



RAP

Energy solutions
for a changing world

Resource Adequacy & Cross-Border Capacity Remuneration Schemes: Options & Alternatives

Introduction
30 May 2017

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Context – adequacy assessed

LoLE < 1 hour



LoLE > 1 hour
(conservative
assumptions)



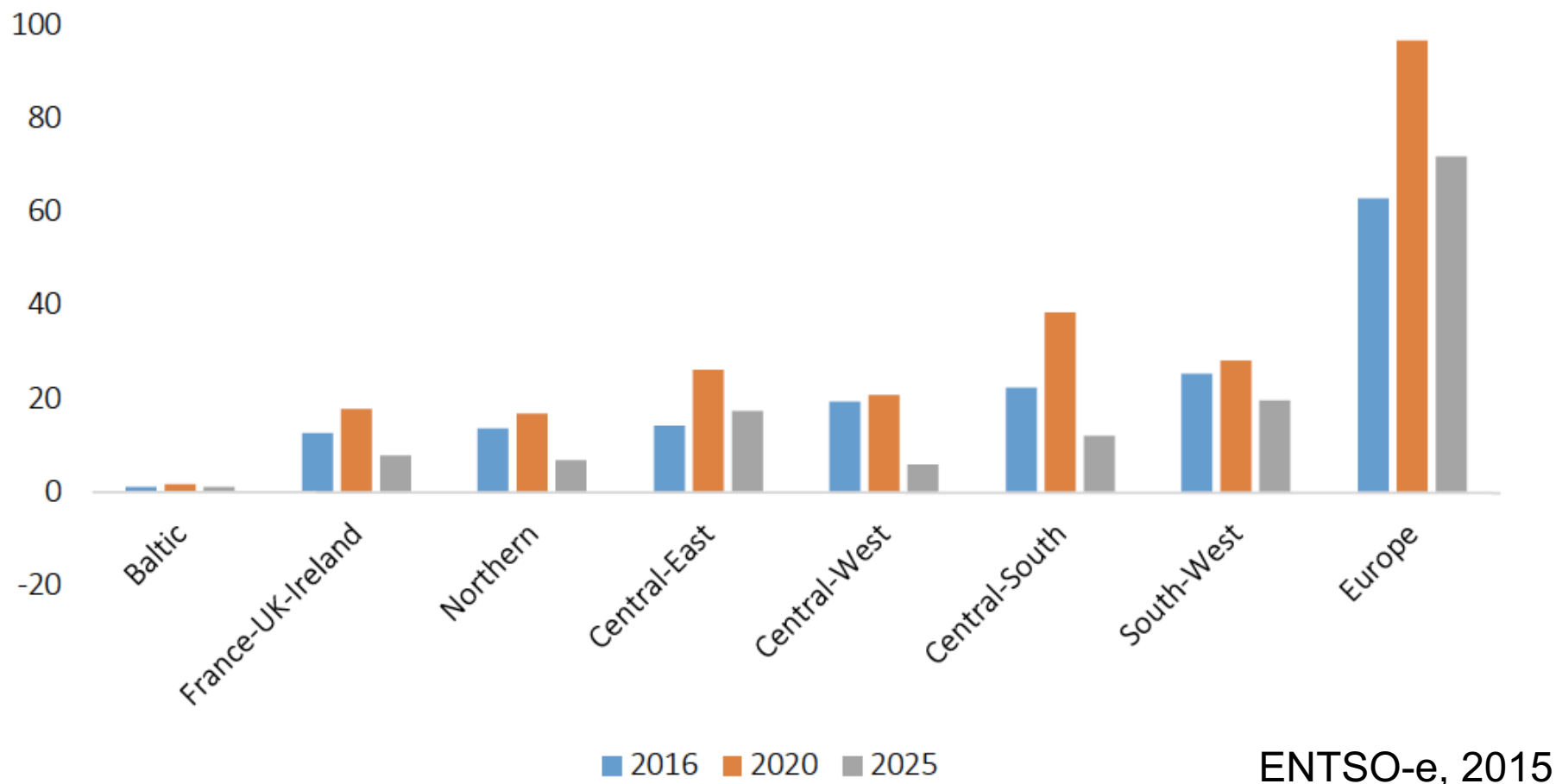
LoLE > 1 hour



COUNTRY	2020			2025
	BASE CASE	SENSITIVITY CASE I	SENSITIVITY CASE II	BASE CASE
AL	Green	Green	Green	Green
AT	Green	Green	Green	Green
BA	Green	Green	Green	Green
BE	Green	Green	Green	Red
BG	Red	Green	Green	Green
CH	Green	Green	Green	Blue
CZ	Green	Green	Green	Green
DE	Green	Green	Green	Blue
DK	Green	Green	Green	Red
EE	Green	Green	Green	Green
ES	Green	Green	Green	Green
FI	Red	Green	Red	Red
FR	Red	Red	Red	Red
GB	Red	Red	Red	Red
GR	Red	Green	Green	Green
HR	Green	Green	Green	Green
HU	Green	Green	Green	Green
IE	Red	Green	Green	Red
IT	Red	Green	Green	Red
LT	Green	Green	Green	Green
LU	Green	Green	Green	Red
LV	Green	Green	Green	Green
ME	Green	Green	Green	Green
MK	Green	Green	Green	Green
NI	Red	Green	Green	Red
NL	Green	Green	Green	Red
NO	Green	Green	Green	Blue
PL	Blue	Blue	Blue	Blue
PT	Green	Green	Green	Green
RO	Green	Green	Green	Green
RS	Green	Green	Green	Green
SE	Green	Green	Green	Blue
SI	Green	Green	Green	Green
SK	Green	Green	Green	Green
CY	Red	Green	Green	Green
TR	Green	Green	Green	Green

ENTSO-e, 2016

Context – capacity surplus

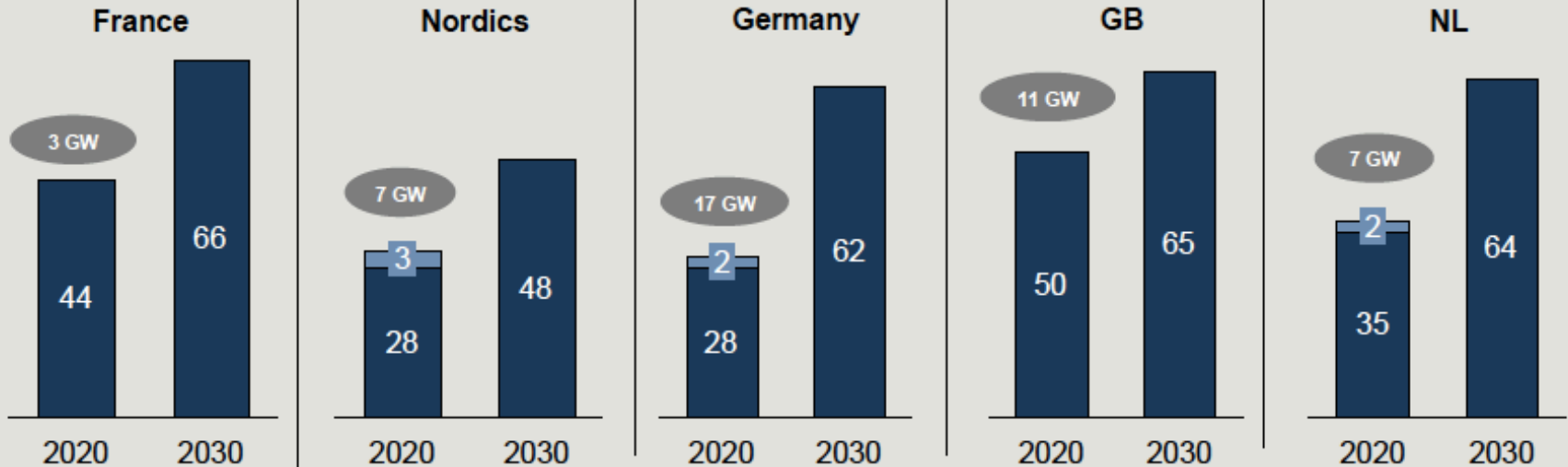


Reliable capacity margin by region (with DR potential)

Price effect of capacity rationalization

Average day ahead prices (EUR15/MWh)

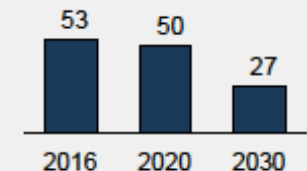
Price effect of decommissioning



Coal in Germany

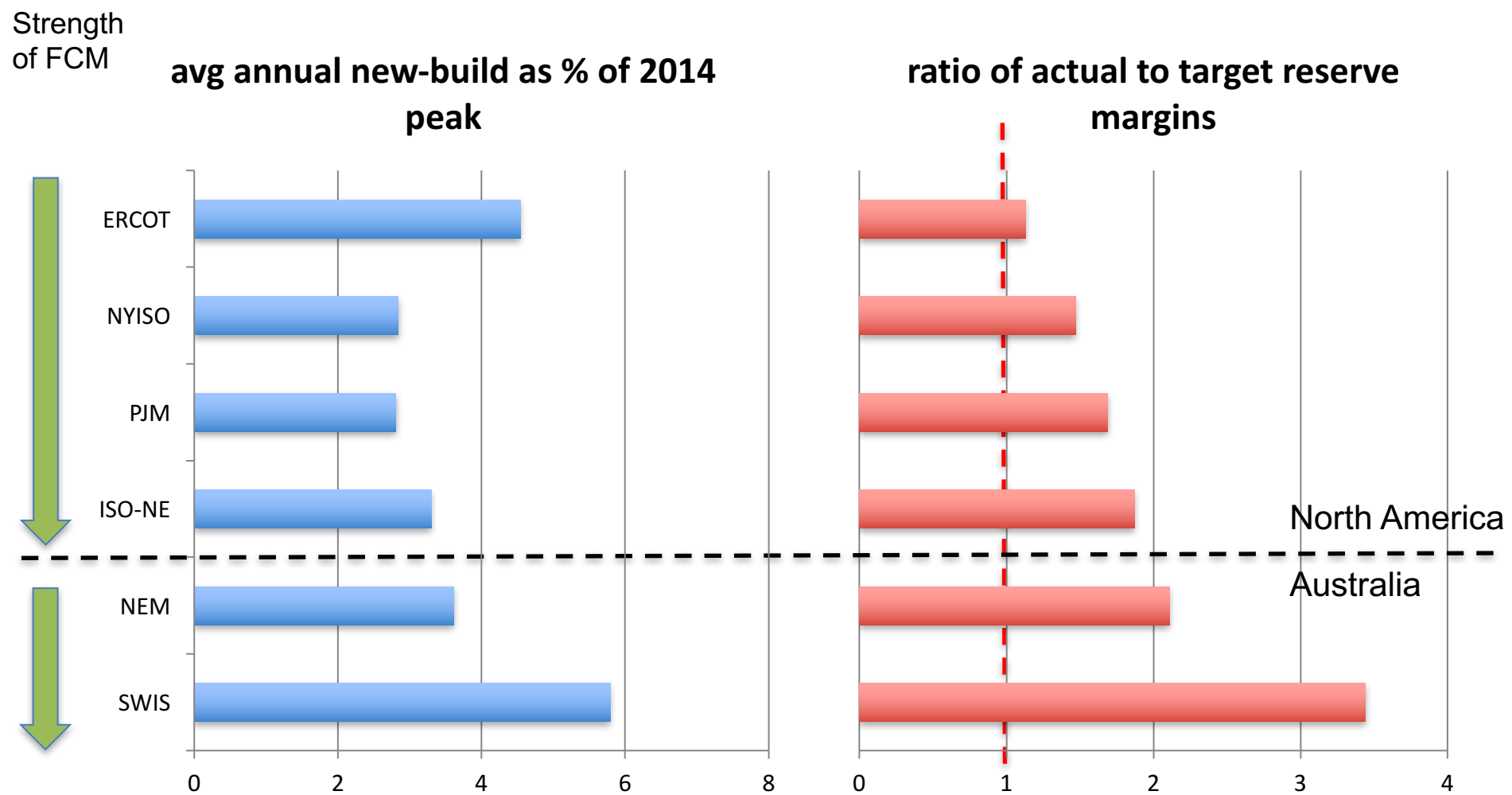
- Mainly gas decommissioned towards 2020 due to low CO2 price => limited electricity price impact
- Mainly coal decommissioned towards 2030 => doubling of electricity price
- Fast decommissioning of coal, through CO2 price or other measures is key to electricity price

Installed coal capacity, GW



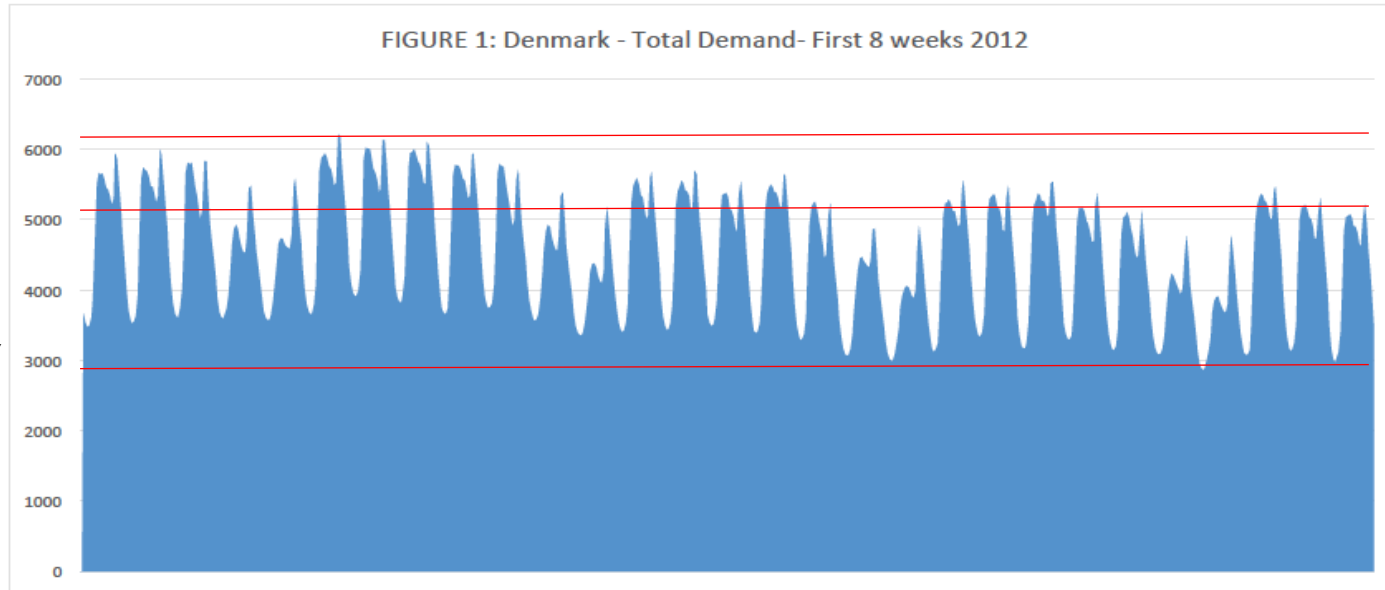
EA Energy Analyses, for DONG (2016)

Capacity markets experience



What *kind* matters - but not to a CRM

Yesterday

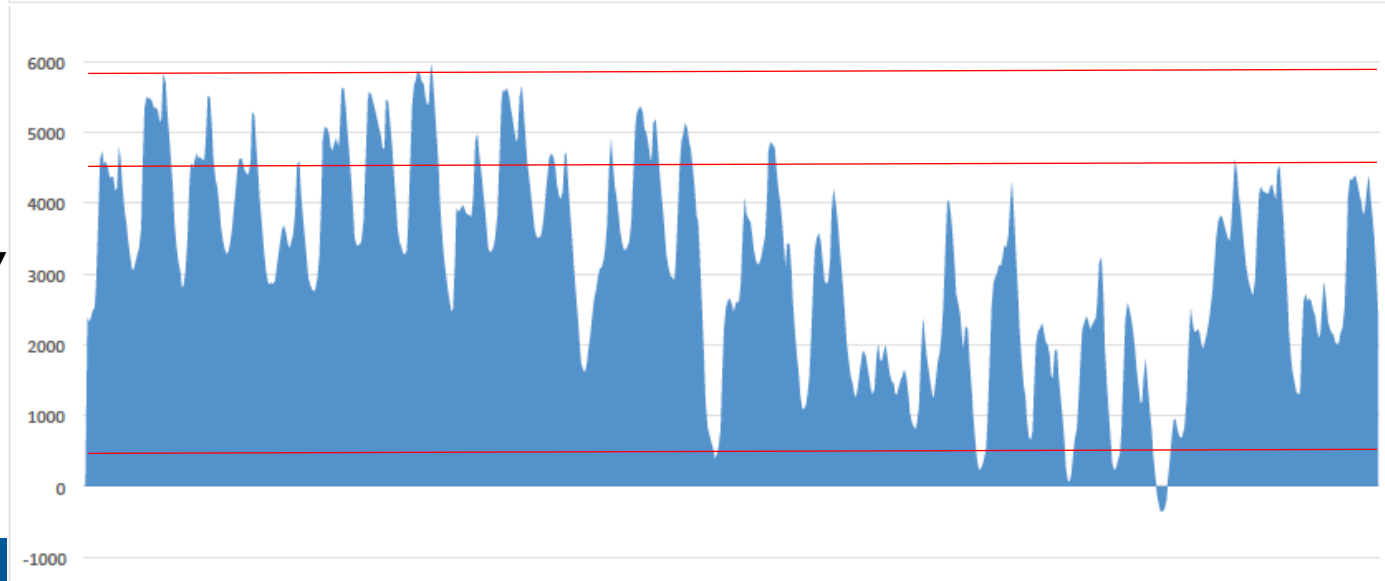


Peak

Mid-merit

Baseload

Tomorrow

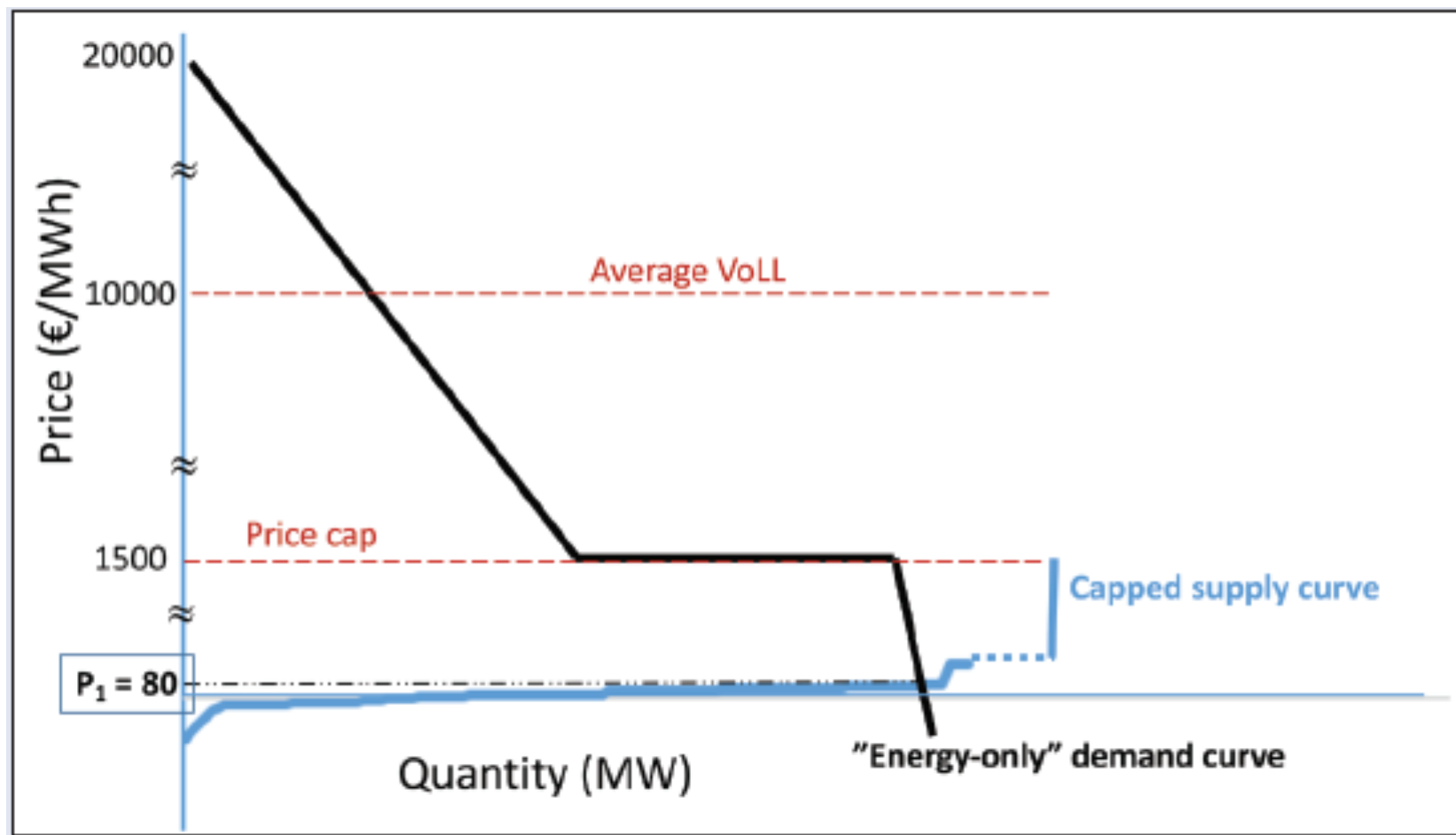


Peak

Mid-merit

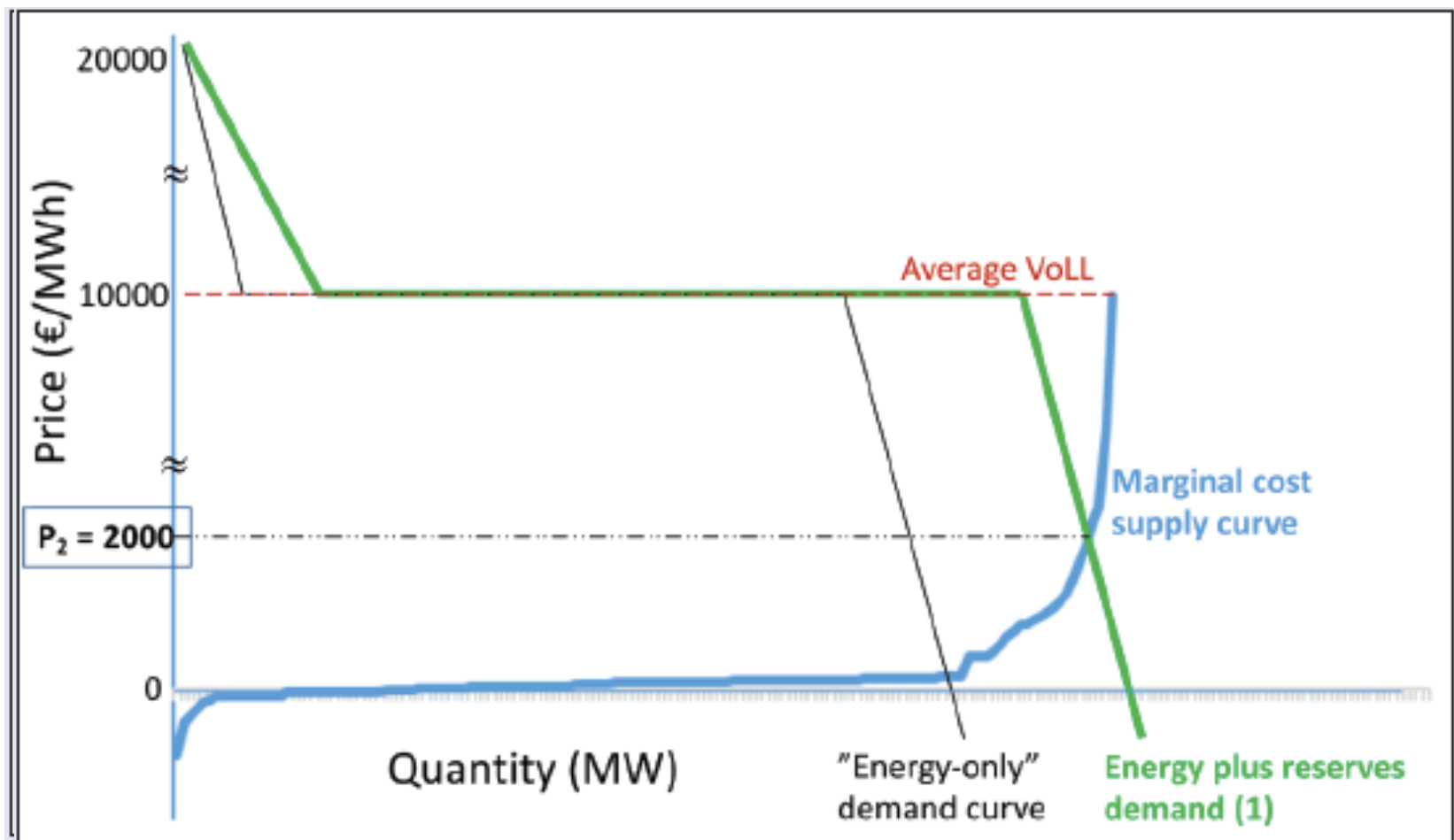
Baseload

Energy market price formation



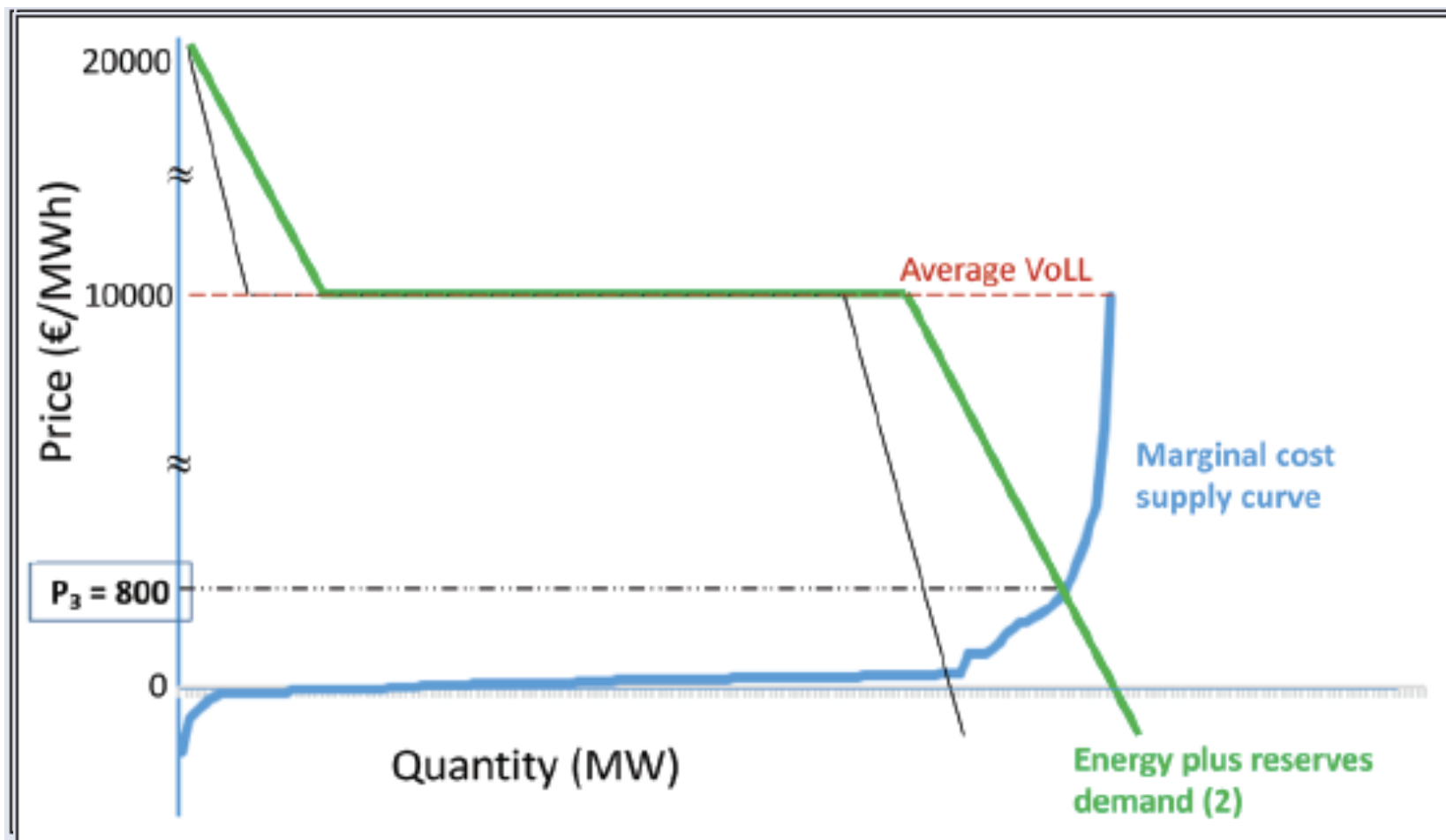
Source: Hogan, M. "Hitting the Mark on Missing Money: ensuring reliability at least cost to consumers," The Regulatory Assistance Project (2016)

Energy market price formation



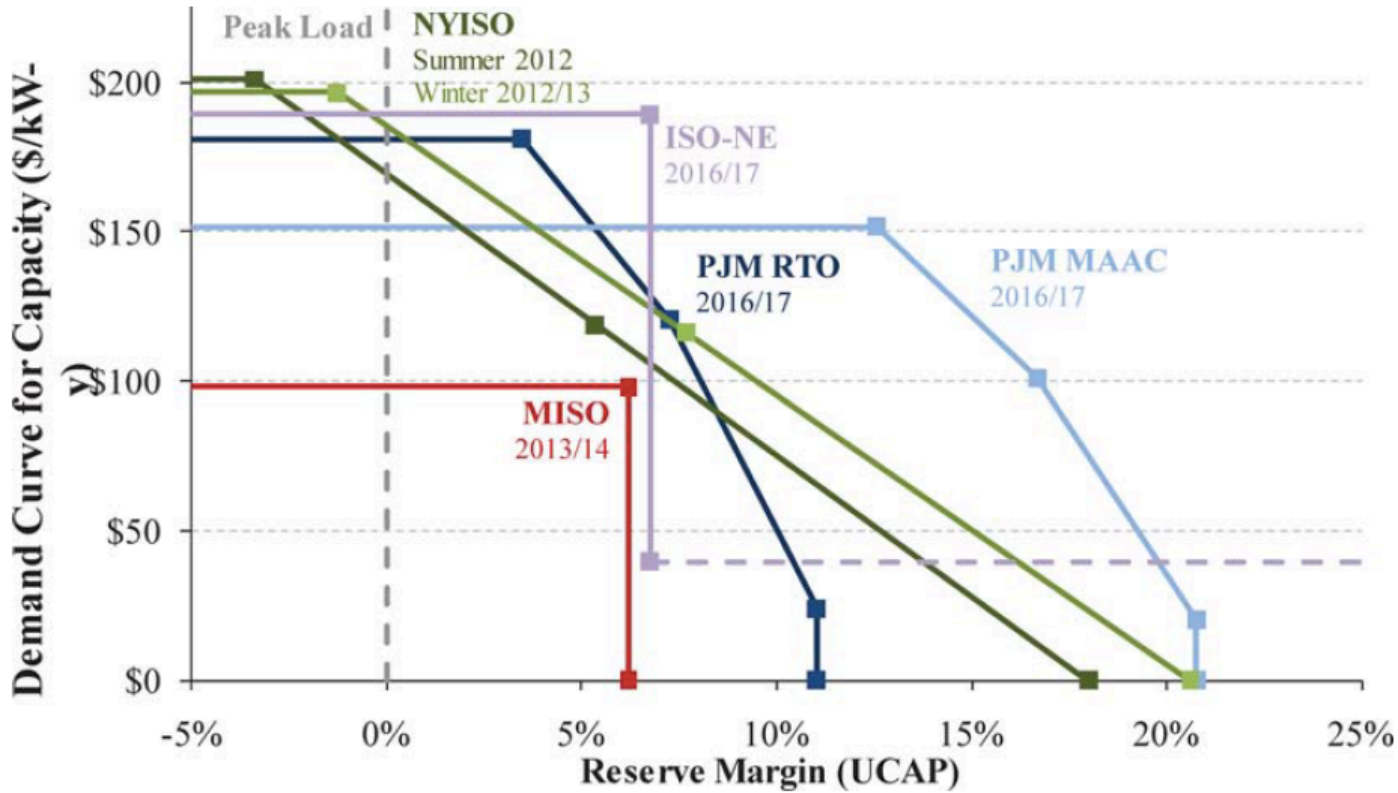
Source: Hogan, M. "Hitting the Mark on Missing Money: ensuring reliability at least cost to consumers," The Regulatory Assistance Project (2016)

Energy market price formation

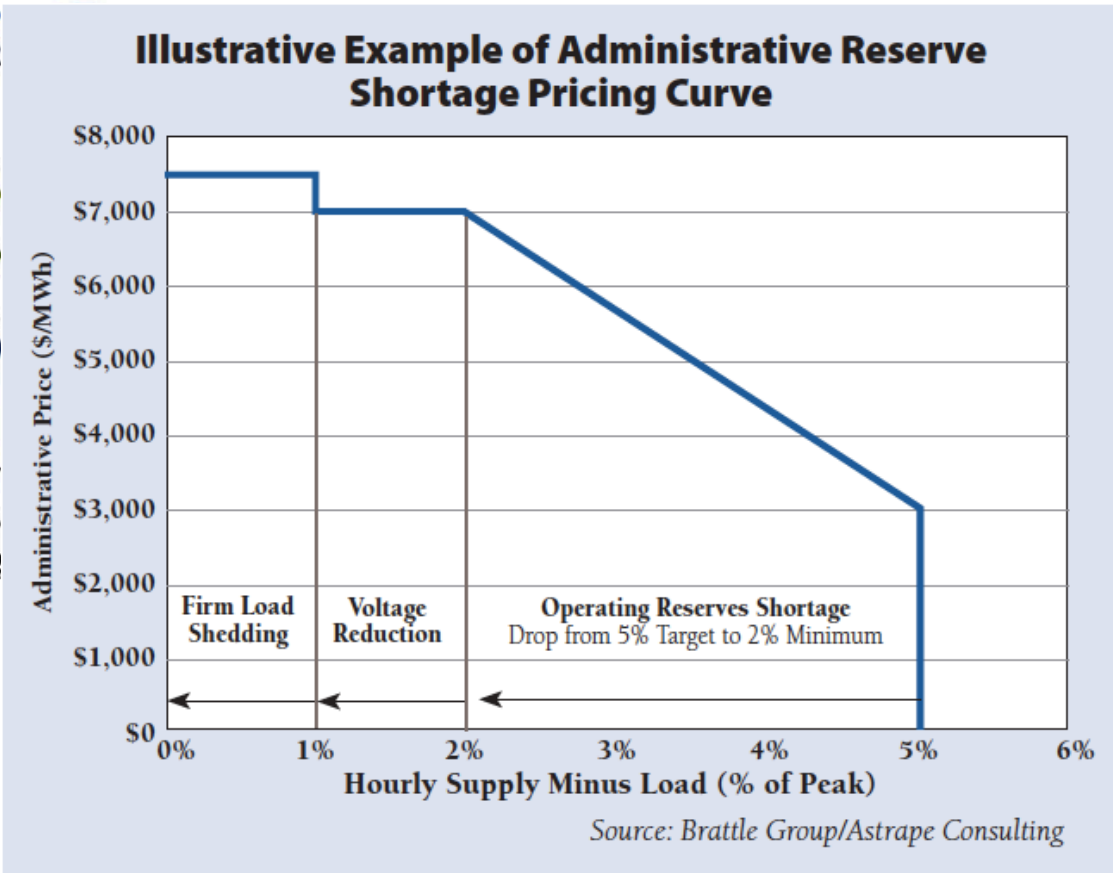
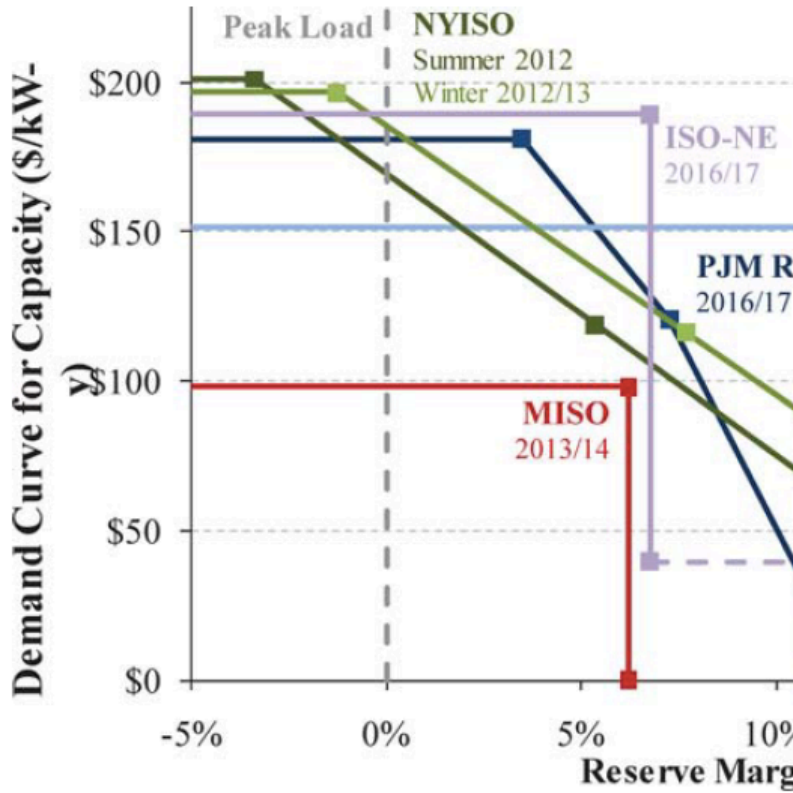


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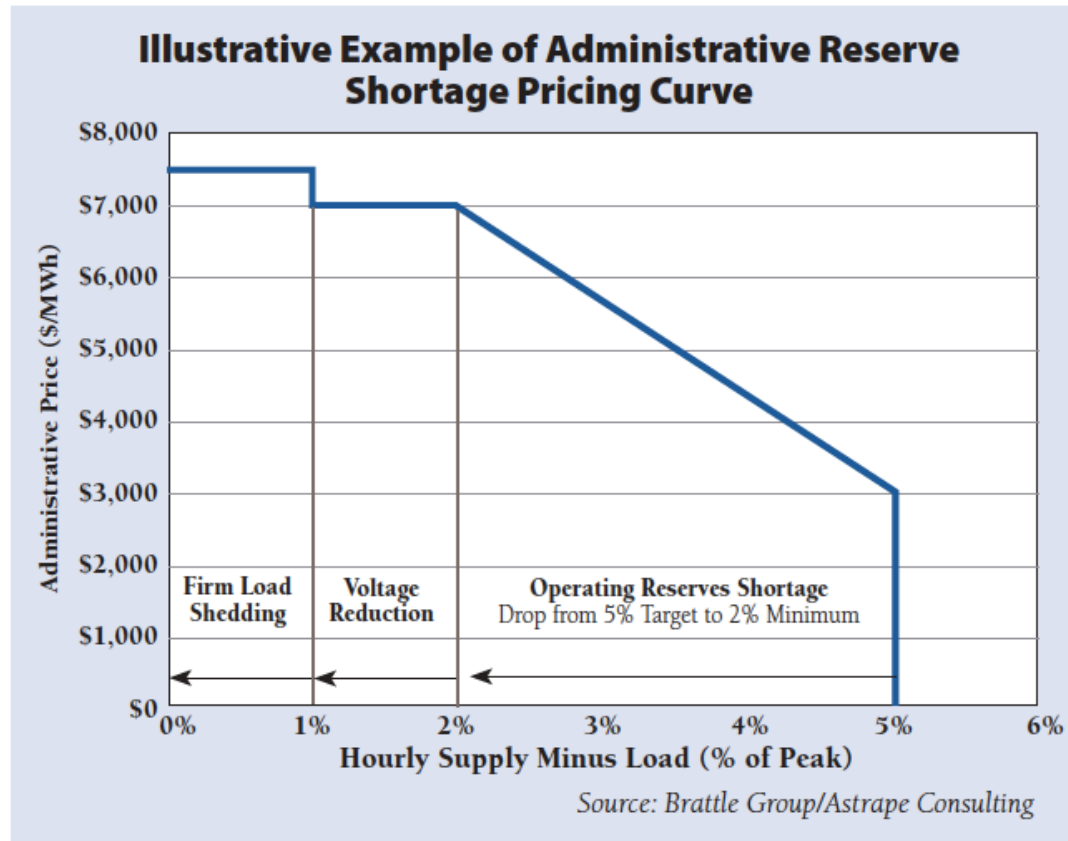
Administrative RA mechanisms



Administrative RA mechanisms

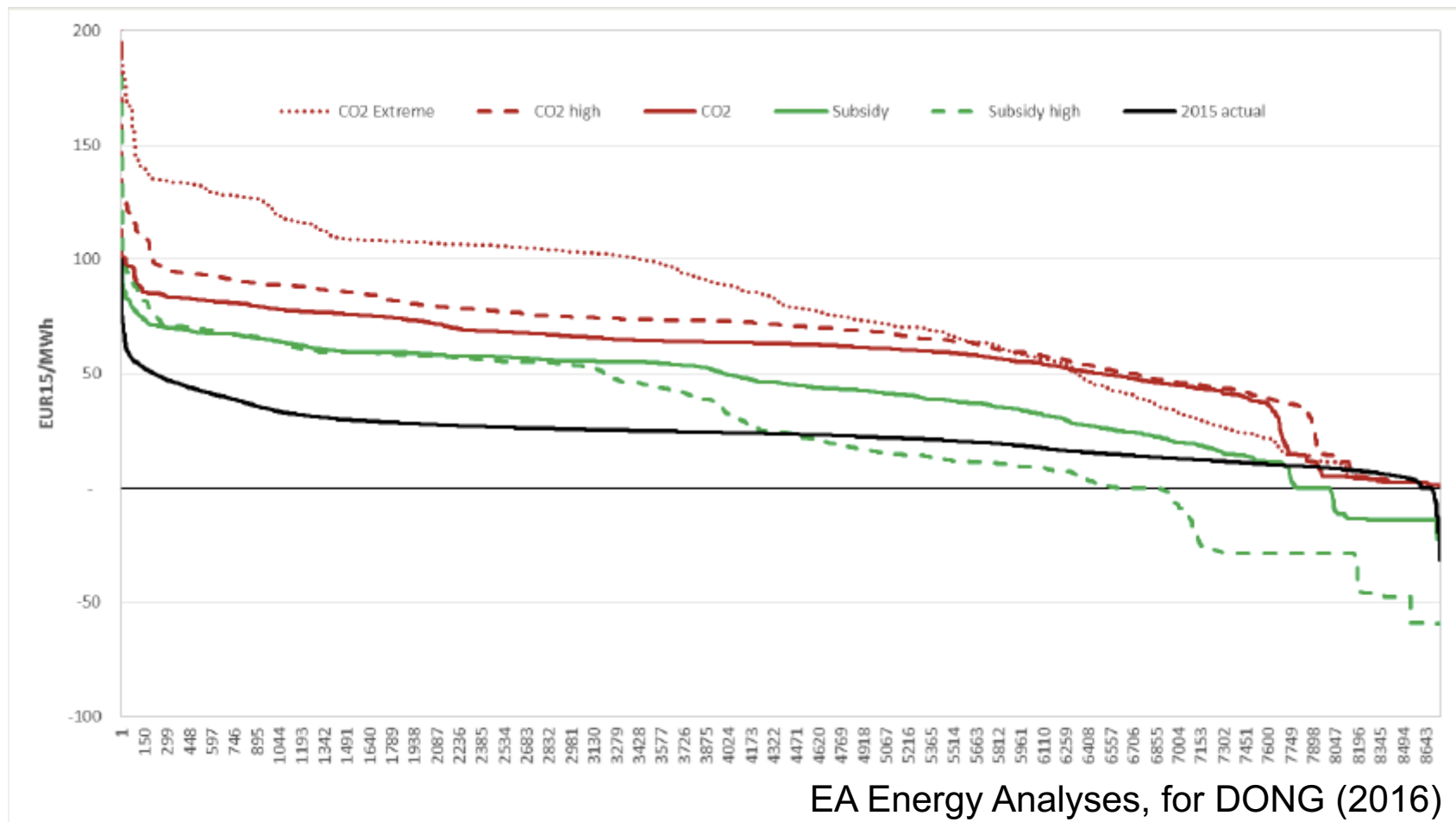


Administrative RA mechanisms



...plus (perhaps) a transitional strategic reserve

Energy prices in high-RES scenario



Higher and more volatile...no price collapse

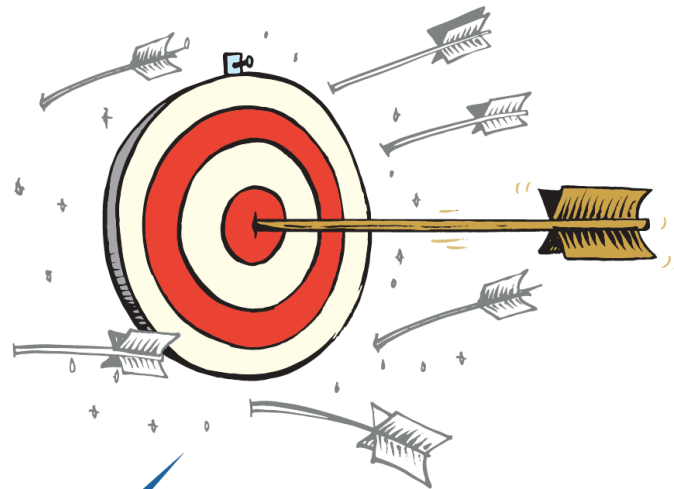
*For more
information...*

Hitting the Mark on Missing Money:

How to Ensure Reliability at Least Cost to Consumers

Author

Michael Hogan



**RAP®**Energy solutions
for a changing world

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.raponline.org

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