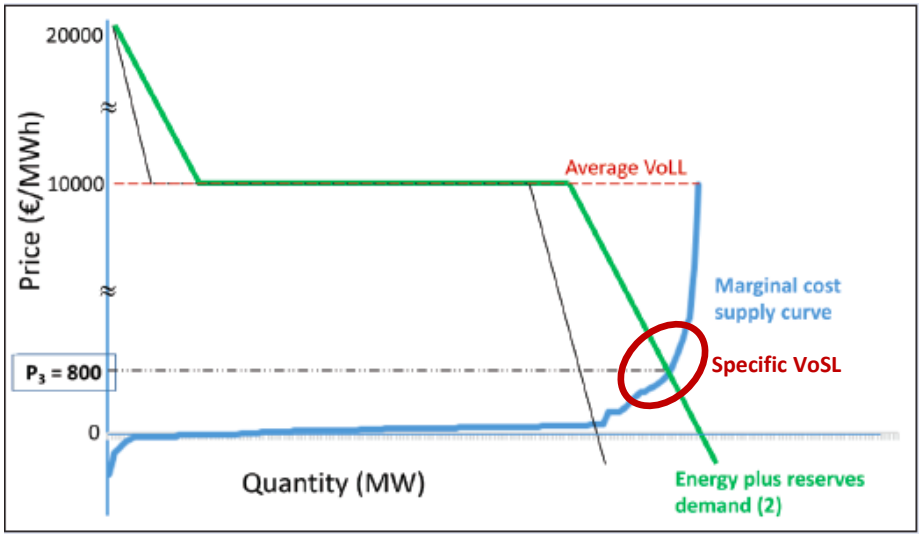
## *We're talking about a fundamental change in the nature of the supply mix*

Can we really afford to continue to build a power system and charge customers based on the assumption that they are happy to pay €35,000-€250,000/MWh for the luxury of not shifting their flexible loads by a few hours?

# We need a new paradigm – VoSL ("Value of Shiftable Load")

## *VoSL: The price at which customers will happily shift flexible loads to save money*

The VoSL for a given end use is often far less than what it costs to ensure (and far more than the price we're charging to ensure it)

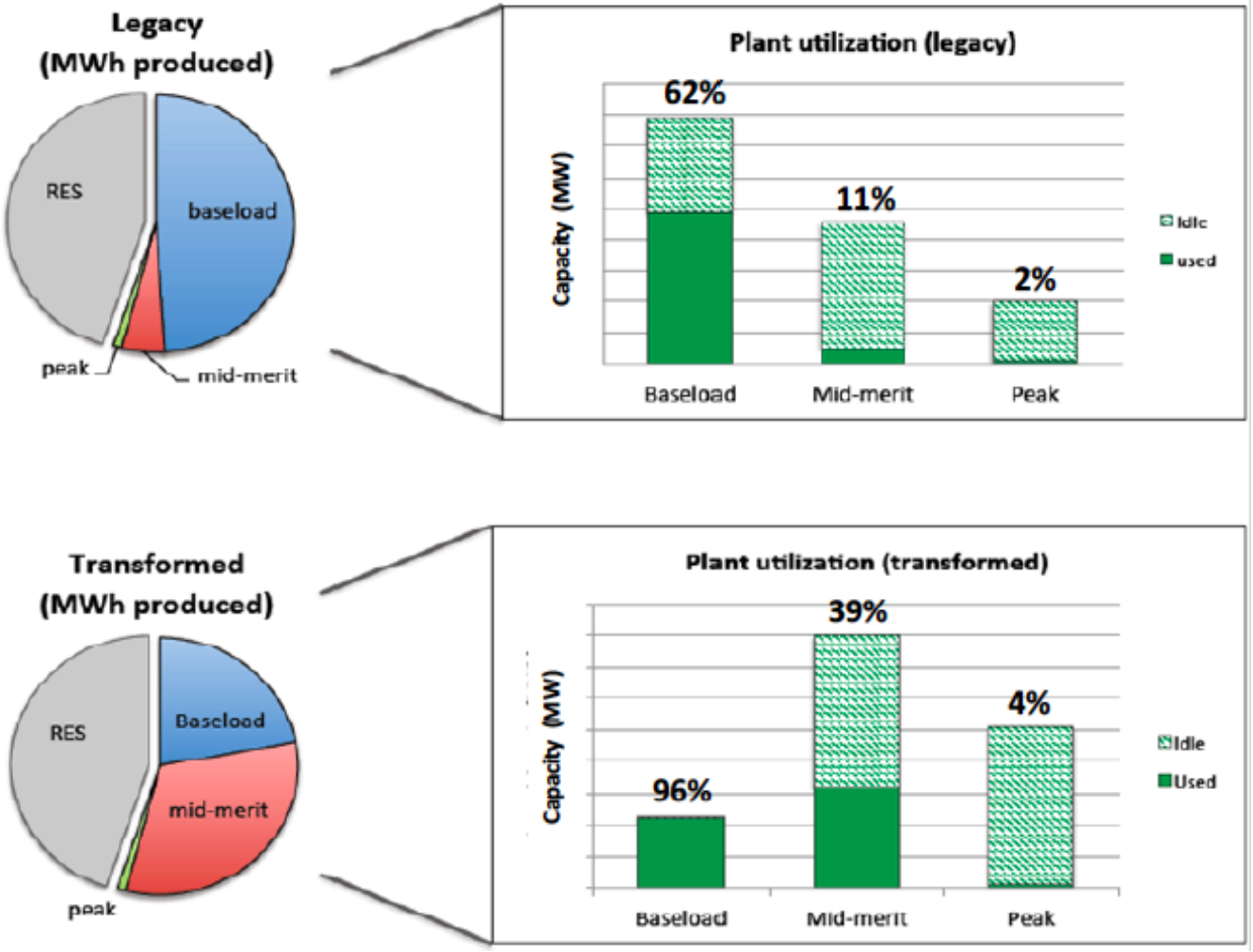


# 2 Fast, reliable and affordable means one thing: Flexible

Flexibility, not capacity, is the new coin of the realm



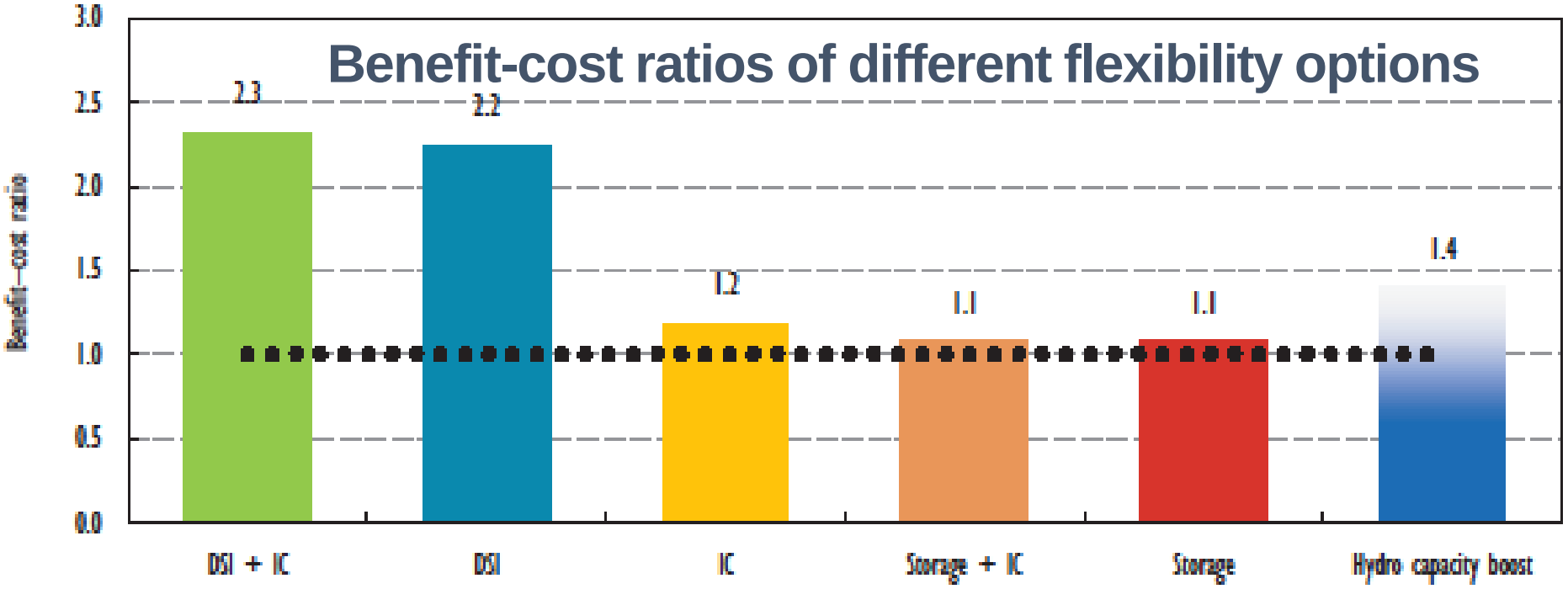
# “How much?” depends on “What kind?”




Considering *only* generation flexibility…the legacy resource portfolio can require up to **40% more investment** in grid and generation capacity than the transformed portfolio

Source: Adapted from *The Power of Transformation* (IEA, 2014)

# System flexibility: Where can we get what we need at least cost?

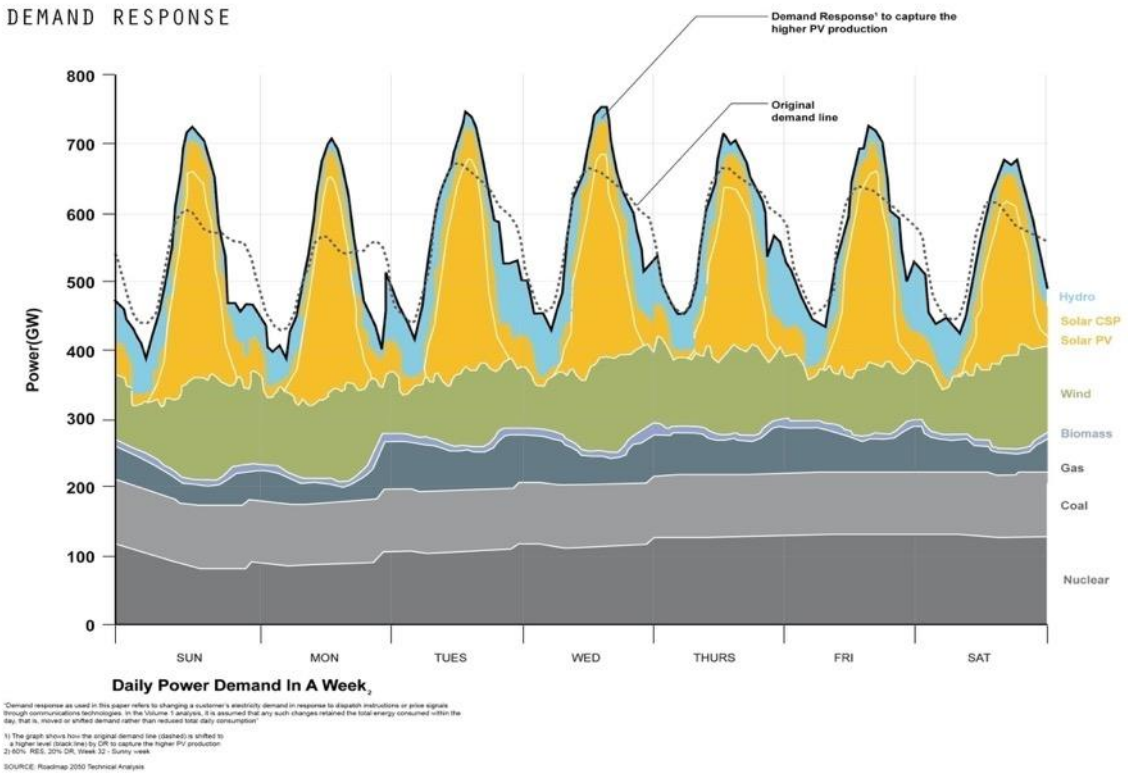



Source: IEA, The Power of Transformation (2014)

# New role for responsive demand

Moving from a world where we forecast load and schedule generation, to a world where we forecast generation and schedule load

*will now need to shape, not just shave, demand*



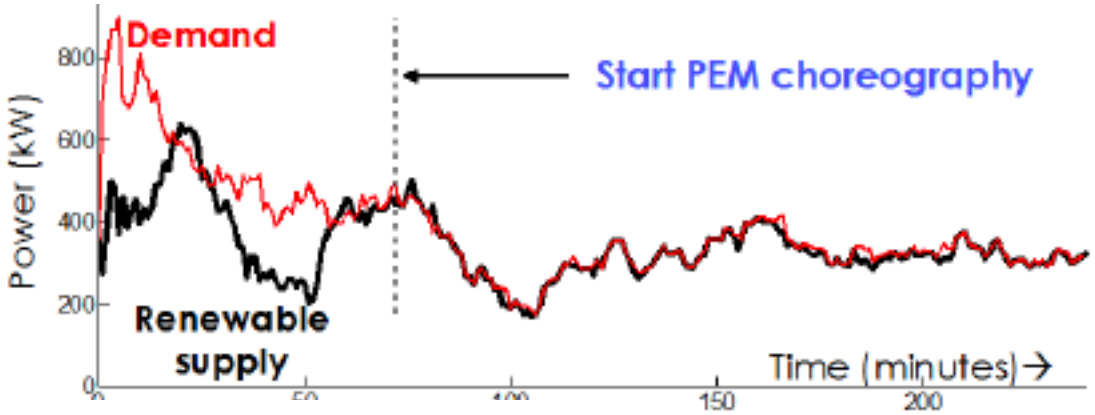
# Innovation: 3rd party access is essential

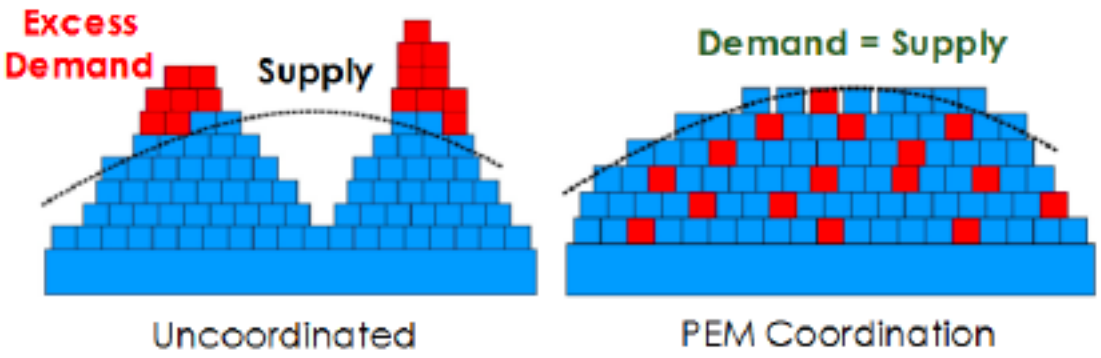








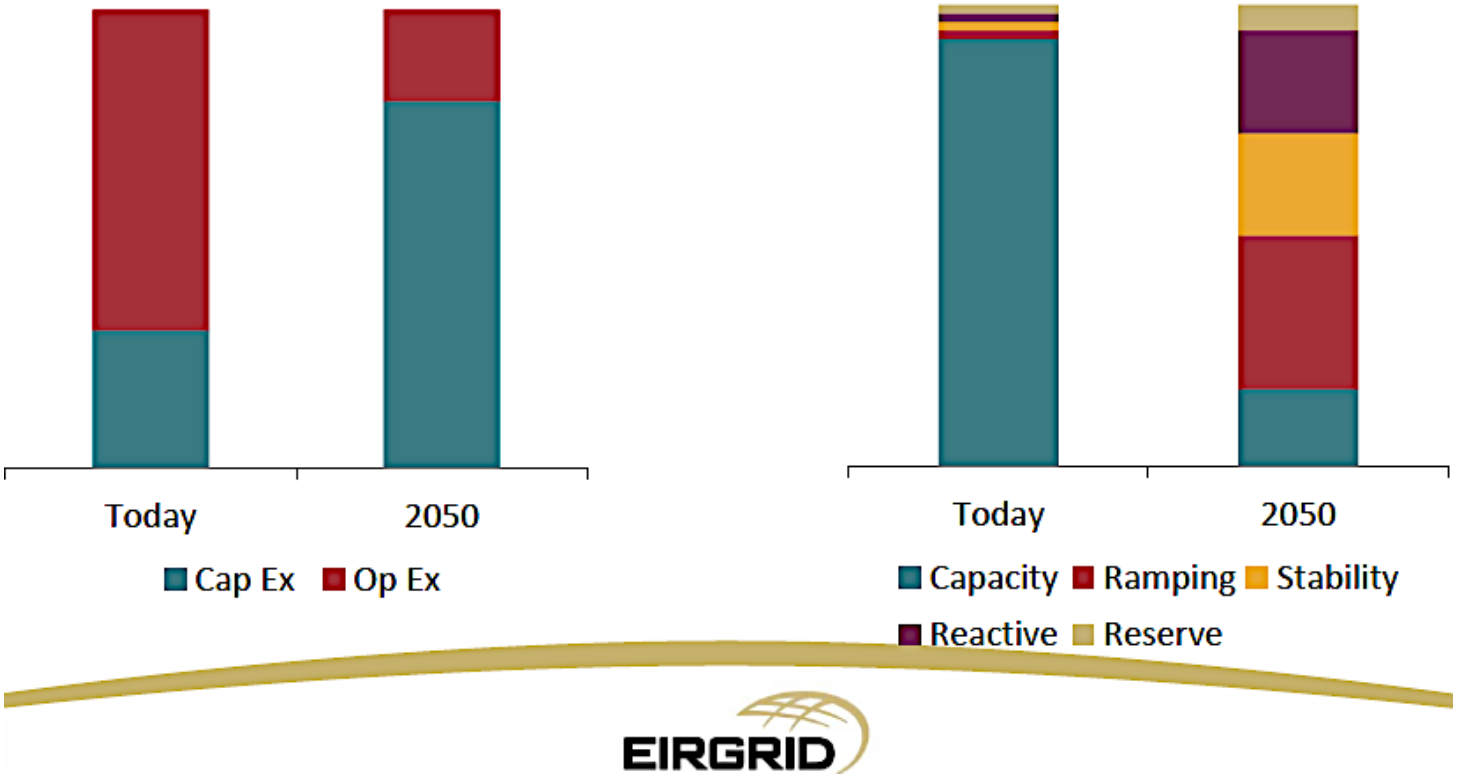
# 3 Priority # 1 (and #2 and #3): Get the energy price right

Marginal-cost energy pricing isn’t necessarily what you’ve been told it is

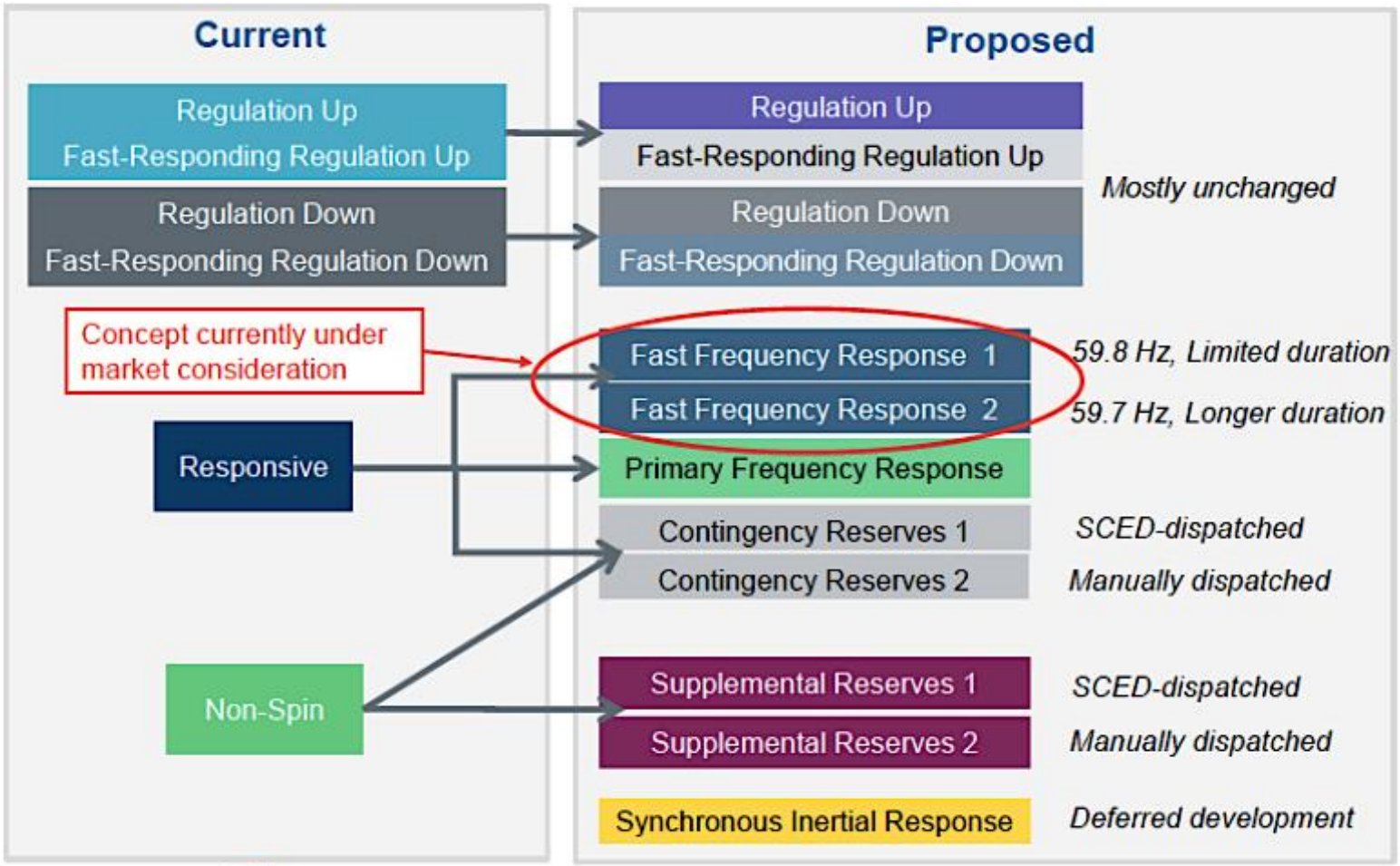


# Capital-intensive yes, but value will come from demand for operational capabilities, *not* capacity

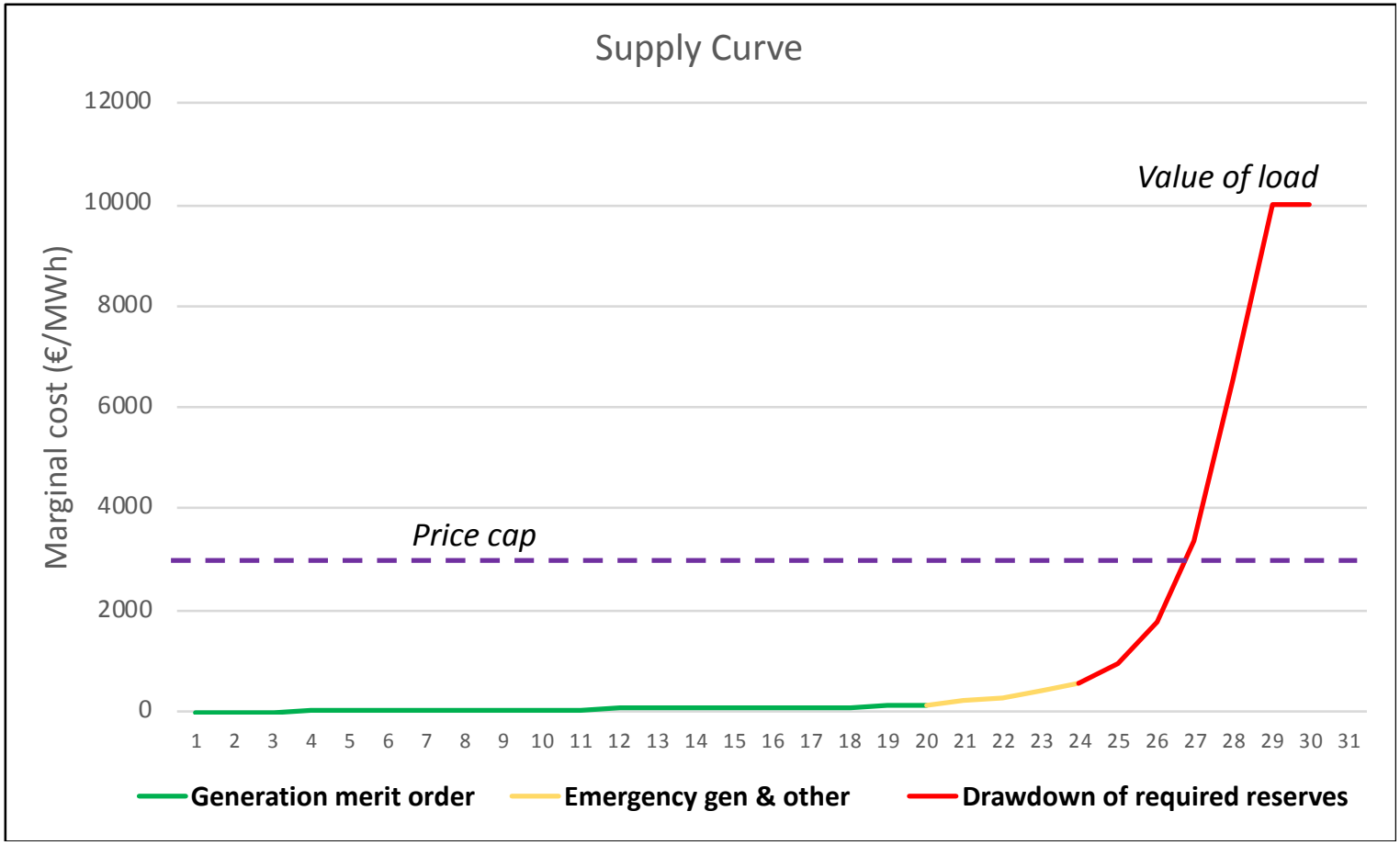
## …so market model should reflect this



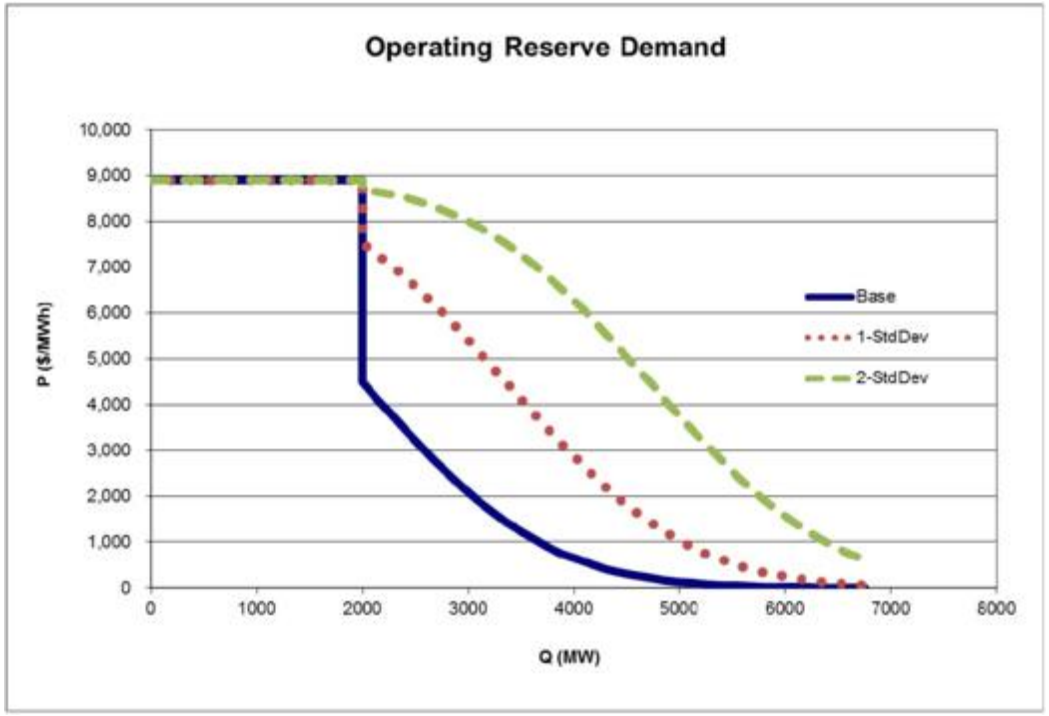
# Rapid growth in range of needed services



# The real supply curve:



# Administrative measures (e.g., reserve shortage function) ensure demand for reliability is priced…

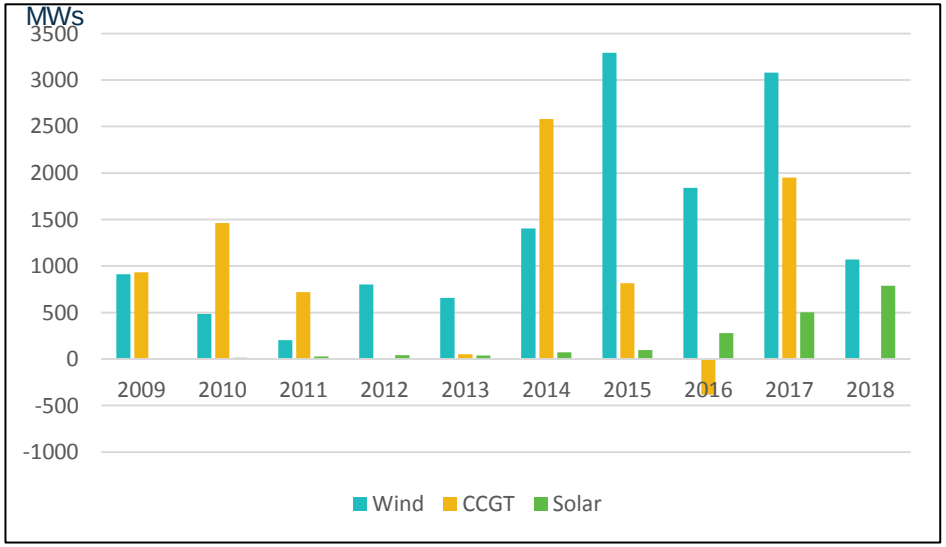



**…creating volume & price risks that drive bilateral contracting (e.g., ~95% of energy consumed in ERCOT is under bilateral contracts)**

- Source: W. Hogan, ”Electricity Scarcity Pricing and Resource Adequacy.” Harvard University, 27 Feb 2014.

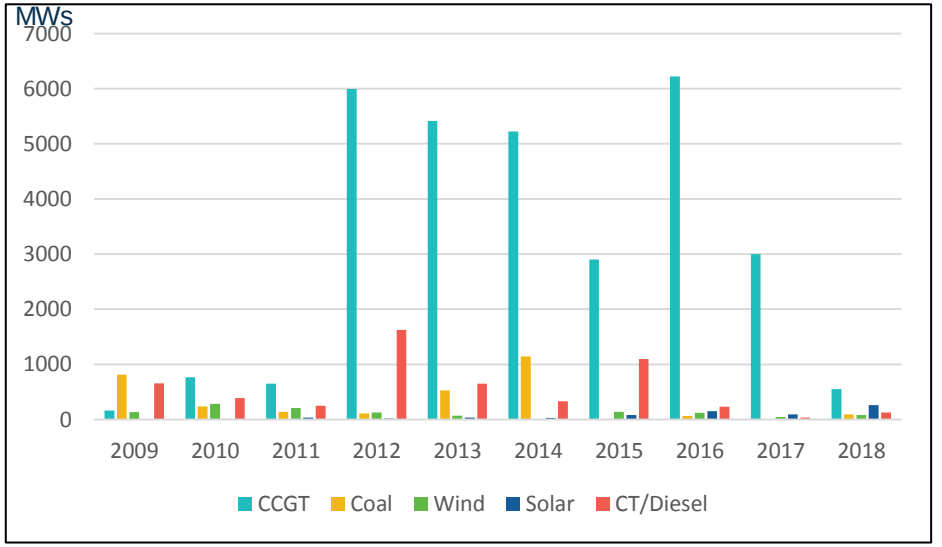
# 10 years of investment in leading markets

## ERCOT




No forward capacity market, but administrative shortage pricing in the energy market, 20% wind share of market in 2018.

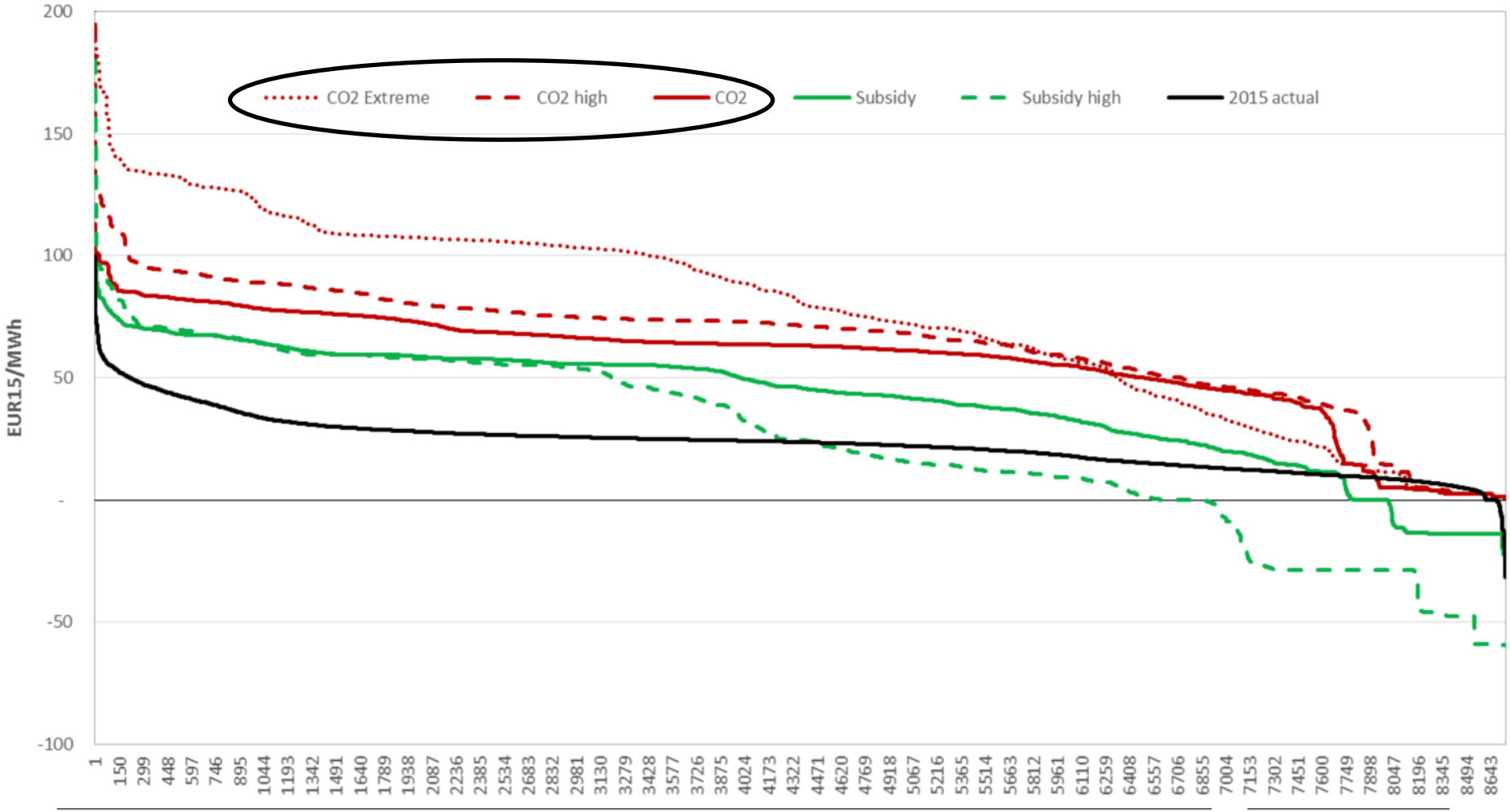
## PJM




Forward capacity market, but with only 1-year rolling ”contracts” for existing *& new* capacity, scarcity pricing, 36% reserve margin in 2018.

- Source: ERCOT and PJM published data.

# When surplus baseload is retired, energy prices reflect true value & consumers are empowered:






Source: EA Energy Analyses for DONG/Orsted, "Modelling Results to Support the Design of Markets for Decarbonization" (Feb 2017).

# 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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