

Blowing Away Money

by Mark Lawson



The Federal Government may have dumped (technically deferred) one nutty green scheme (emissions trading) but an equally nutty scheme remains in place - requiring electricity distributors to buy green electricity.

This scheme is nutty because no one has shown that green electricity supplied to an operating power network actually reduces emissions. The government, various green lobby groups and the mass of voters have simply assumed that it does. There are doubts about efficiency losses due to the whole network having to be retailored to accommodate renewables. And more doubts over just how much additional backup generator capacity will be required for intermittent power sources. These doubts are either ignored or dismissed as “myths”.

However, there are now a few incomplete reports from real world networks that use substantial amounts of alternative/renewable/green power. Those reports indicate that that the problems of wind networks are not myths at all. They indicate that these sources of energy may be up to three times more expensive than conventional coal and gas generated energy. As for the actual savings in carbon achieved by renewables, there are virtually no reliable estimates from operating grids.

To explain the problem let us stay with the most common form of alternative electricity generation, that of wind power. Power supply has to equal demand at all times on power grids, but changes of one or two percent either way can be tolerated. Thus if wind power is generating just one or two per cent of power on a network grid operators can work around it. At levels of 5-10 per cent grid operators cannot simply adjust the grid, instead they have to adapt the grid to using wind power. Because wind power can vary a lot this usually means they have to ensure that there are more open cycle gas turbines available. These are like aircraft engines and they can be powered up and down quickly to meet changes in supply if the wind falls or picks up. However, they are less efficient than larger, closed cycle gas plants and that efficiency will be further degraded because they have to power up and down frequently to accommodate changes in wind.

That variability of wind also means that grid managers have to keep more of what are generally called spinning reserves, that is generators that are operating (and so generating emissions) off the grid which can be connected at a moment's notice. Power grids always have some spinning reserve in case one of the conventional power plants have to shut down unexpectedly. Grid managers use arcane risk management procedures to work out how much reserves of various types they should have at 5 minutes, 10 minutes and two hour intervals and so on, throughout the day.

A network using lots of wind has to increase those reserves, but by how much? Green academics and wind lobby groups insist that only a small amount of additional reserves will be required, and that overall wind energy will not cost all that much. A common estimate is that a 20 per cent penetration of wind (that is wind generates 20 per cent of total power) will boost wholesale prices by 10 per cent. This implies that wind power is 50 per cent more expensive than conventional power.

Engineers who have done the calculations have come up with estimates that wind power is double the cost of conventional electricity, and that the additional reserve requirements will almost completely wipe out any savings in carbon. (The references to these reports are given in my book.) Engineers tend to be conservative in dealing with new technology, it's what they do, but then the green academics and lobby groups are hardly likely to emphasise difficulties. A glance through the reports shows that the assumptions they use can be changed to reach any conclusion the author wants.

However, there are some bits of evidence from the real world use of wind, including the much quoted Wind Report 2005 issued by E.ON Netz GmbH, which owns a lot of wind power stations on the Baltic coast. See:

<http://www.wind-watch.org/documents/eon-netz-wind-report-2005/>

This report says that “traditional power stations with capacities equal to 90 per cent of the installed wind power capacity must be permanently online in order to guarantee power supply at all times”.

This is not fair to wind as, for various reasons, at the time of the report the company could not use wind towers over a wide area and had to rely mostly on wind off the Baltic which is highly variable. Now the company is drawing on wind towers over a large slice of Germany and uses wind forecasting systems to reduce reserve requirements.

So what level of spinning reserves does the company now consider to be safe? E.ON Netz has said nothing at all on that key issue since the 2005 report. In fact, no company or grid manager using wind in any quantity seems to have said anything about reserve requirements. As any favourable pronouncement would have been repeated endlessly by green academics, this silence is ominous but that is about all anyone can say.

On the issue of costs there is a report from the Rheinisch-Westfälisches Institut für Wirtschaftsforschung (a leading economic research institute based in Essen) issued in October 2009 entitled, “Economic impacts from the promotion of renewable energies: The German Experience”, see:

<http://www.wind-watch.org/documents/economic-impacts-from-the-promotion-of-renewable-energies-the-german-experience/>

This report says that extensive subsidies for wind power has resulted in the country having the second largest installed wind capacity in the world, behind the US.

Despite having a lot of wind turbines and retail distributors of power paying wind farms three times the going wholesale rate for power (through the mechanism of “feed-in tariffs”), only about 6.3 per cent of total power consumption is supplied by wind. The subsidies required to get to that level, the report estimates, costs power consumers an additional 7.5 per cent on their bills. The contribution from photovoltaics is a negligible 0.6 per cent, despite utilities paying eight times the going rate for electricity from those projects.

It gets worse. Further into the report, the institute estimates the cost of carbon abated through this process simply by assuming the wind energy displaces an equivalent amount of gas and coal generation. No allowance is made for reserve requirements or of the loss of efficiency from retailing the network to accommodate wind. On those favourable assumptions the report calculates the cost of saving each tonne of carbon at 54 Euros or several times the price of carbon on the European ETS at the time of the report. The cost of using PVs to reduce carbon comes to a staggering 716 Euros a tonne.

Another piece of real world evidence is “Wind Energy The case of Denmark” produced by a prominent conservative think tank, the Centre for Politiske Studier (Centre for Political Studies or CEPOS) in September 2009. See: <http://www.windaction.org/documents/23098>.

This report estimates that Denmark produces the equivalent of about 19 per cent of its electricity demand with wind turbines, but only about half of that is used locally. The rest is exported to Sweden, Norway and Germany through connections to the national grids, and those countries use the energy to pump water uphill into their major hydroelectric dams. This is the only way to store electricity on a power station scale. As well as having lots of dams, those national grids are much larger than the Danish network and so can absorb the additional power easily.

Although wind power indirectly saves some emissions in Denmark because it can be used to store up excess wind energy in dams in another country (reserve requirements, or losses through retailing the network are not discussed), the report estimates that the cost per tonne of CO₂ is 87 Euros or \$US124. That was more than six times the price of carbon on the ETS at the time of the report. Danish domestic electricity prices are among the highest in the European Union, although this is not strictly the result of wind power. Commercial and industrial prices are deliberately kept down to make industry competitive with the rest of Europe.

Green activists bitterly disagree with most of this, pointing out that the Danish Institute is politically conservative so what else would it be expected to say? If we seriously judged reports on the political colour of the people writing them then almost all of the evidence for wind power would be swept from the board.

Another, more relevant complaint is that reserve requirements will not be all that bad, if the wind farms are spread over a large enough area. The risk of changes in the wind is greatly reduced. The trouble is that if the wind towers are spread over too large an area then transmission distance comes into play. Electricity from wind farms can only be transmitted only so far. So what is the trade off? How far can a grid manager spread wind farms and how much does wind vary over those areas? Although there is some evidence on this point for Europe, which wind activists do not like, the issue is almost entirely unstudied in Australia.

As well as rushing into wind, despite massive gaps in our knowledge of just how effective this technology may be, the Rudd (now Gillard) Government has added its own peculiar frills such as allowing the likes of solar hot water services to count towards the renewables target. This has led to other problems and the recent splitting of the scheme into a Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET) which we will not discuss here.

Although the use of hot water services seems laudable, especially considering that a well sited and maintained system might actually save carbon (the energy is stored in the hot water service), this is an extremely expensive way to do it. Large scale renewable projects have the advantage of economies of scale and still the electricity they generate cost several times that of conventional power. Further, solar hot water panels have to be properly sited and maintained to make any real difference, and with the solar industry undergoing a massive expansion many of the installers will not be adequately trained.

The Australian government has dived head-first into renewables with both eyes shut, and with the general approval of the voters, who mostly have no idea of what they have approved or how much it will cost. The government should drop the whole renewable energy scheme as too complicated and expensive and unlikely to save much carbon.

Mark Lawson is a senior journalist the Australian Financial Review. He has written: “*A Guide to Greenhouse Lunacy – bad forecasting, terrible solutions*”

Connor Court - \$29.95. <http://www.connorcourt.com/catalog1/> or book stores.