



Re-Powering NSW 2016

Opportunities for wind energy

27 October 2016



Our generation, your future

Infigen - Australia's leading wind energy business



LAKE BONNEY 1

Location: South Australia
Status: Operational March 2005
Installed Capacity: 80.5MW
Turbine: 46 Vestas V66



CAPITAL

Location: New South Wales
Status: Operational January 2010
Installed Capacity: 140.7MW
Turbine: 67 Suzlon 2.1MW S88



ALINTA

Location: Western Australia
Status: Operational January 2006
Installed Capacity: 89.1MW
Turbine: 54 NEG Micon NM82



LAKE BONNEY 3

Location: South Australia
Status: Operational June 2010
Installed Capacity: 39.0MW
Turbine: 13 Vestas V90



LAKE BONNEY 2

Location: South Australia
Status: Operational September 2008
Installed Capacity: 159.0MW
Turbine: 53 Vestas V90



WOODLAWN

Location: New South Wales
Status: Operational October 2011
Installed Capacity: 48.3MW
Turbine: Suzlon 2.1MW S88

Infigen's NSW renewable energy investments

- **Operational**

- \$374 Million Capital Wind Farm near Bungendore, NSW
- \$115 Million Woodlawn Wind Farm, near Tarago, NSW
- Capital East Solar PV Demo/Energy Storage Facility

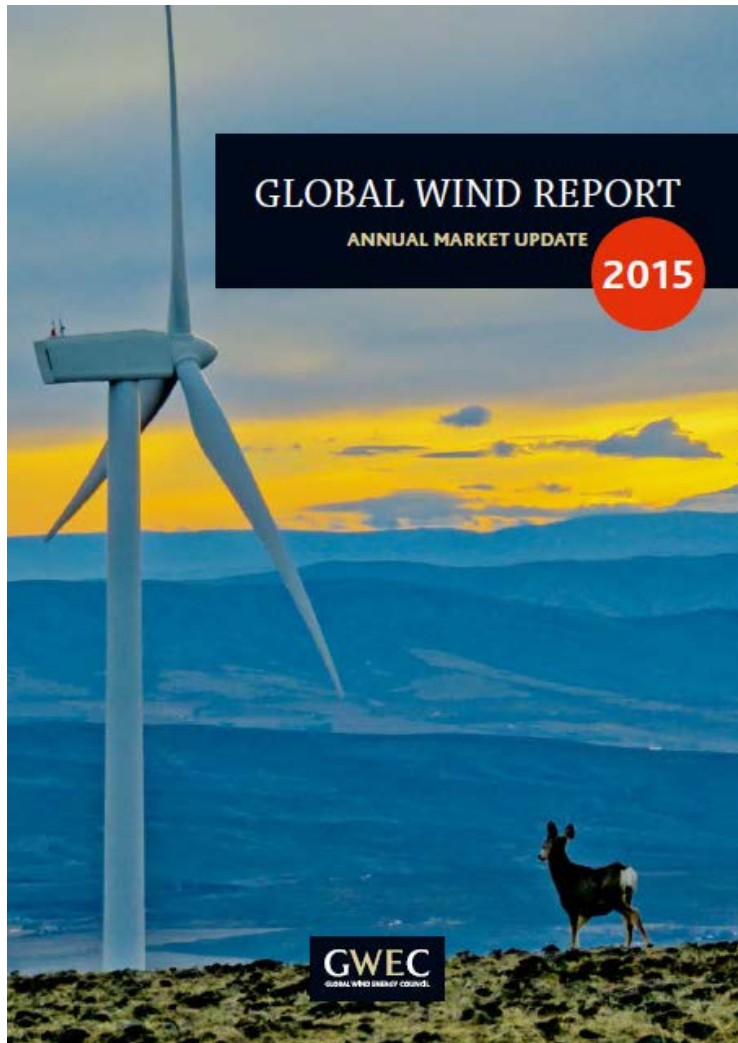
- **Planning Approved**

- 90-100 MW Capital II Wind Farm
- 90-100 MW Bodangora Wind Farm
- 100-115 MW Flyers Creek Wind Farm
- 37 MW Capital Solar PV Farm
- 40 MW Manildra Solar PV Farm

Infigen Energy is the largest owner of wind energy generation in NSW, and in Australia

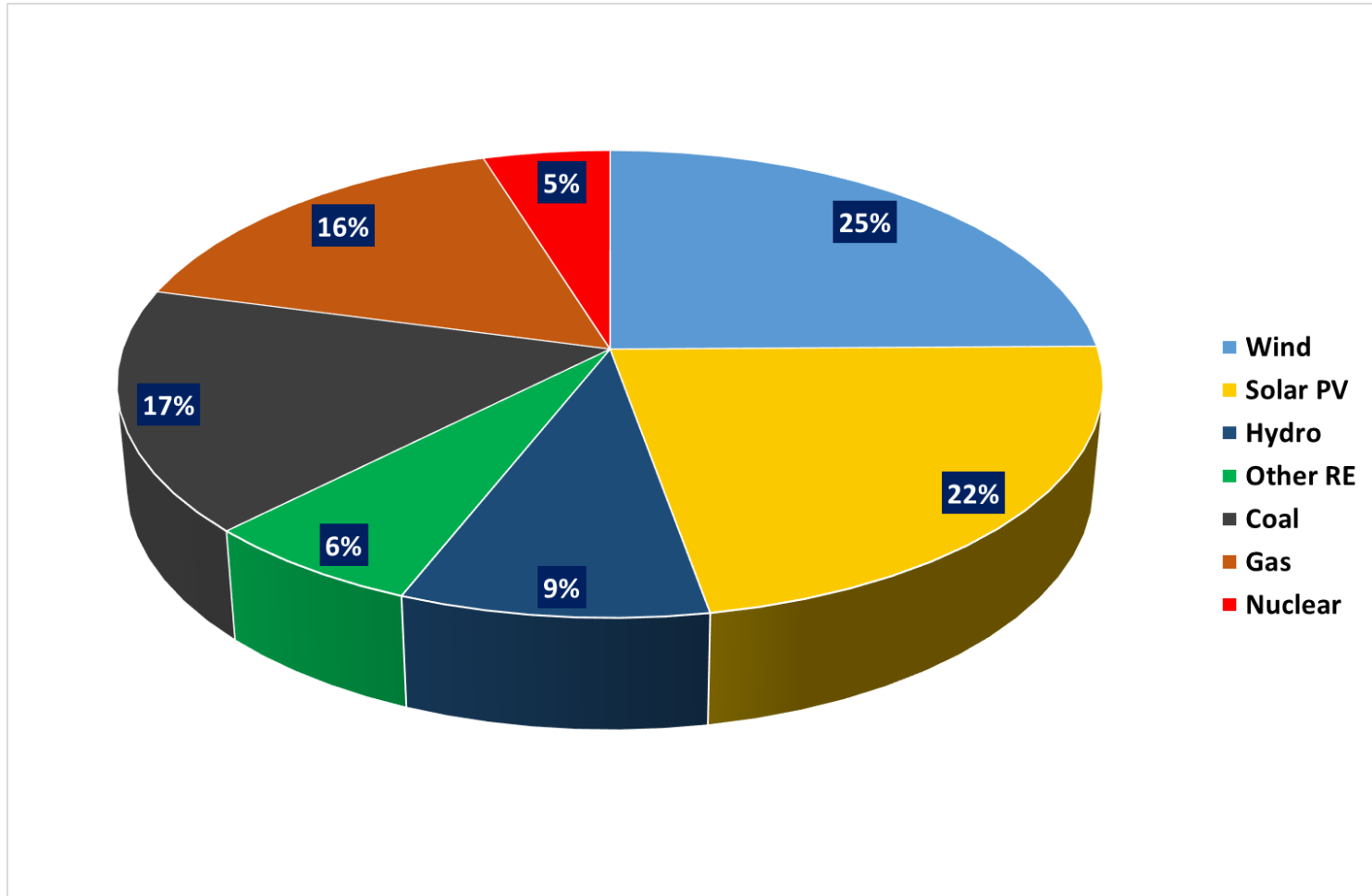


Global context: Wind Energy was #1 new build generation technology in 2015



More wind energy capacity was installed in 2015 than any other electricity generation technology

Global Context: Renewable technologies made up over half of electricity capacity additions worldwide in 2015

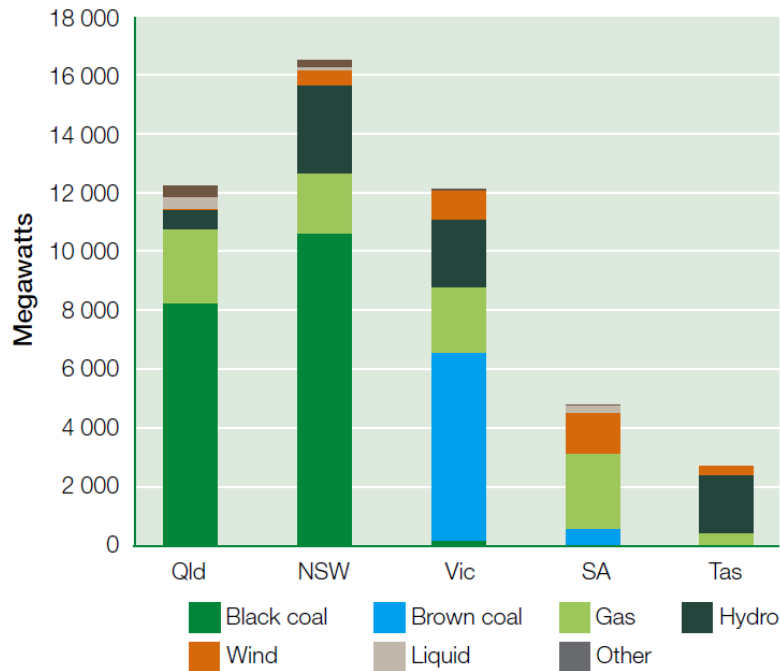


Renewable Energy Investments: Major Milestones Reached New World Record Set
United Nations Environment Programme, Bloomberg New Energy Finance March 14, 2016

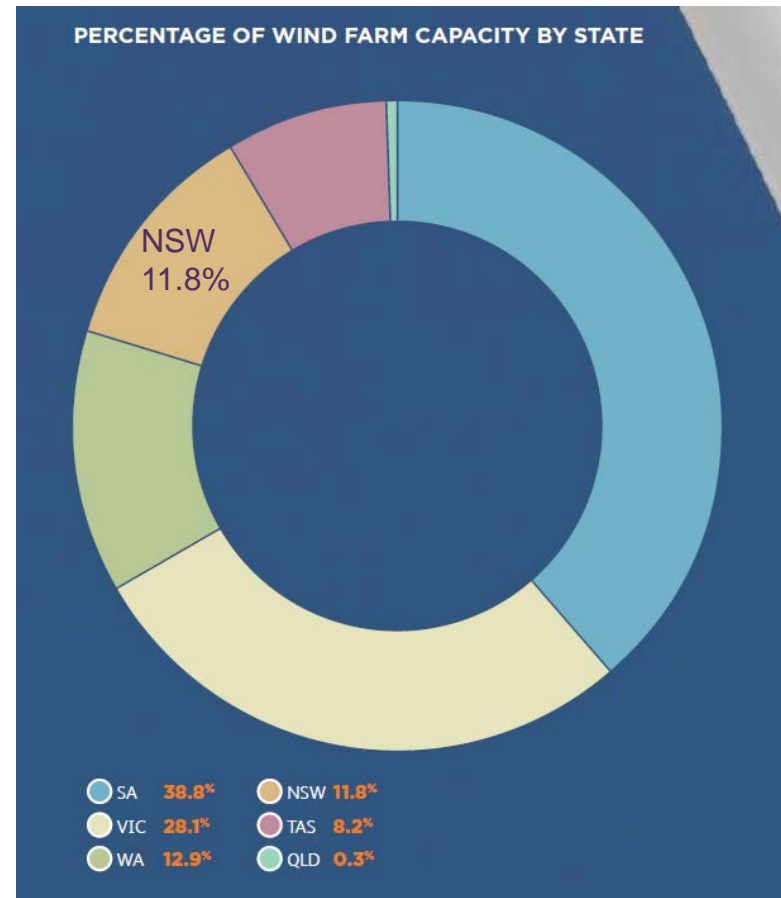
NSW context: wind energy's low base provides strong scope for growth



Generation capacity, by region and fuel source, 30 June 2015



Sources (figures 1.5–1.6): AEMO; AER.



Clean Energy Report 2014, CEC June 2015

NSW has natural advantages for wind energy deployment

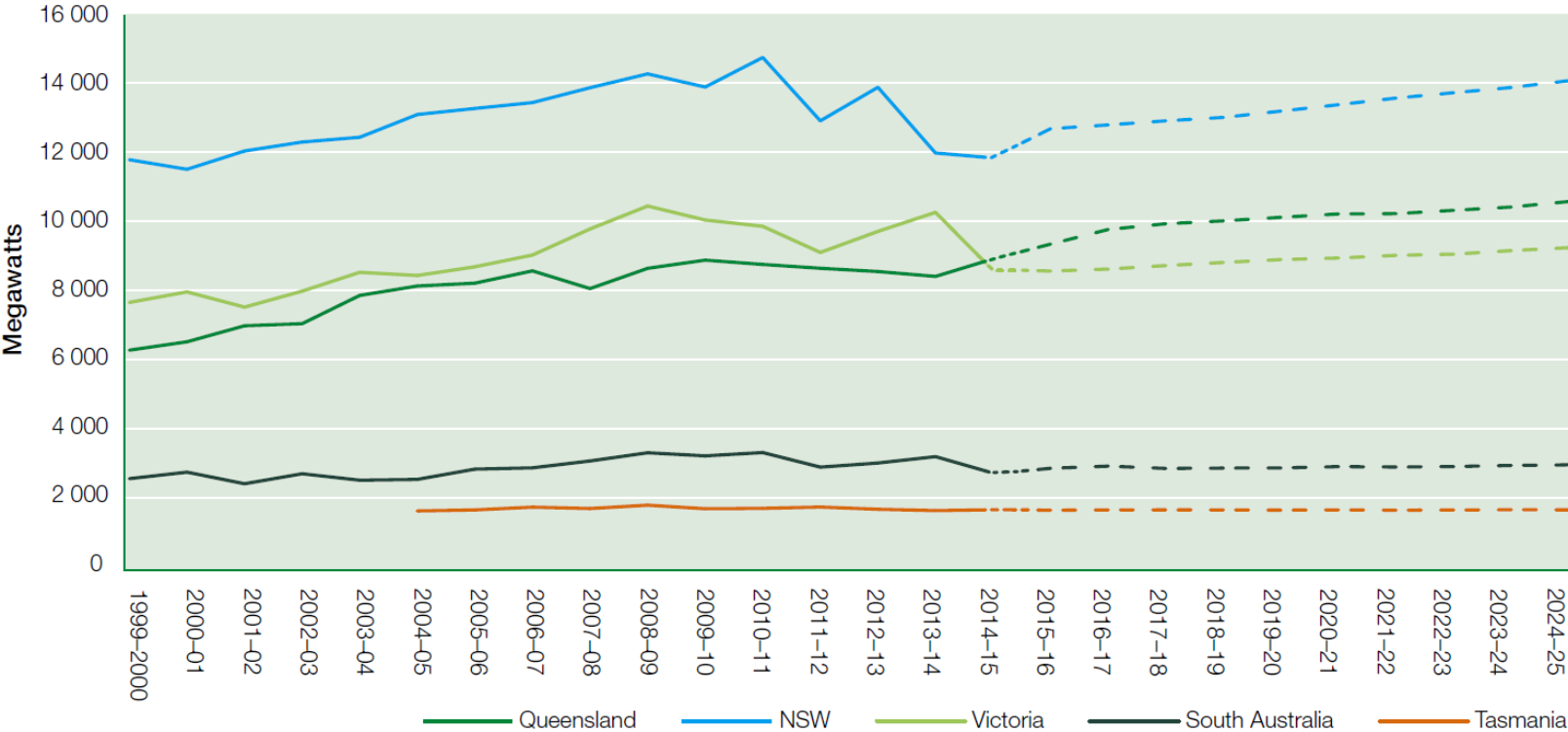


Wind energy prospects by State:

State	Demand Growth	System capacity for new wind	Wind Resource	Electricity prices	Planning conditions
NSW	Fair	Good	Good	Fair	Improving
Victoria	Fair	Good	Very Good	Poor	Improving
Queensland	Good	Excellent	Fair/Poor	Good	Good
South Australia	Poor	Poor	Excellent	Good	Good
Western Australia	Fair	Fair	Excellent	Good	Good
Tasmania	Poor	Poor	Excellent	Fair	Good

NSW has relative demand growth advantage

Maximum demand, and forecast maximum demand, by region



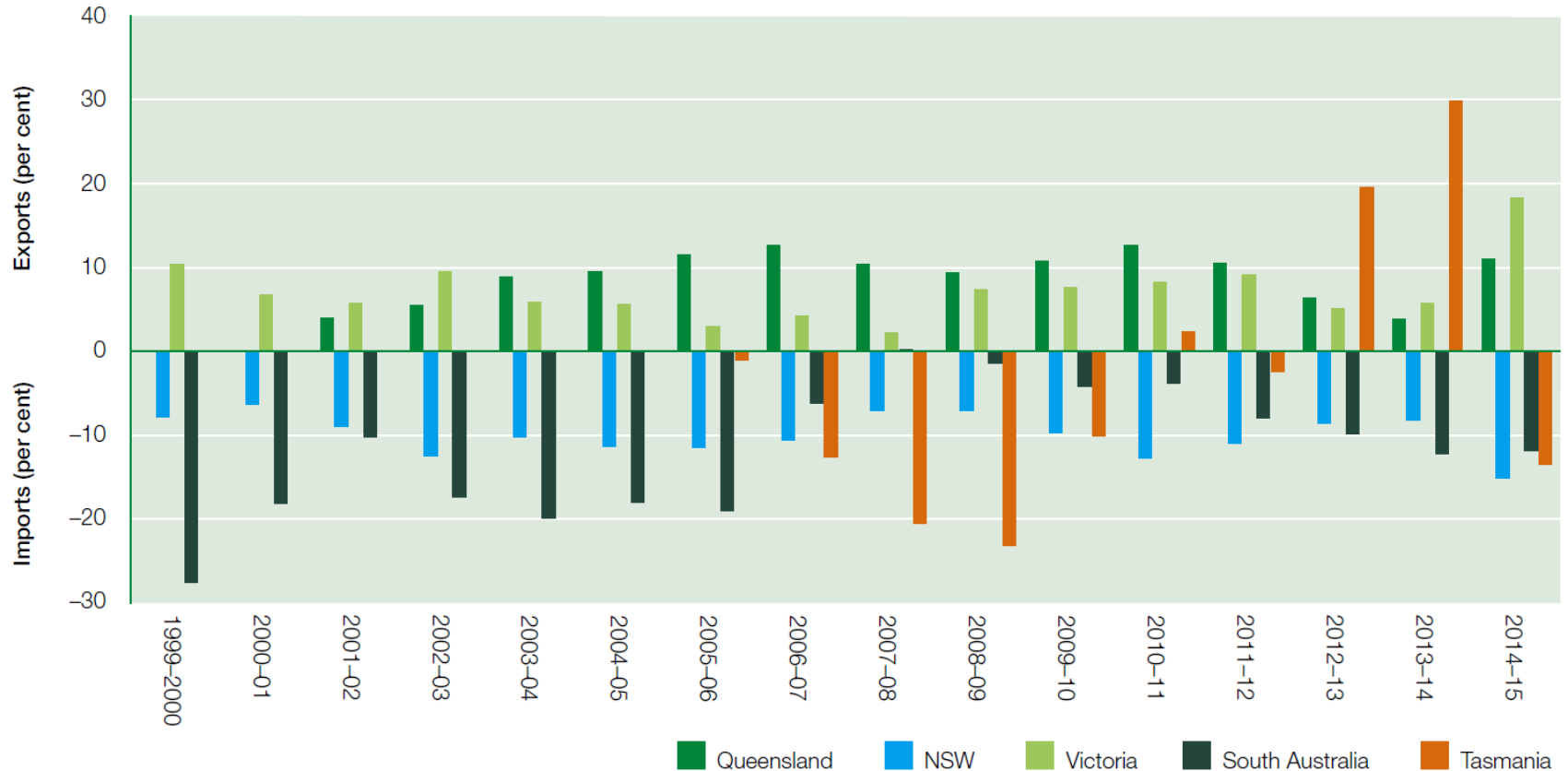
Note: Actual data to 2014-15, then AEMO forecasts published in 2015.

Sources: AEMO; AER.

NSW has “central” position in the NEM, enhancing interregional trade opportunities



Interregional trade as a percentage of regional electricity demand

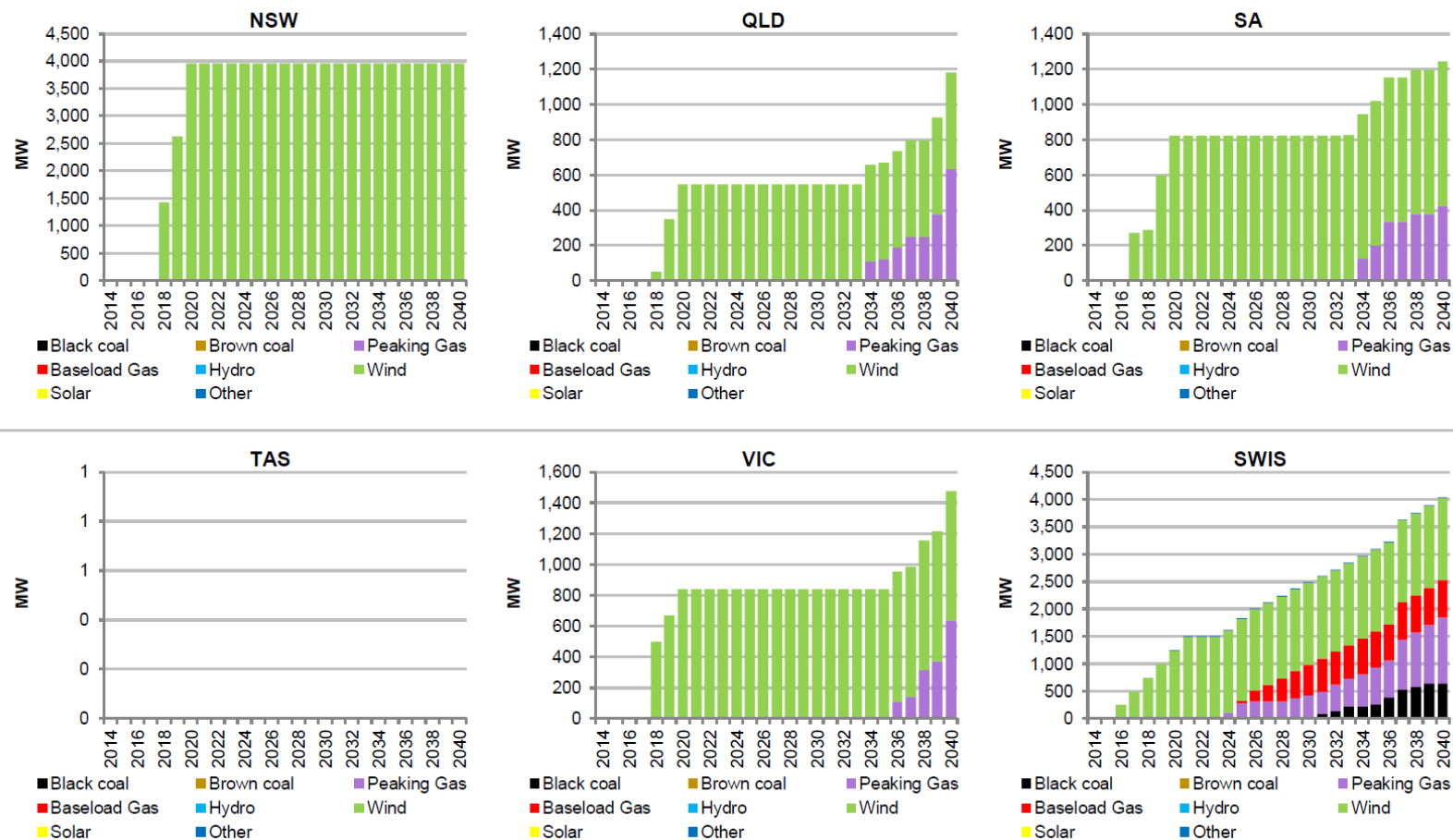


Sources: AEMO; AER.

NSW forecast to achieve the largest share of renewable investment over the next decade

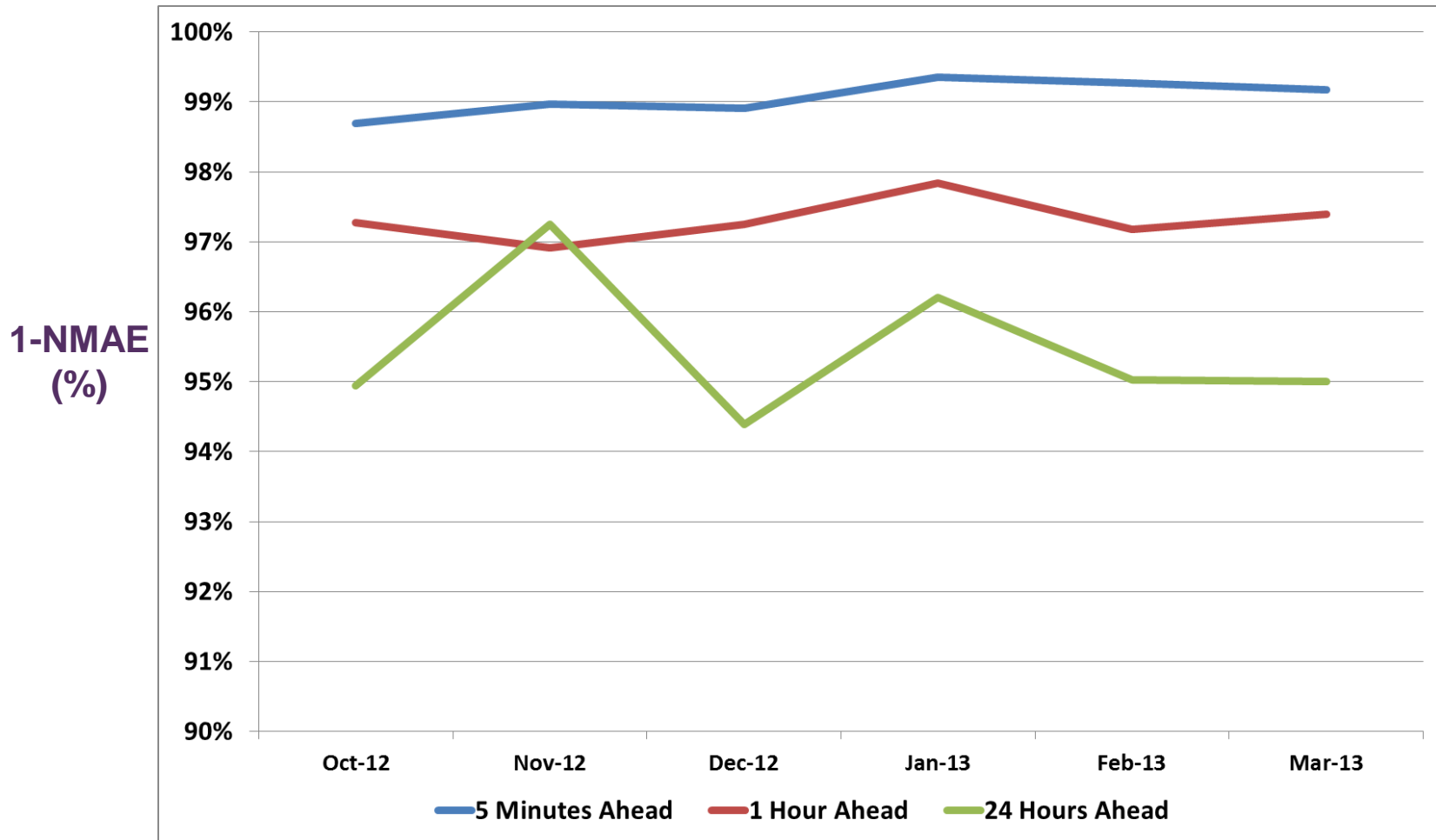


Figure 8 New entrant capacity by grid: Reference case



Managing the transition to clean energy: Wind energy generation is highly predictable

NEM wind generation is forecast with 97-98% accuracy one hour ahead of time



Data from Figure 64, 100% Renewables Study – Draft Modelling Outcomes, AMEO April 2013

NMAE: Normalised Mean Absolute Error

Managing the transition to clean energy: High regional wholesale electricity prices are driven by changing thermal fuel mix, poor competition, and poor interconnection



- Wind farms apply downward pressure on wholesale electricity prices. Wind energy is a price taker, not a price setter.
- In SA almost all dispatchable generation now relies on increasingly expensive gas competing with LNG exports
- In SA and Queensland a lack of effective competition in generation eg. reflected in “strategic” and “late” rebidding in the wholesale market causes higher prices
- SA is connected only to Victoria, and interconnection capacity is insufficient to dampen the abovementioned factors
- SA also has the highest peak to average load ratio of any State increasing its reliance on interconnection capacity

Managing the transition to clean energy: South Australia's black system event



Conclusion

- Australia's electricity generation fleet is transitioning to clean energy
- NSW is very well-placed to benefit from the transition – generating jobs of the future, and economic activity in rural areas
- Substantially increased variable output generation is entirely manageable in the NEM and particularly in NSW
- Enhanced regional interconnection is a desirable security improvement for the NEM and a strong opportunity for NSW

