Centre for Energy and Environmental Markets

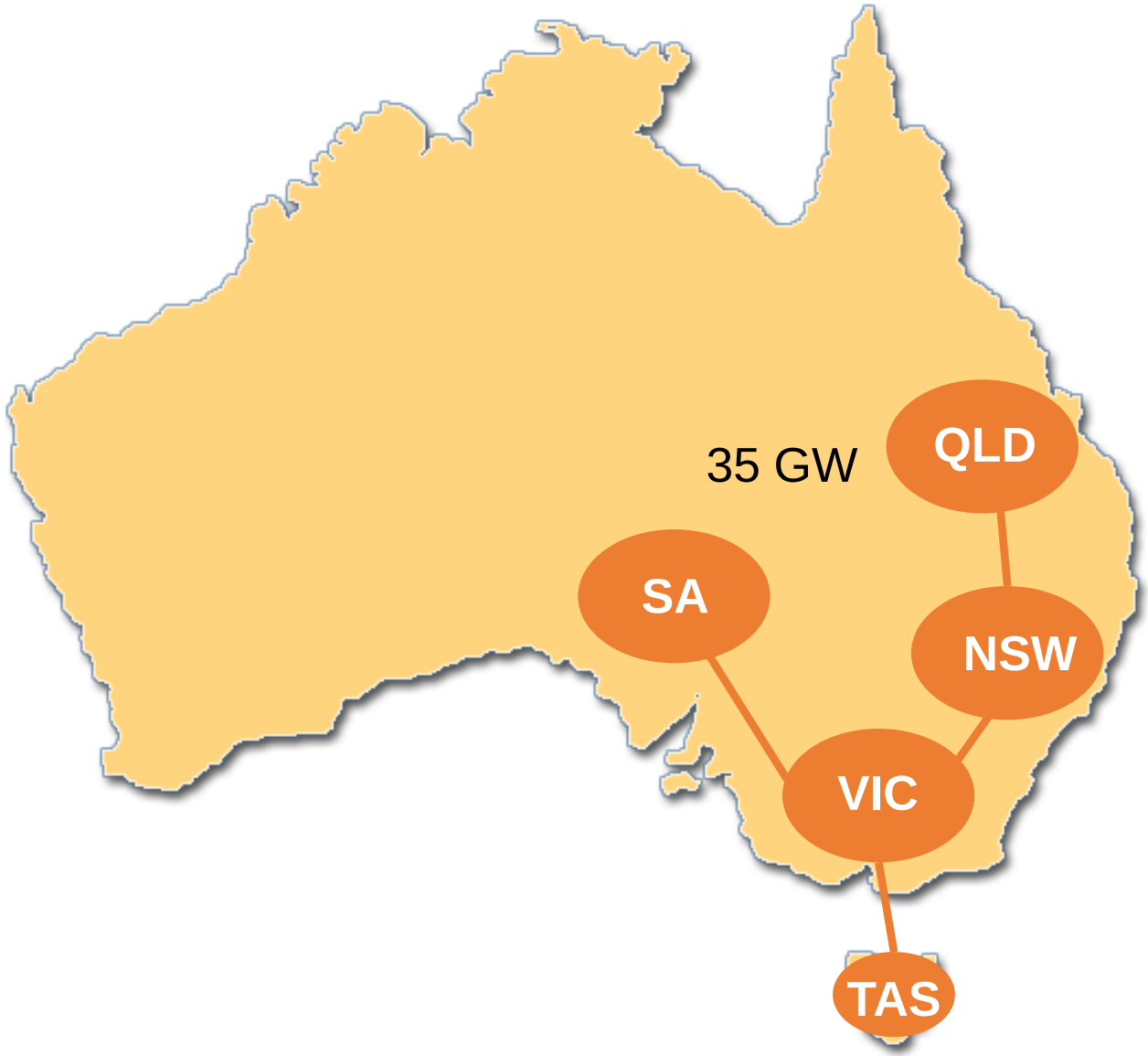
UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA

Will Australia's energy-only market work with high renewables?

Dr Jenny Riesz

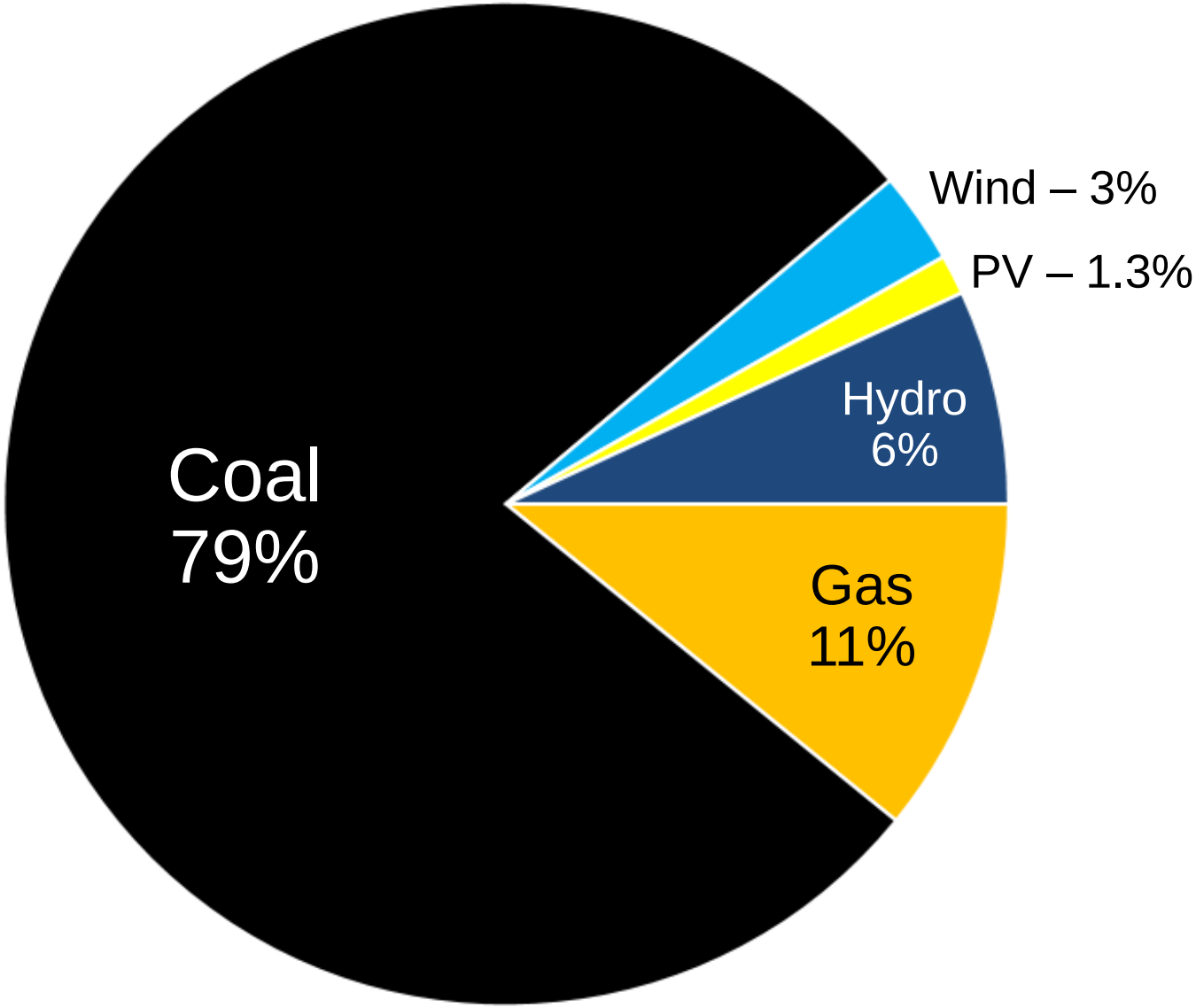
Solar Integration Workshop – 22nd October 2013

Australian National Electricity Market (NEM)

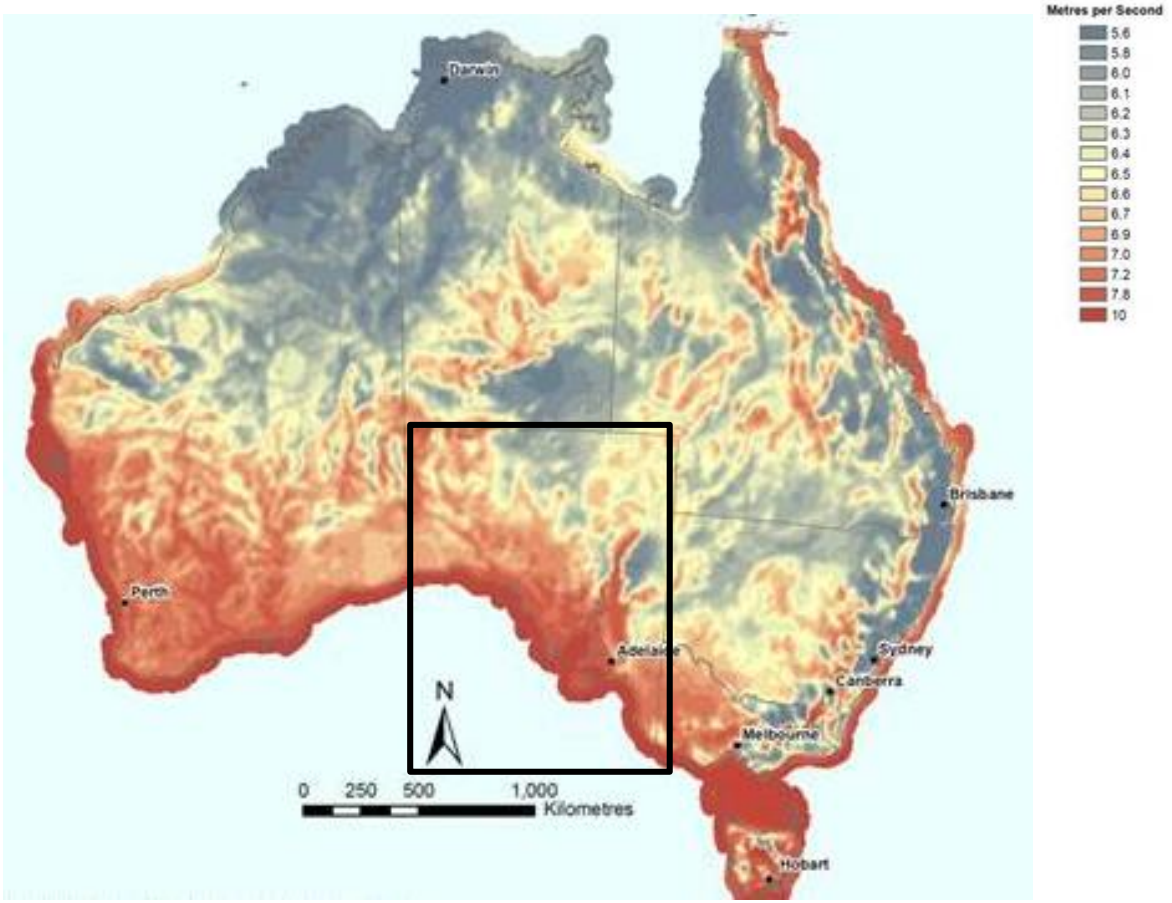


- Energy-only
- Market Price Cap = $13,100/MWh (>€9000)
- Exercise of transient market power viewed as important to avoid “missing money”
- Single platform real time market (no day-ahead market, units manage self commitment)
- 5min dispatch intervals
- Sophisticated frequency control ancillary services market (8am Thursday)

Electricity generation in the NEM



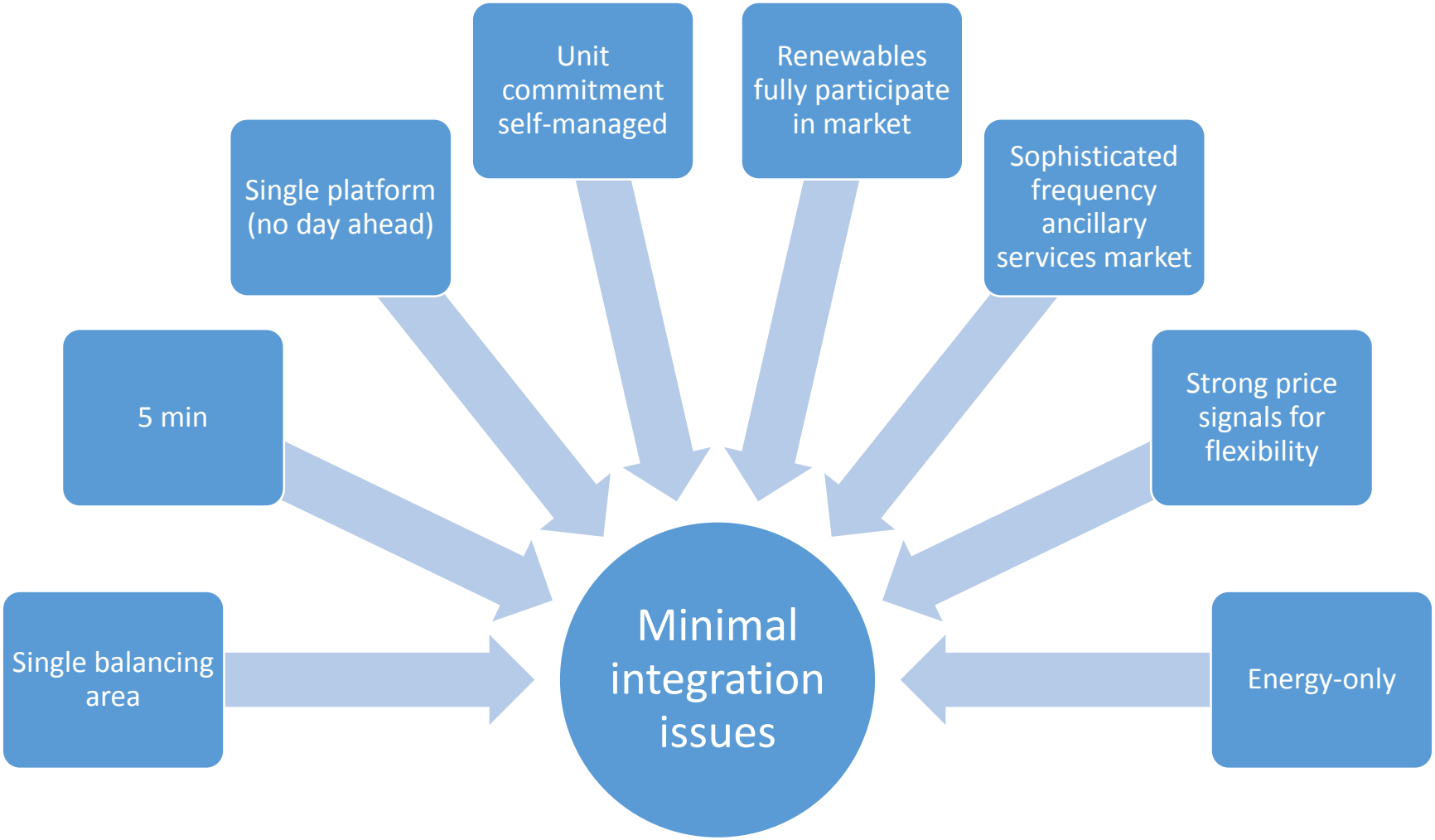
Renewable development – South Australia



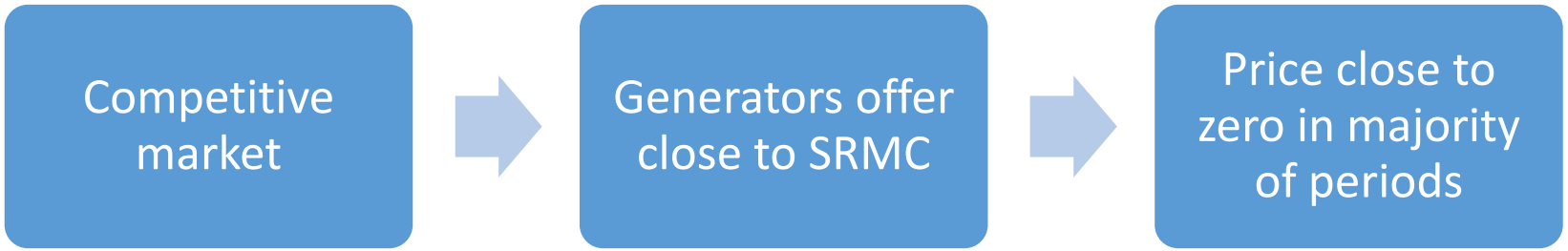
Mean wind speed 80m above ground level

- >30% energy from variable renewables
  - 27% wind
  - 4% rooftop PV
- >85% instantaneous

Renewable integration in the NEM



Will the NEM work with high renewables?

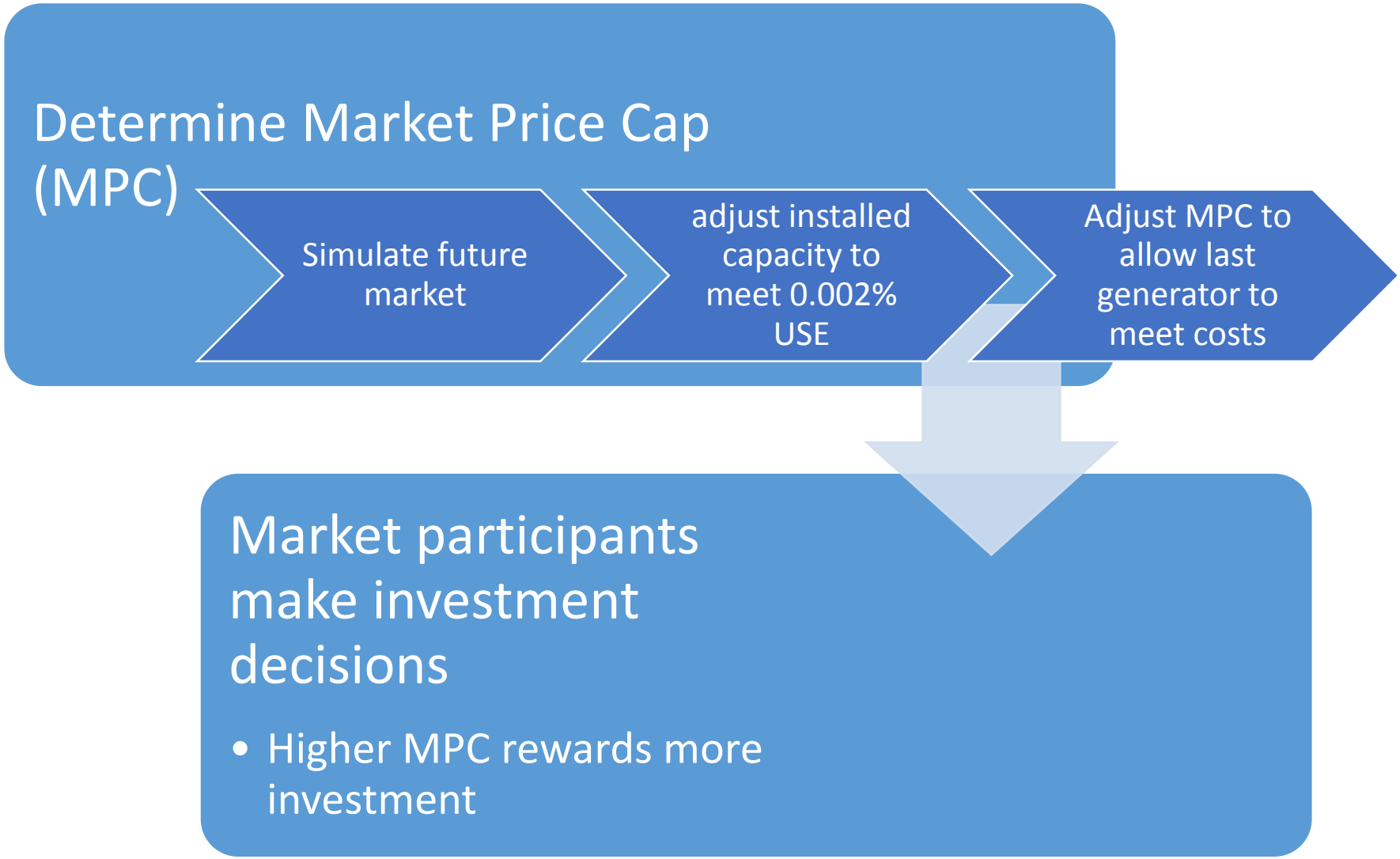


How do generators recover costs?

How do we maintain accurate investment incentives?

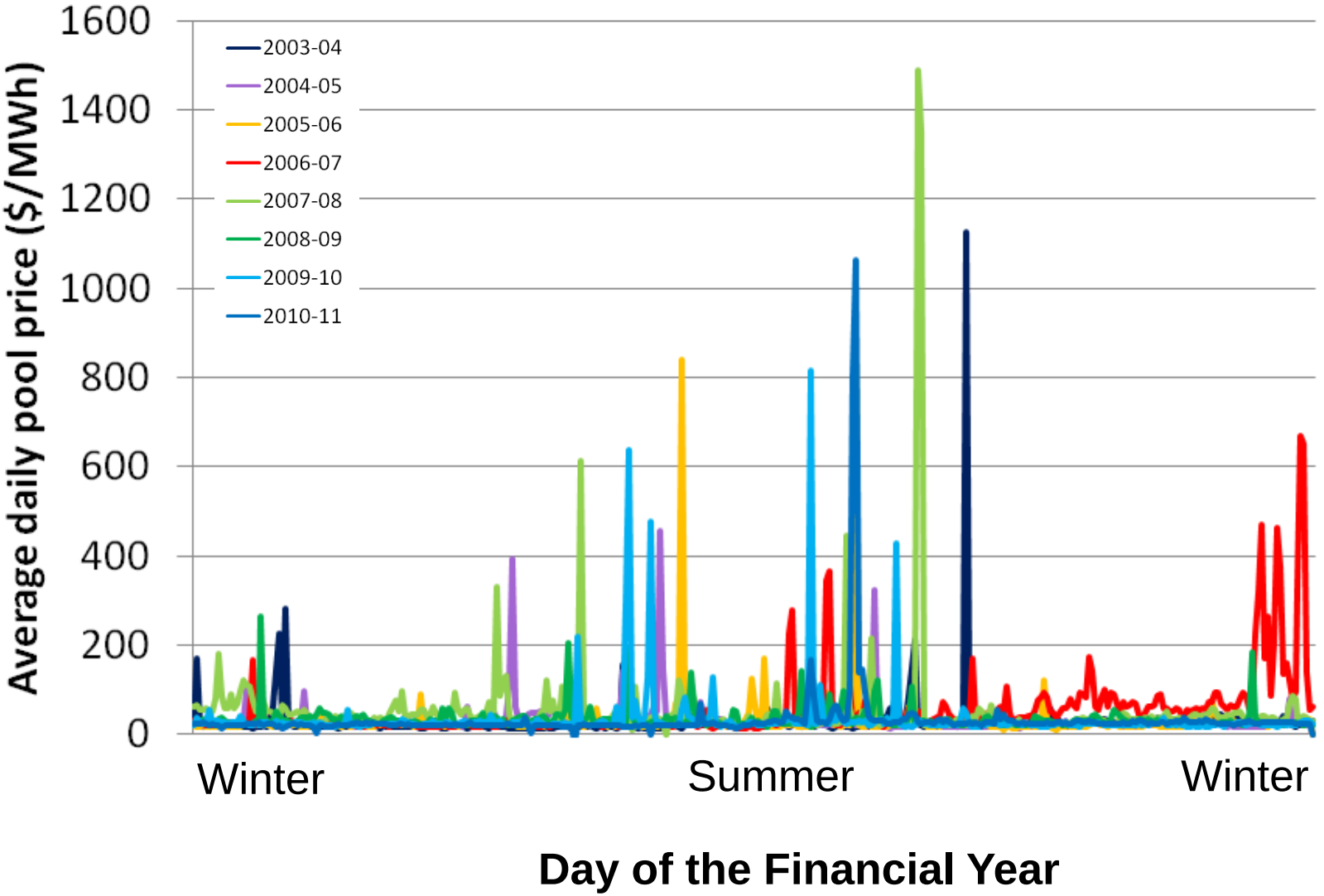
SYSTEM ADEQUACY

Managing system adequacy in the NEM



Price volatility

Generators already earn 20-50% of annual revenue in top 20 days of the year

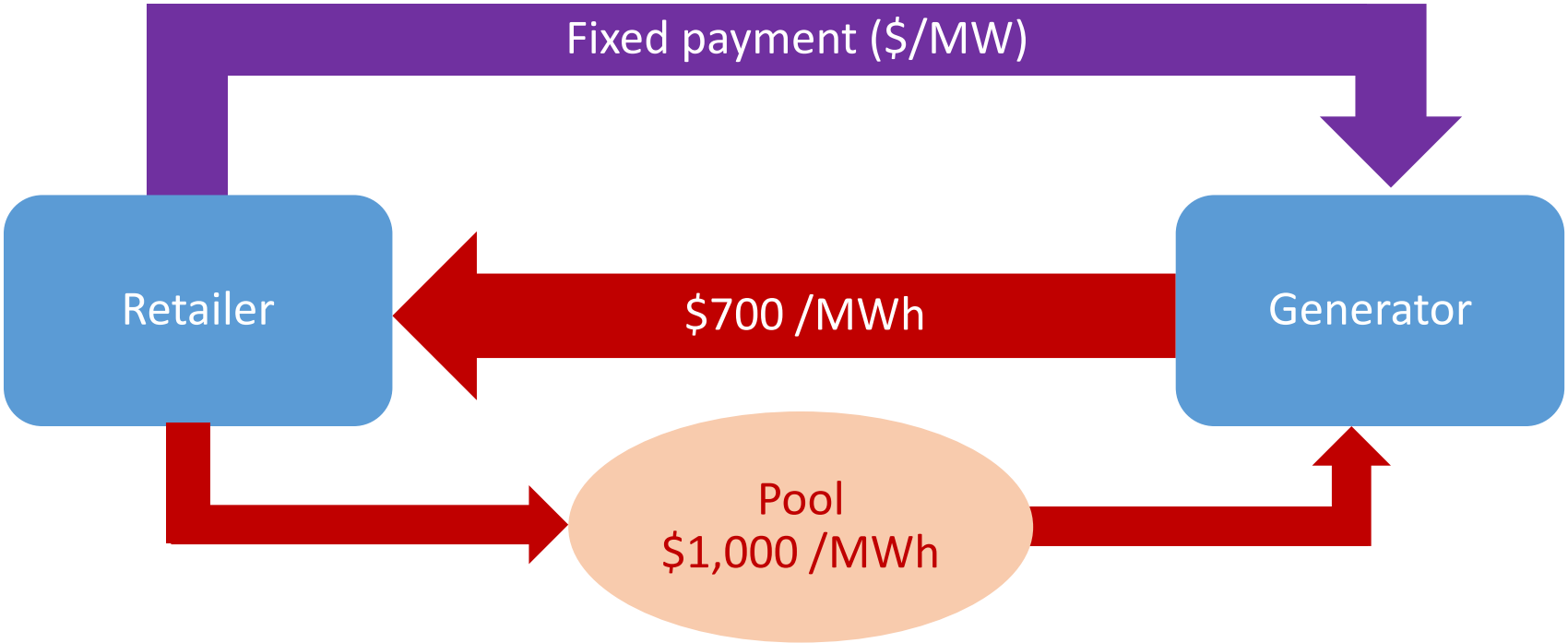


Managing price volatility

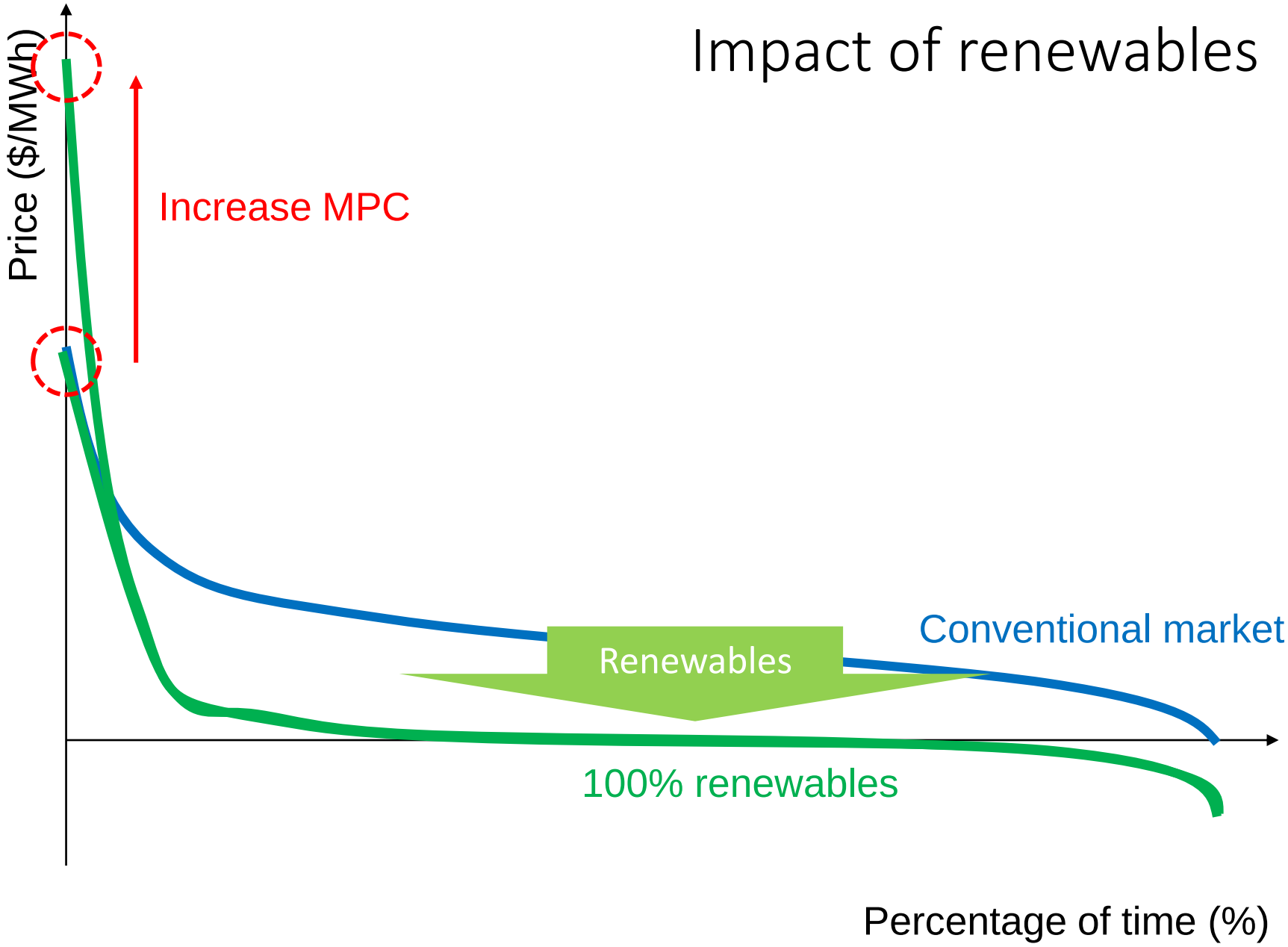
- Market participants manage price volatility via:
  - Contractual arrangements – mature derivatives market
  - Vertical integration

Provides many of the benefits of a capacity market, but market participants retain decision making

Cap contract:
($300 strike price)



Impact of renewables



How much would the MPC need to increase?

2009 selected for analysis (closest level of USE to the Reliability Standard)

Set all historical half-hourly prices below $300/MWh to zero

Multiply all remaining prices by a “scaling factor”

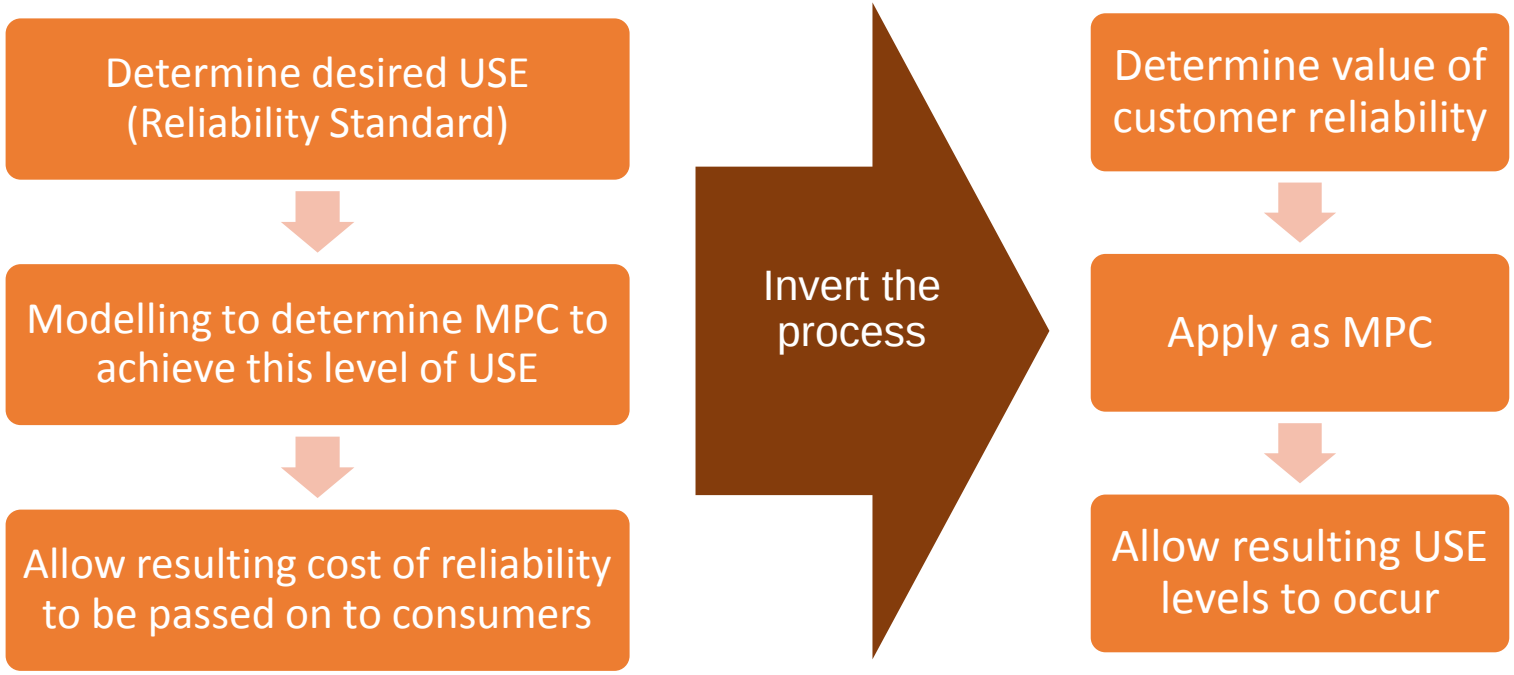
Adjust scaling factor so that total revenues earned achieve cost recovery (in aggregate) for 100% renewable system

How much would the MPC need to increase?

	Scaling Factor	MPC ($/MWh)
Level in 2009 (reference year)	1	$10,000
Maintaining historical aggregate revenues	3	$30,000
Sufficient aggregate revenues to support 100% renewables	6 - 8	$60,000 to $80,000

Perhaps this isn't crazy…

Renewables don't affect VCR



	Value of Customer Reliability ($/MWh)
Residential	20,710
Small business	413,120
Large business	53,300
Average	**94,990**

Oakley Greenwood, "NSW Value of Customer Reliability", Australian Energy Market Commission, 2012

Issues with increasing the Market Price Cap

Increased costs of hedging

Increased prudential obligations

- Increased barriers to entry

Discouragement of inter-regional contracting

- May interfere with generation locational decisions

Increasing importance of the contracts market

Consider:

- Close monitoring
- Mechanisms for increased transparency
- Disincentivise vertical integration?
  - Reduces liquidity and contracting options

Demand Side Participation

Why have a Market Price Cap?

- Demand is inelastic
- Need to protect consumers

Increase DSP sufficiently → True representation of "value of lost load" in market, for each consumer → No MPC required

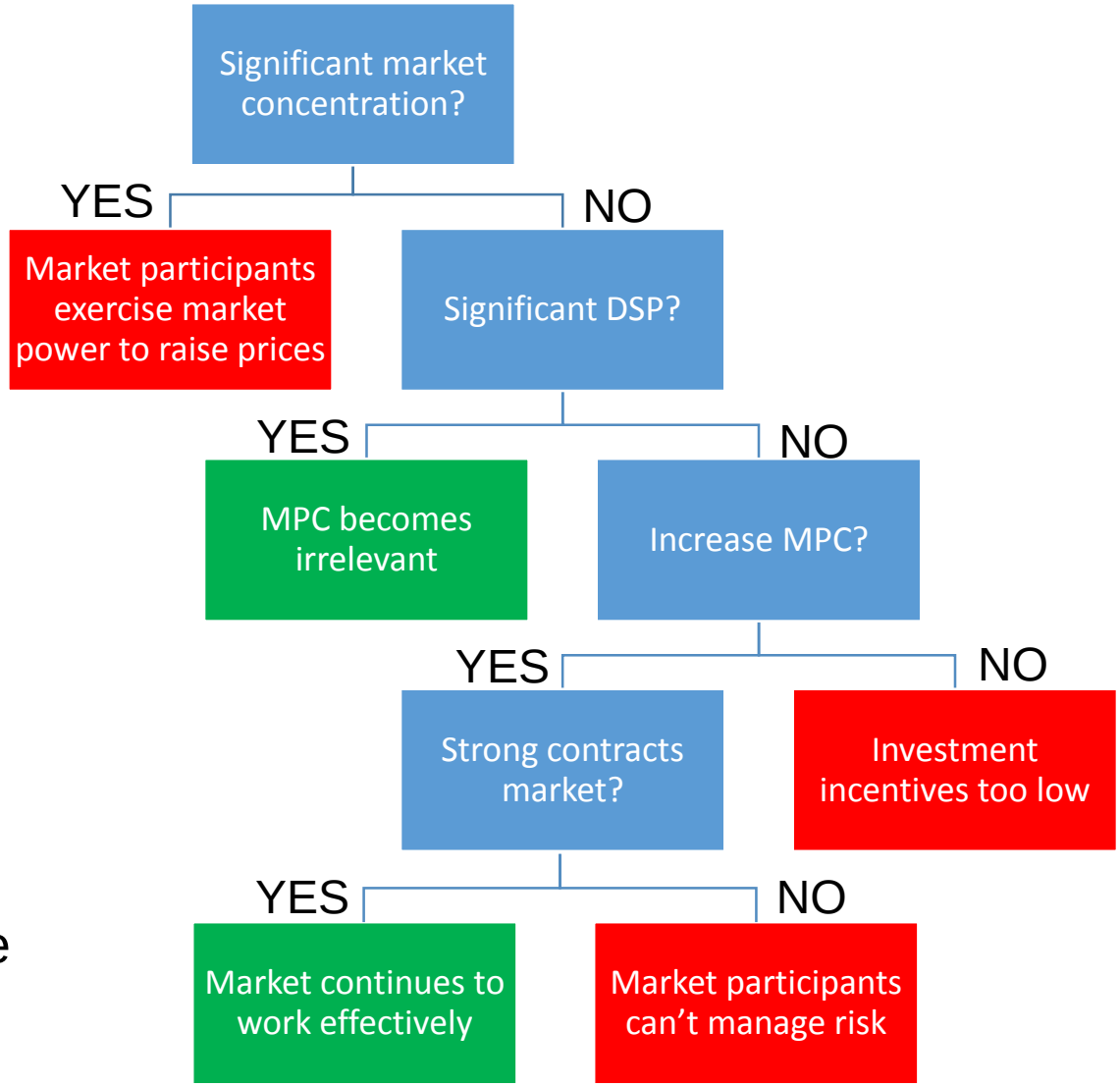
Conclusions

More renewables

Prices close to zero in majority of periods

- Not that different from the present NEM
- Already:
  - High price volatility
  - Market Price Cap » generator SRMC
  - Participants manage risk via contracts or vertical integration

Will the energy-only market work?



Constant monitoring is wise – new issues will arise over time

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Thank you

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