FACT SHEET 2

Wind Farming & the Australian Electricity System

How Do I Know Wind Farms Are Reducing Greenhouse Emissions?

Whenever a wind farm is operational, its output is being fed into an electricity grid and the energy is being used somewhere in the system downstream. Although the contribution of wind energy is currently quite small relative to the total generation on Australian electricity networks, every unit generated from wind is a unit that does not need to be produced by other generation, 90% of which comes from fossil fuels. The type of generation actually displaced (and hence the emissions saved) by wind energy, will vary depending on the geographic location of the wind farm and the time of generation.

How Much Fossil Fuel Does Wind Power Offset?

Depending on where it is located in Australia, a typical new 50 megawatt (MW) wind farm displaces between 65,000 and 115,000 tonnes of carbon dioxide - equivalent to leaving tens of thousands of tonnes of coal in the ground each year. The amount varies depending on what type of fossil fuel the wind energy is displacing.

What Happens When The Wind Stops Blowing?

The output of fossil fuel fired generators can be controlled, wind power cannot. Presently, wind power variability has no impact on the operation of most large Australian electrical networks because it still makes a relatively small contribution to the total generation. Today when wind farm outputs increase, the fossil fuel generators simply back off, and vice-versa when output decreases. Networks have to be able to accommodate changes like this all the time because of fluctuations in load.

In the future, more wind farms will be built and the percentage of the electricity from wind will increase. How well the networks cope with this depends largely on the type and size of fossil fuel generation being used, network operational policy, and whether the lessons learnt from other places in the world can be applied.

In some parts of Germany, wind energy can contribute up to 70% of a region's electricity needs. This has required the use of long term wind energy forecasting and changes to the way that these networks are controlled. These changes have been driven by a desire from community and Government, to see the environmental benefits of wind energy increased.

It has also been found that as more wind farms are built, their combined fluctuations and hence overall impact on electrical networks are reduced. This is because wind speed depends largely on local weather patterns and these become more diverse the further they are apart.

How Predictable Is Wind Power?

Wind power output is intermittent, but the output from wind farms can be usefully predicted as much as 24-48 hours in advance. With increasingly effective data collection across Australian wind sites, forecasts are likely to improve with significant benefit to network managers.

How Does Wind Energy Compare To Other Types Of Generation?

In terms of mechanical operation and maintenance, wind turbines are more than 99% reliable, compared to around 97% for the steam turbines used by coal plants.

Because turbines in Australia are generally located to take advantage of strong and consistent winds, their utilisation rates (the amount of time they are in use) are generally in excess of 95%, which compares favourably with conventional power plants. Wind turbines are very efficient in converting the primary fuel (wind) to energy. Today's large scale machines typically operate at efficiencies of approximately 47%. This compares with coal to energy conversion efficiencies of 30 – 40 % for coal burning plants, where the majority of energy is lost as heat in the exhaust.

How Much Wind Power Can We Have In Our Energy Mix?

Large scale wind generation needs to work hand in hand with conventional sources. AusWEA has a target of 5,000 MW of wind to be installed in Australia by 2010 - about 6% of Australia's electricity needs. Recent modelling by technical experts has revealed that at least this amount of wind power can be integrated into the national grid subject to wide distribution, strong interconnection and state of the art forecasting. However, there are plans in some overseas countries for wind power to contribute as much as 10% of energy needs by 2010.

How Can I Help Promote Wind Power?

In almost every State, householders and businesses can elect to pay a little extra on their power bills for "Green Power". Through a process audited by a third party, "Green Power" customers are assured that renewable electricity, equivalent to the normal consumption, is fed into the grid reducing the amount of fossil fuel based generation needed. The collective purchasing power of "Green Power" customers represents a significant benefit to the environment and is a way of promoting renewable energy sources such as wind power.

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