



Benefits and challenges of demand response in the wholesale market

Australian Institute of Energy / Young Energy Professionals — Sydney, 28 April 2014

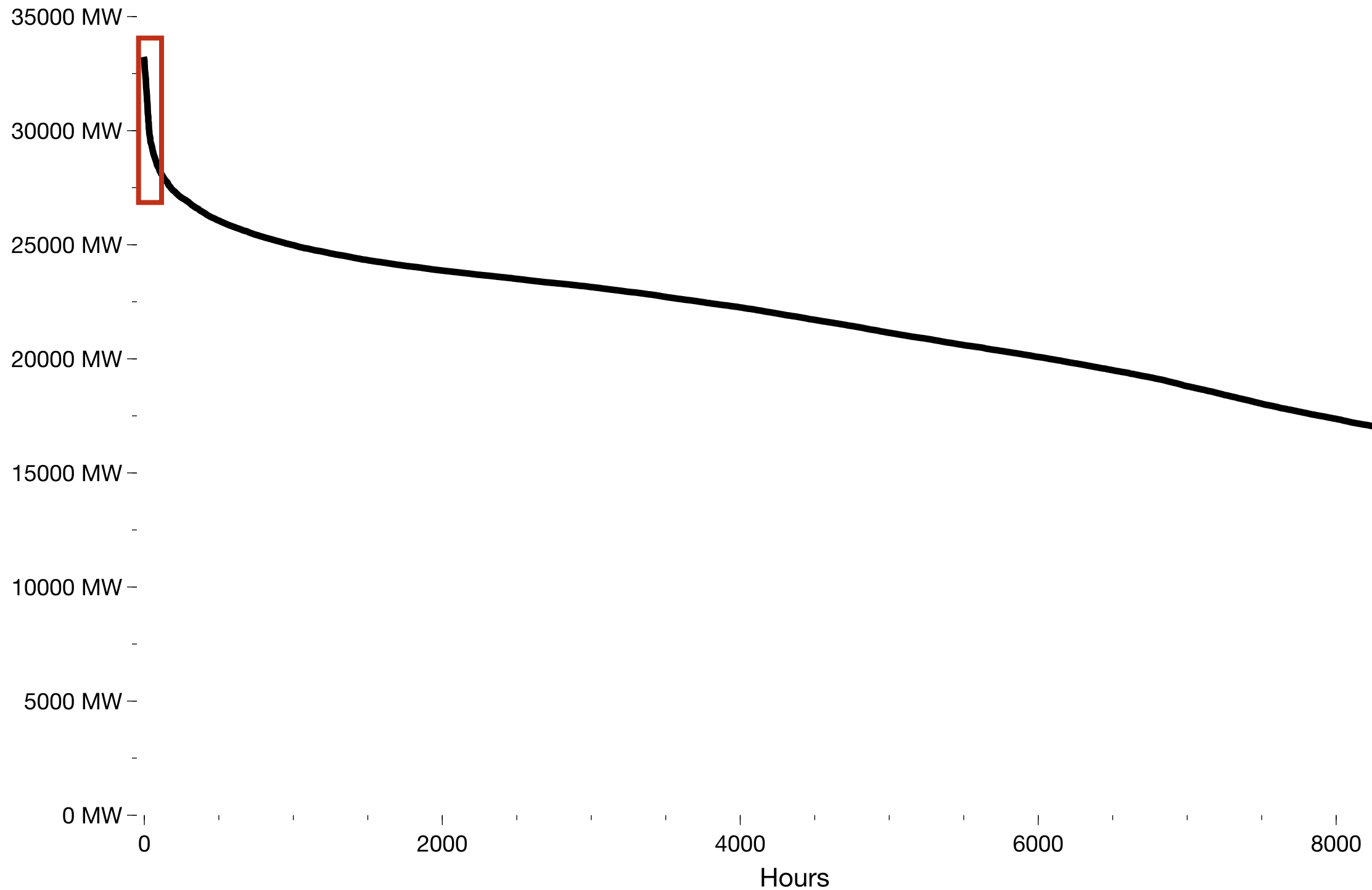
Overview

- Why is wholesale demand response a good thing?
- What's the problem in the NEM at the moment?
- What challenges may arise in the future?



■ Why is wholesale DR a good thing?

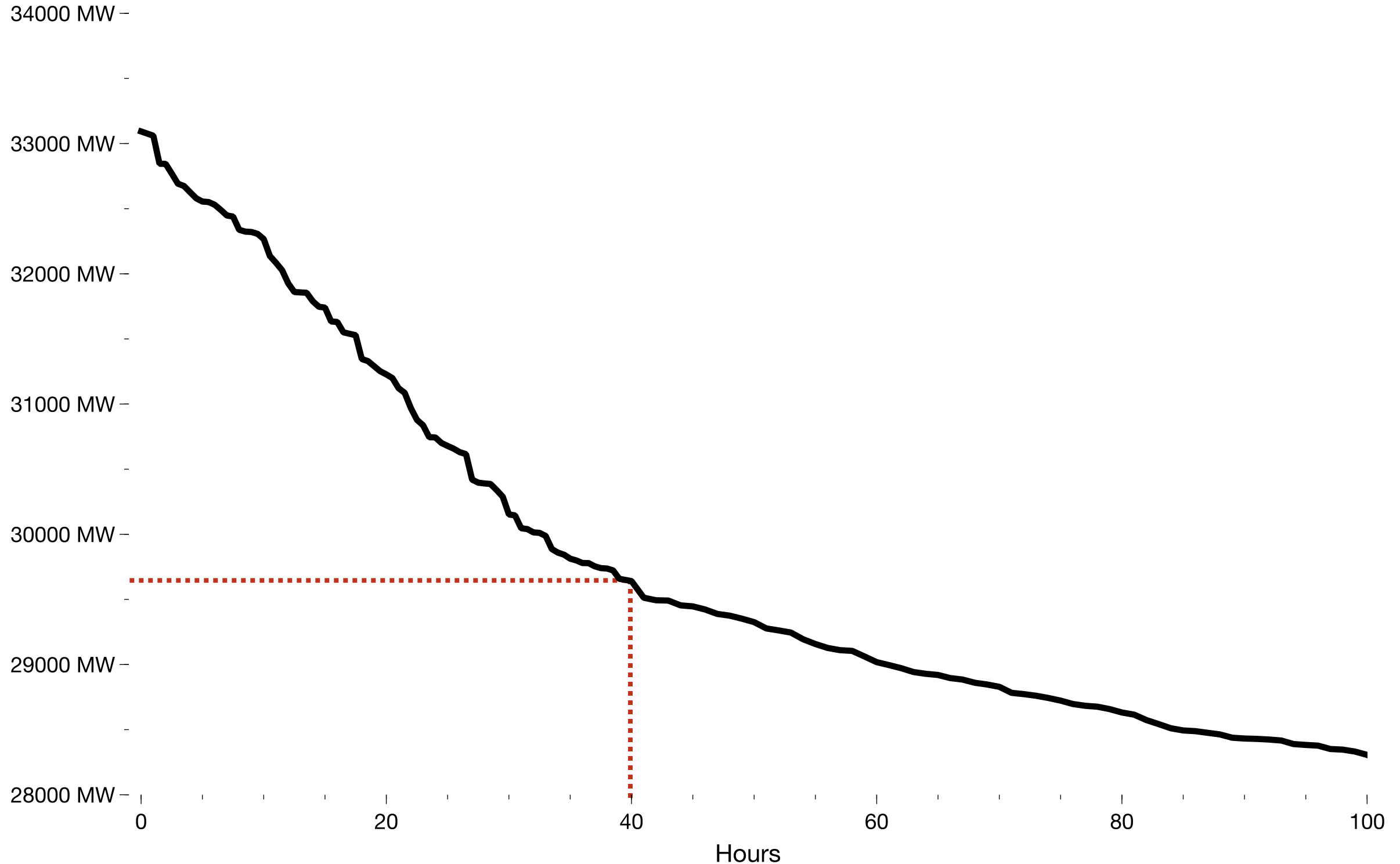
Conventional technology mix



Data: AEMO "total demand" for all NEM regions, year ending 31 March 2014

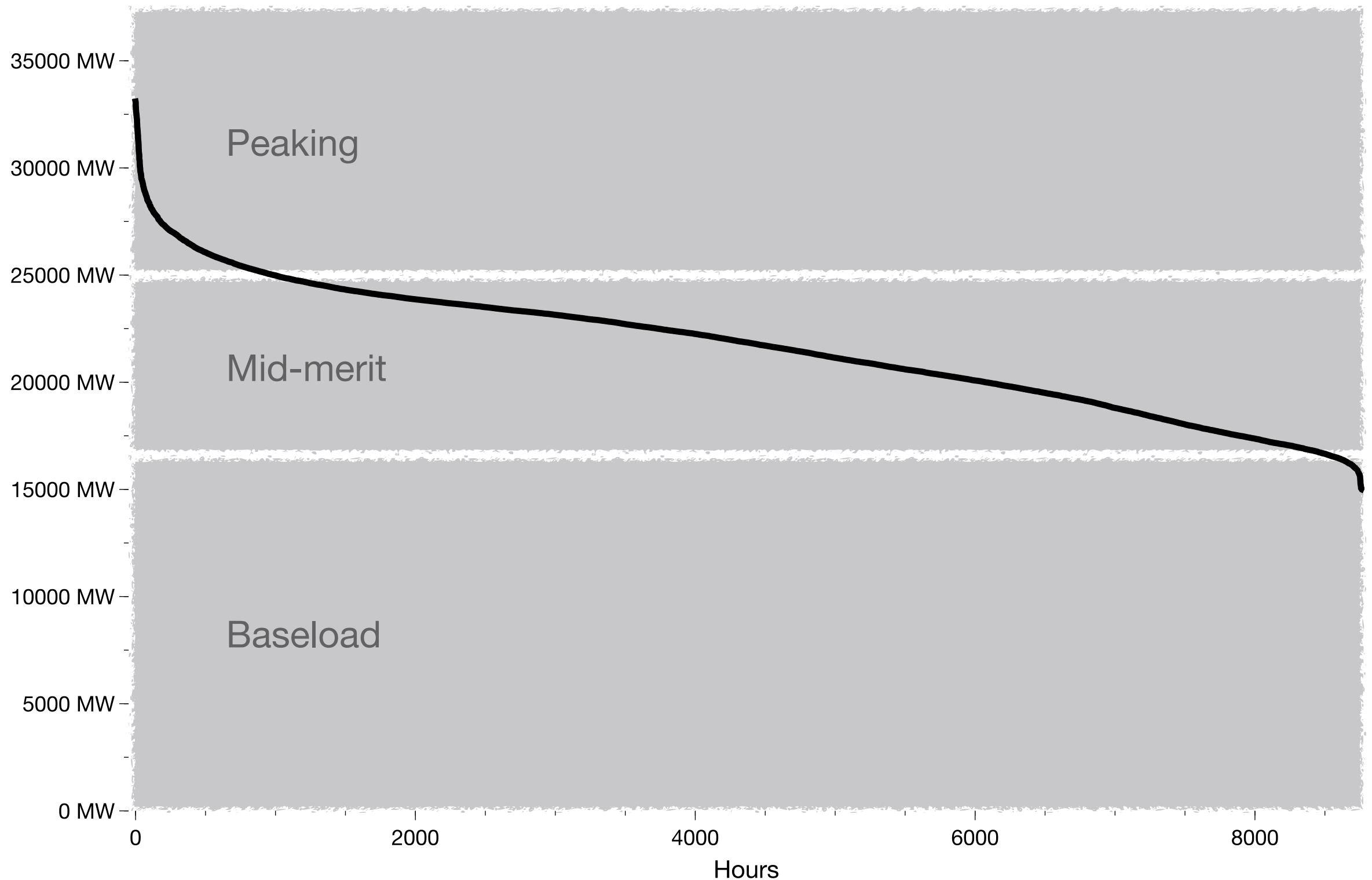
Much demand occurs for only a few hours

Over 10% of peak demand is there for 40 hours or fewer



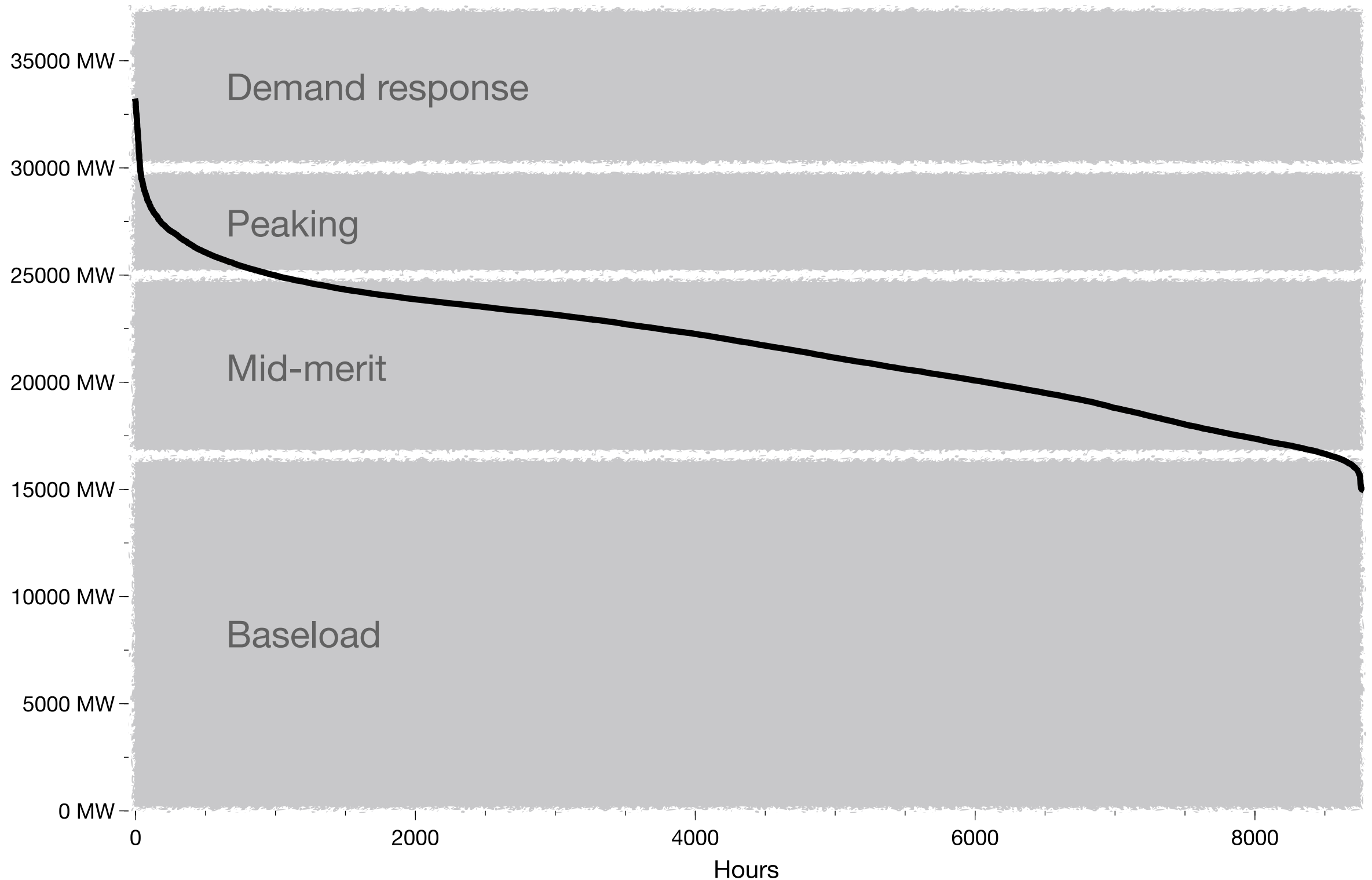
Data: AEMO "total demand" for all NEM regions, year ending 31 March 2014

Conventional technology mix



Data: AEMO "total demand" for all NEM regions, year ending 31 March 2014

More efficient technology mix



Data: AEMO "total demand" for all NEM regions, year ending 31 March 2014

Why is wholesale demand response a good thing?

Benefits for participating customers

- They are financially rewarded for their flexibility

Benefits for all consumers

- Increased competition leads to lower wholesale and hedge prices
- The load factor seen by the generation fleet improves, lowering costs

Benefits for networks

- Peak demand growth is reduced, so less network augmentation is needed
- Engaged consumers make price signals in tariffs more effective
- Presence of aggregators makes demand management projects easier and cheaper





■ What are the problems for DR in the NEM?

Customers have limited options for wholesale DR

Exposing themselves to the spot price

- They have to manage volume and pricing risk themselves, 24x7
- This only suits large sophisticated customers

Selling it to their retailer

- Many retailers aren't interested in buying DR
- Retailers generally aren't good at procuring DR

There is no third option

- They cannot shop around for a better deal elsewhere

As a result, DR penetration is low in the NEM

Markets which make provision for DR have much higher levels of participation

Market	DR capacity	% of capacity
PJM	14,118 MW	8.6%
WEM	499 MW	8.4%
ISO-NE	2,164 MW	7.4%
NYISO	2,248 MW	6.7%
NEM	820 MW	1.6%

PJM: 2014/15 Base Residual Auction results, Doc #645284, p. 9. 14,118.4 MW of DR cleared in the RPM; 2014/15 RPM Base Residual Auction parameters, Doc #631095, p. 2. Forecasted peak of 164,758 MW.

WEM: IMO, Summary of Capacity Credits for the 2011 Reserve Capacity Cycle (October 2013-2014).

NYISO: NYISO's Demand Response Programs. Donna Pratt, Manager Demand Response Products. May 2011; NYISO Press Release, 22 July 2011. Peak demand reached 33,454 MW on 21 July 2011.

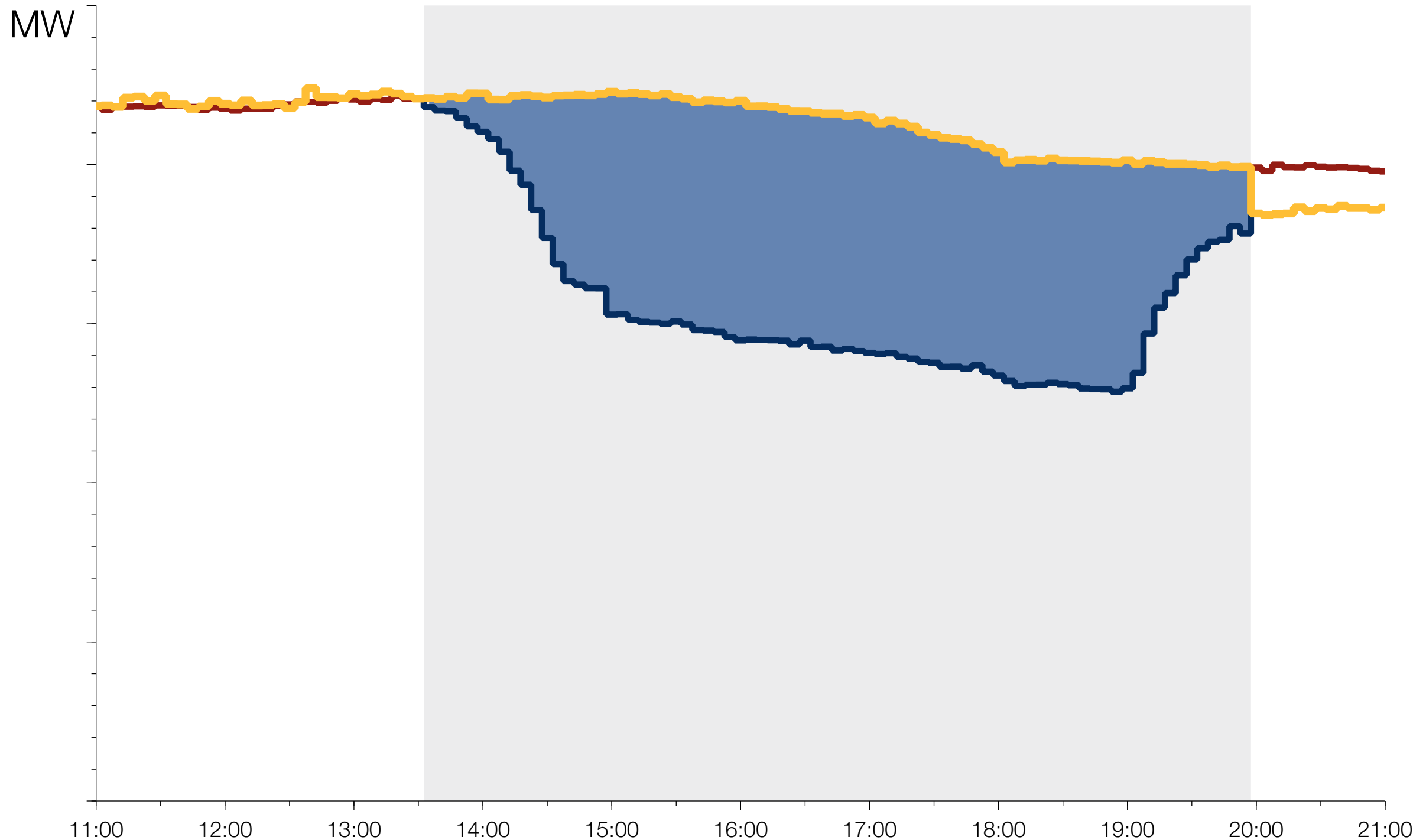
ISO-NE: Forward Capacity Auction 5 (FCA5, 2014-15) Results Summary, 2011; ISO Installed Capacity Requirements, PAC Meeting, July 2011. Compares cleared FCA5 MW to the CELT 2011 Forecast 50/50 Peak of 29,380 MW for 2015 Capability Year.

NEM: AEMO 2013 NEFR estimated available DSP at MPC for summer 2013-14, compared to total registered generation, Oct 2013.

Demand response mechanism

Allows DR to be treated like generation in the wholesale market

- Baseline
- Consumption
- DR
- Retail energy



Data: EnerNOC portfolio during PG&E dispatch on 9 Aug 2012, with uncapped baseline adjustment.

Demand response mechanism

A minimal reform to allow widespread DR participation

Unbundles DR procurement from retail supply

- Customers can shop around for the best deal for their DR
- Can still sell to their own retailer if they wish
- Should lead to a competitive market for DR, including specialist aggregators

Treats wholesale DR like non-scheduled generation

- Customers earn the spot price for their load reductions
- Aggregated DR is likely to be offered as hedges
- AEMO decided scheduled participation was too hard for initial implementation

Generators and retailers don't like it

- Introduces additional competition to generators in the wholesale and hedge markets
- Breaks exclusivity of retailers' relationships with customers

The state of play with the DRM

Implementation

SCER decision at its December 2012 meeting.



AEMO to establish an advisory stakeholder working group upon SCER direction.



AEMO to submit rule change proposal to the AEMC no later than December 2013.



AEMO develop guidelines and procedures in parallel to rule change process.

The mechanism should commence no later than early 2015.

Now mid-2016?

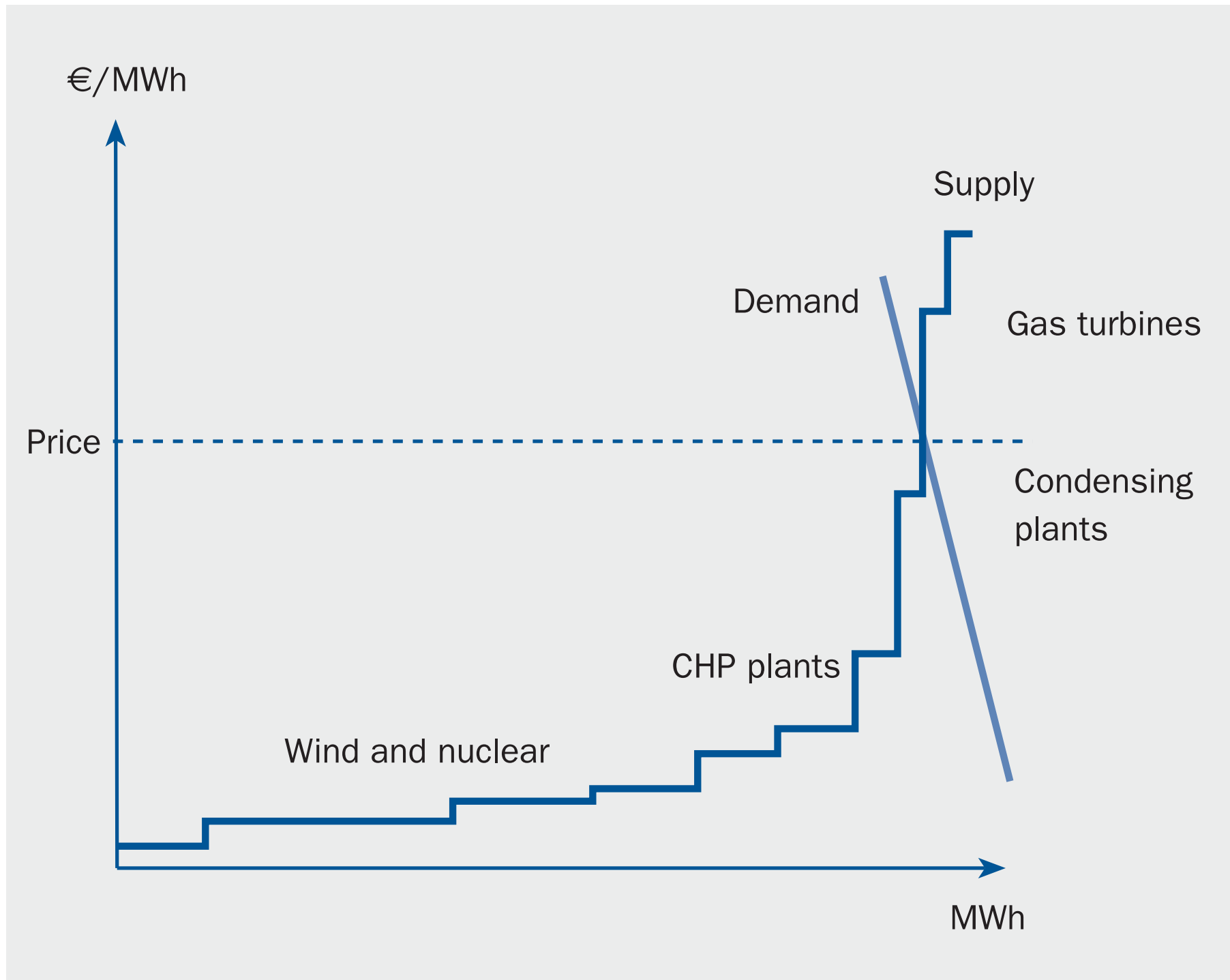
Additional cost-benefit analysis first.



■ What other issues may be important?

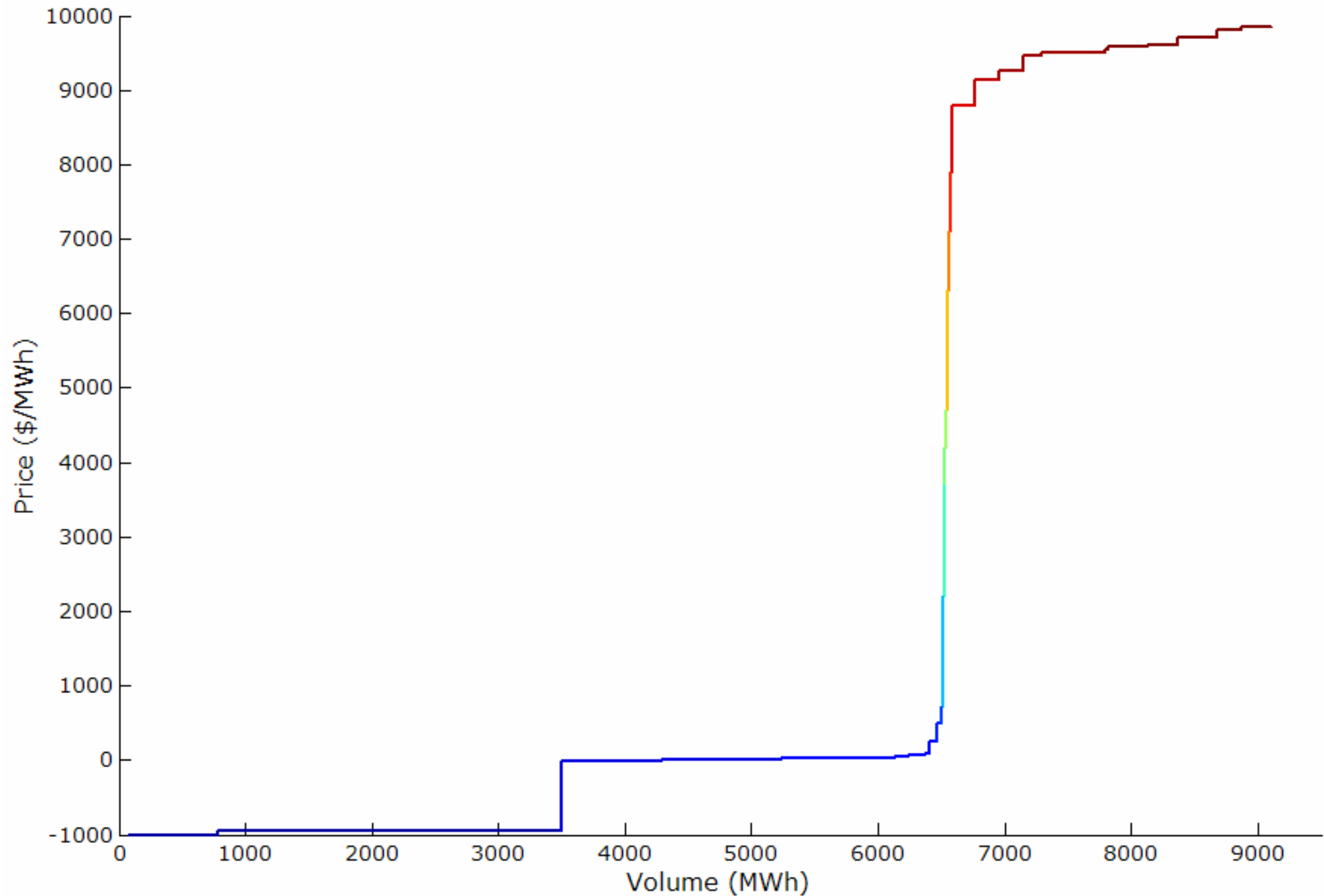
Typical electricity market supply curve

It's a curve, and it's fairly static. The demand changes, but the supply curve doesn't.



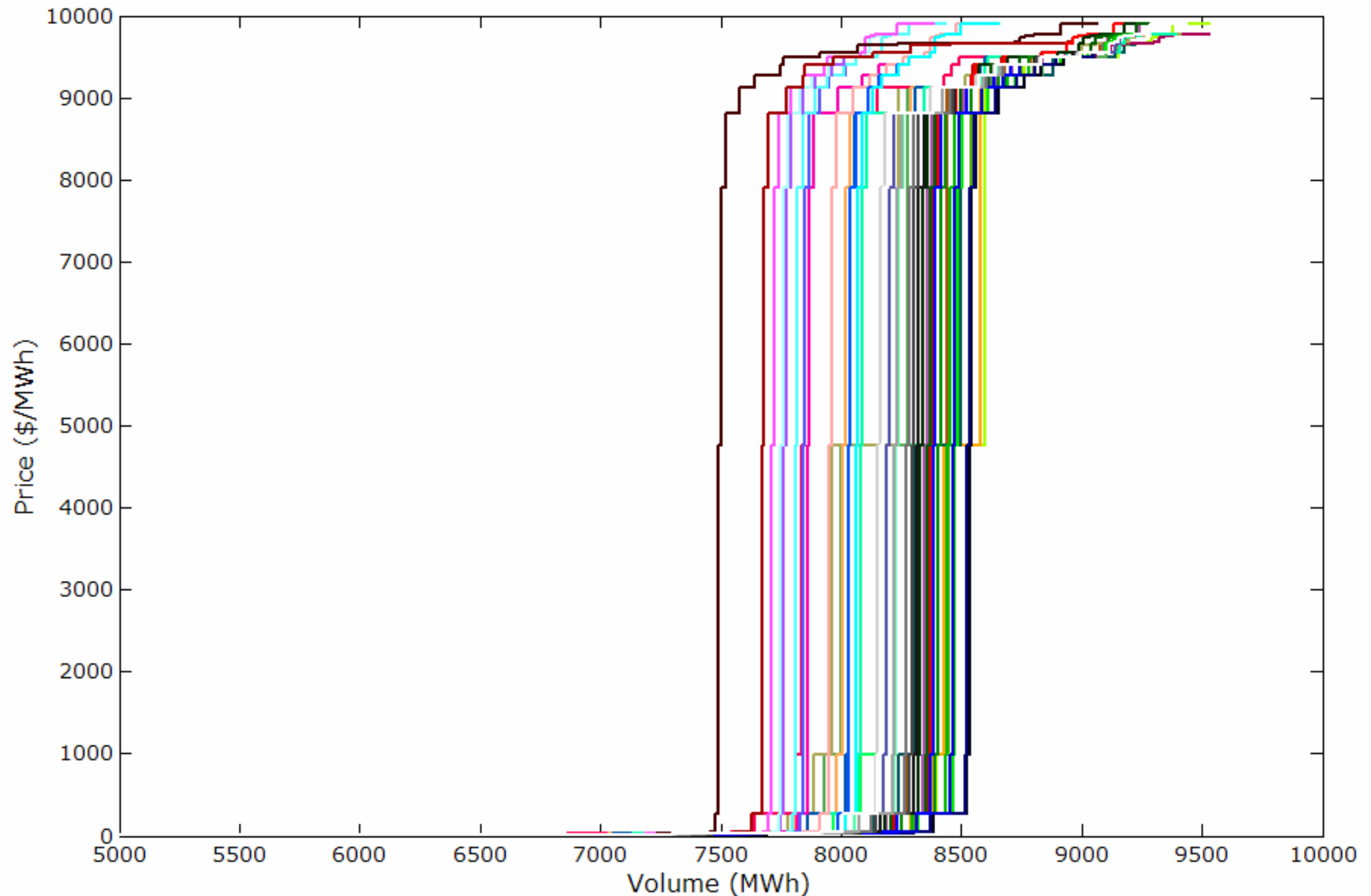
NSW supply curve

Most of the capacity is offered at very high or very low prices



NSW supply curves over the course of a day

The vertical transition moves around, as load is moved from high to low price bands



NEM dispatch needs to be fixed

This affects all participants, not just DR, but it harms DR disproportionately

It doesn't work very well for scheduled generators

- They can't rely on AEMO to dispatch them when the price is above their offer price
- They can't rely on AEMO not to dispatch them when the price is below their offer price
- Hence everyone tries to avoid being scheduled

It doesn't work very well for consumers

- They don't discover the price until after they have consumed

These are a consequence of:

- Lack of a day-ahead or hour-ahead market
- 5 minute dispatch / 30 minute trading intervals
- Gate closure within the trading interval

Fixing these would result in more efficient dispatch

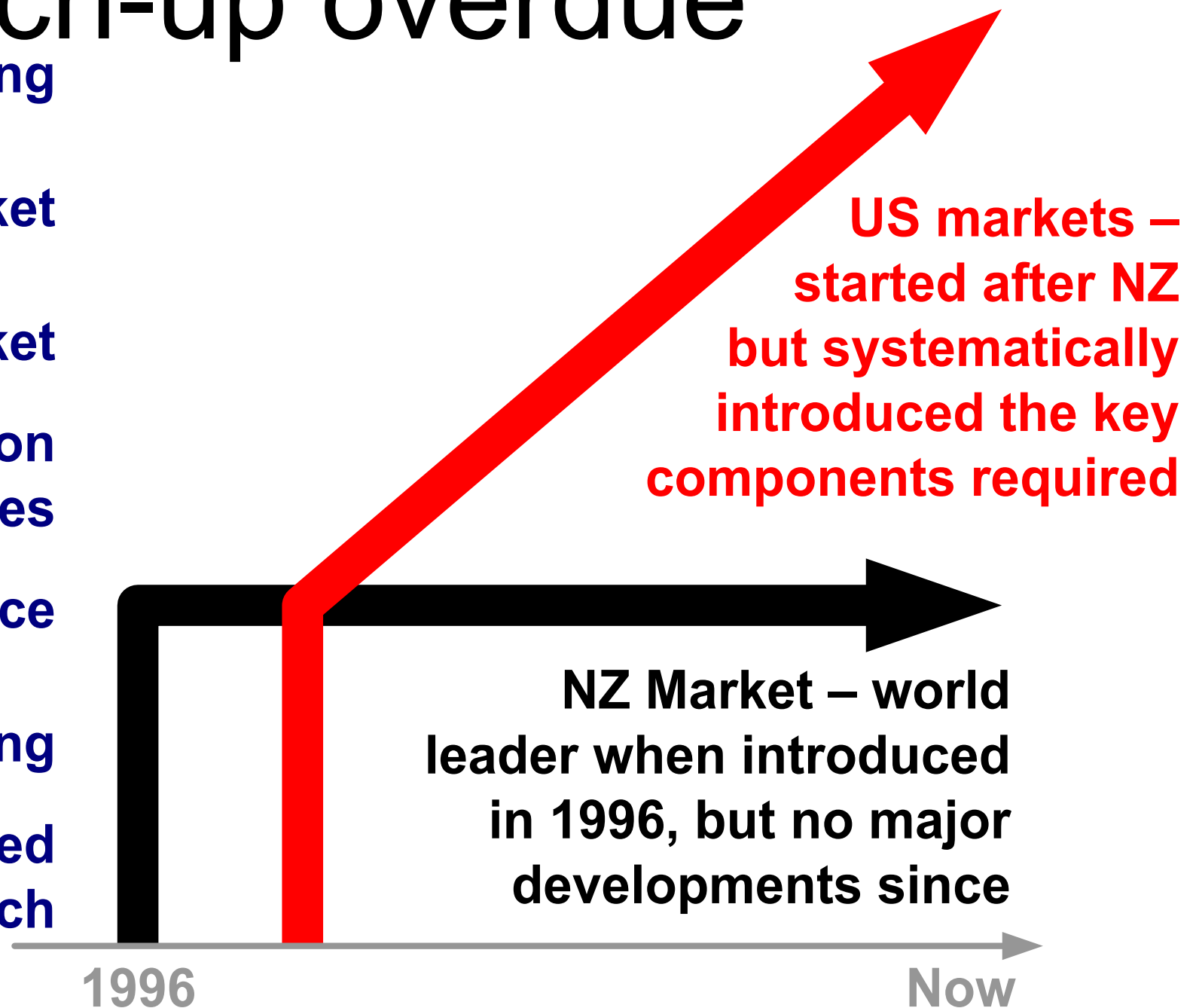
- Much less steep supply curve
- High level of voluntary scheduled participation

NZ market design has not evolved

Catch-up overdue

Key components of an efficient electricity market

Scarcity pricing
Day-ahead market
Capacity market
Transmission congestion hedges
Market surveillance
Nodal pricing
Bid-based economic dispatch





Dr Paul Troughton

Director of Regulatory Affairs

+64 404 522 002

ptroughton@enernoc.com

www.enernoc.com