



Australia's National Energy Market

**IEA Electricity Security Advisory
Panel**

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Date
23 June 2016

A brief history of the NEM

- The NEM supplies around 19 million people
- 40,000km of transmission lines and cables
- Supplies about 200 TWh of energy to businesses and households each year
- The NEM is an energy-only gross pool
- 4 GW PV capacity distributed throughout the system



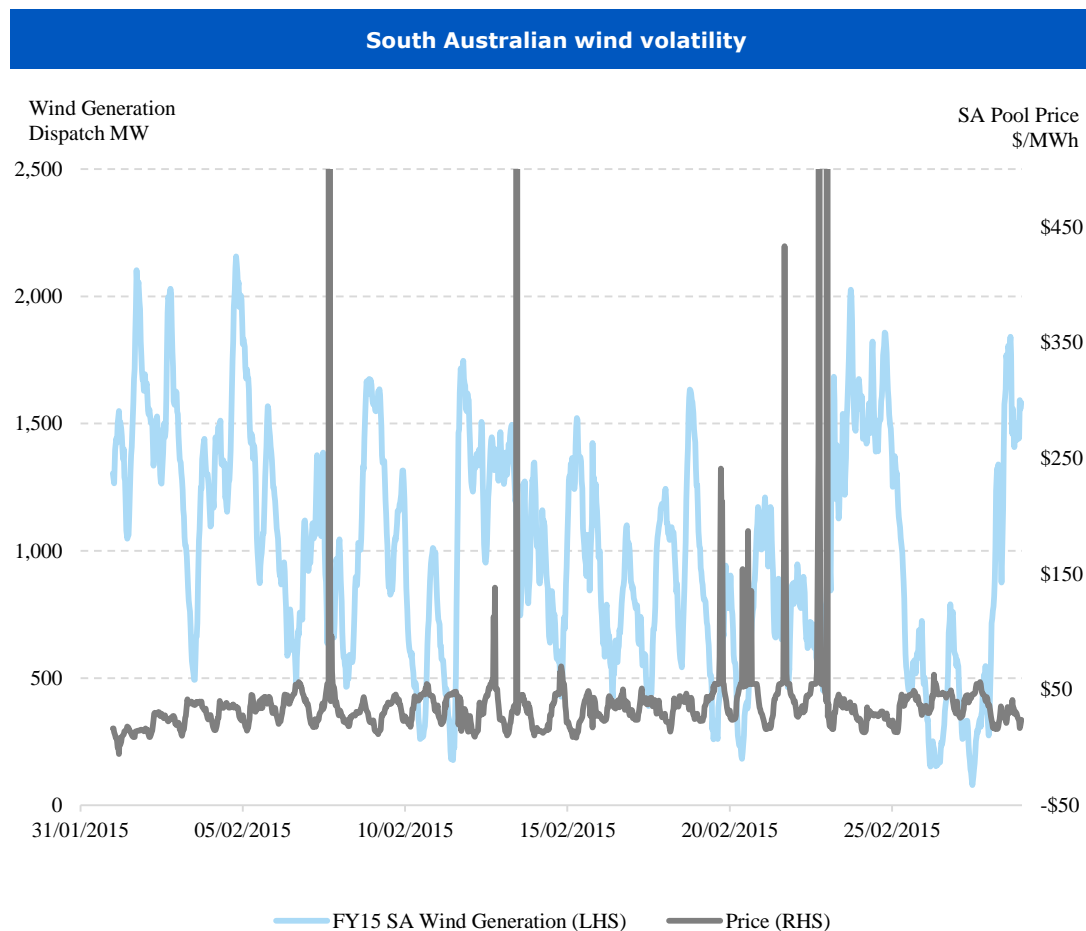
An examination of the situation in South Australia

- Peak demand in the range of between 3,000 MW to 3,300 MW
- One of the peakiest systems: 2.4 times
- Wind represents 29% of total registered capacity and supplies 37% of total electricity consumption
- 7% of South Australia's total energy consumption sourced from distributed solar PV
- 2 GW of renewable capacity in a system with peak demand of around 3 GW to 3.5 GW
- Only 10% of wind capacity and 31% of solar capacity in South Australia can be relied upon
- Total firm capacity is now less than 3 GW but peak demand is between 3 GW and 3.2 GW



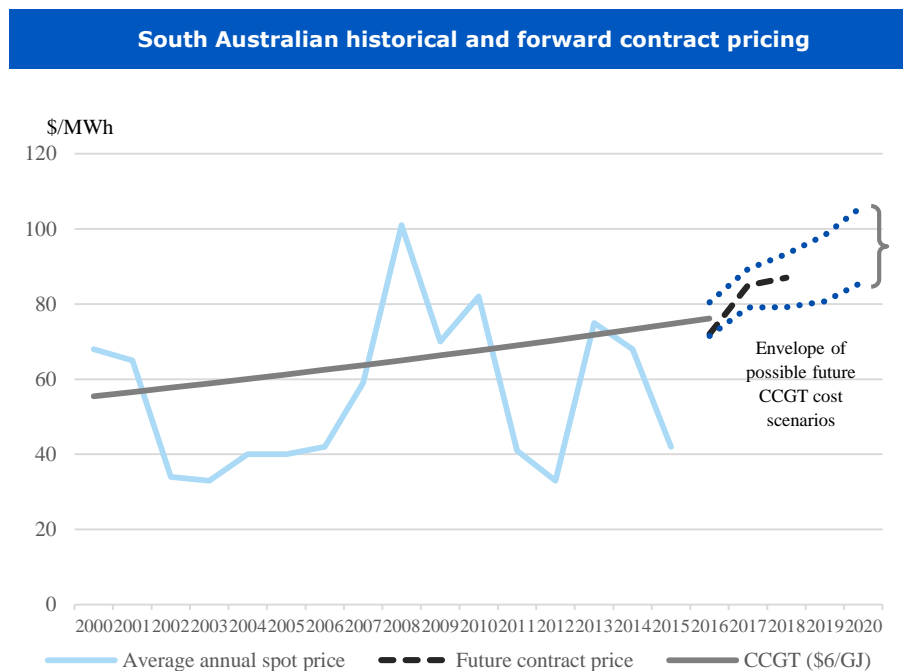
Lessons learned and where to from here

- Energy-only markets unsuitable in systems with high renewable energy
- Market price cap in the NEM (currently \$13,900) would need to increase to around \$80,000 per MWh
- Extreme volatility is unacceptable to customers, governments and investors



Lessons learned and where to from here

- Short-run (minutes to days) could be served by dynamic pool-style market that reflects efficient dispatch
- Medium-term (3-5 years) could be served by short-term firm capacity market to reflect fixed operating and maintenance costs
- Long-term (5+ years) could be served by long-term capacity market to reflect capital cost of new firm capacity



Integration with climate change policy

- Emissions reductions of 26-28% of 2005 levels by 2030
- Age-based operations limit on existing thermal generation
- Large-scale renewable energy incentives to ensure retired capacity is replaced with zero emissions renewable energy



Concluding remarks
