



CERES PROJECT

Clean Energy from Yorke Peninsula



Wind Farms and the SA Electricity Market Fact Sheet

This fact sheet provides a simplified and brief summary of the following;

- The basics of the South Australian electricity market
- The components that make electricity prices in South Australia
- How do wind farms operate in the market?
- What impact do wind farms have in the market?
- What are the specifics for the CERES wind farm?

South Australian electricity market basics

The SA electricity market is part of the National Electricity Market (NEM) which comprises:

- A wholesale market - where generators of electricity compete to supply to the electricity pool. This includes conventional fossil fuel generators and renewable generators such as wind farms.
- A retail market - where retailers compete to provide electricity to customers. Retailers can also be generators.
- Transmission - which is the bulk delivery of power, typically over high voltage power lines.
- Distribution - which is the tailored delivery of power to customers, typically over low voltage power lines.

The SA electricity demand has one of the most “peaky” profiles of any modern state in Australia and in fact the world. This is driven by climate and high penetration air-conditioning.

The SA market is relatively small on a national scale but spread over a large geographic area - Mt Gambier to Ceduna.

The SA market has the highest percentage use of gas of any NEM state and typically the SA wholesale price is set by gas-fired generation. Gas prices have and are expected, by most commentators, to continue to increase over this decade.

The combination of the SA demand profile, network topography, reliance on gas, together with carbon pricing and the continued increase in air-conditioning, places upward pressure on SA electricity prices.

Wind farms are typically price takers in the NEM wholesale market. In other words, they bid a low price to ensure their supply into the NEM. This is essentially because their fuel source (wind) has a zero cost.



Maintenance being undertaken on state of the art power electronics which is housed in a HVDC Converter Station.

Components of Electricity Prices

Electricity prices are made up of a combination of;

- Wholesale pool price – competitive market managed by the Australian Energy Market Operator (AEMO)
- Transmission cost – regulated by the Australian Energy Regulator (AER)
- Distribution costs – regulated by the AER
- Retail costs – A competitive price that includes the cost of Carbon Pricing and Renewable Energy Certificates (RECs), if applicable.

Typically a retailer provides an overall price to a customer that reflects the sum of the above four components.

The laws and regulations that govern the electricity market are reflected in reciprocal NEM state legislation and some specific state requirements.

(Refer to the following websites for more information: www.aemo.com.au, www.aer.com.au and www.escosa.com.au)

How do wind farms operate in the market?

Wind farms are required to bid their output into the NEM and typically bid in a fashion that means they are price takers.

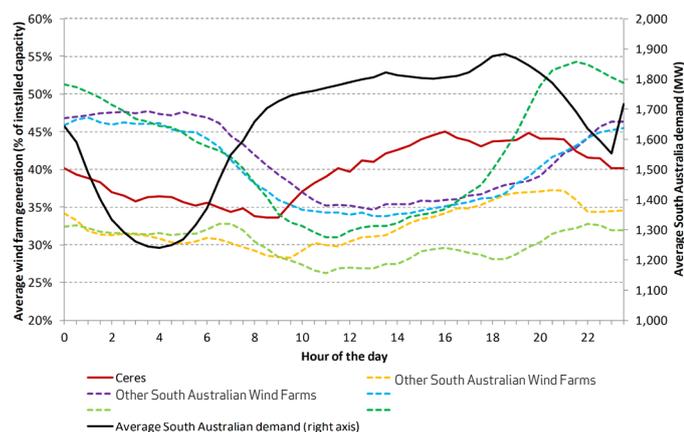
Wind farms pay under a “user pays scheme” to connect to the grid to achieve reasonable access to the market. That access is not guaranteed.

If there is oversupply or if there is a need to constrain the transmission (i.e. access to the market), then not all of the available wind farm output can be placed into the market.

Wind farms quite often oversupply the market and hence cause downward pressure on the wholesale electricity price.

Wind farms earn revenue from selling power into the competitive wholesale market and from the creation and sale of accredited Renewable Energy Certificates (RECs) (Hydro, solar, geothermal and wave also create RECs).

The combination of electricity and REC sales – both sourced in competitive markets – is what is needed to enable the financial viability of all forms of renewable energy.



CERES Project output is well matched to South Australian demand

What impact do wind farms have in the market?

As indicated earlier wind farms are typically price takers and they put significant downward pressure on the wholesale price of electricity because they typically displace higher priced gas generation. This is because the wind farms bid low and even negative prices at times.

Under the Federal Government Renewable Energy Target (RET) scheme, retailers are required to have a defined percentage of their sales to customers that must come from accredited renewable energy sources – such as wind farms, hydro, solar, geothermal and wave.

The RET has targeted to have 20% Renewables by 2020 and the SA government objective is to see 33% by that time.

The cost of the RECs is typically reflected in the retail component of the total electricity price (see earlier section). The impact of all renewable projects is to increase that retail component of price.

It should however be noted that the retail component is typically the smallest component of the four price components. The upward pressure in the retail component from wind generation is more overcome by the downward pressure on the wholesale price.

Hence the overall impact on electricity prices by wind farms is downward pressure.

The actual impact on prices is complex and driven by a combination of the SA demand profile, availability of power supply, network topography, reliance on gas, together with carbon pricing and the impact of air-conditioning.

Analysis from independent energy experts, ROAM Consulting, has shown that wind power currently contributes only 2 per cent to the average South Australian power bill – an excellent result for a renewable technology that now provides more than 20 per cent of the state’s energy needs.

What are the specifics for the CERES Project?

- The wind farm will generate enough electricity to power up to 225,000 homes every year and contribute to SA’s energy security
- Green house gas emission reduction - up to 2,500,000 tonnes of global warming pollution (CO₂) avoided each year - the equivalent of a 278,000 hectare large tree plantation
- Contribution to the National and State renewable energy targets with over 2,000 GWh of annual production representing approximately 14 per cent of the South Australian electricity demand and contributing 4.4 per cent of the 2020 National renewable energy target (AEMO, 2011)
- Provide 600 MW of power, on average for 40% of the time directly into the SA electricity market in Adelaide placing significant downward pressure on the competitive wholesale market
- Provide an output profile that is well matched to the average daily SA demand profile. Refer graph opposite.