Fallacies About Wind

(Submission #204 from Professor Diesendorf)

Wind power is one of the most environmentally damaging sources of electricity.

To the contrary, wind power has one of the lowest environmental impacts of all energy sources. Only solar photovoltaics, based on either thin films or Sliver cells could possibly compete in this regard. By almost any criterion, coal is by far the worst.

To reduce local biodiversity impacts of wind farms, planning guidelines for the siting of wind developments have been put into place by the Federal, State and Local Governments.

Proposed wind developments must receive federal planning approval under the Environment Protection and Biodiversity Conservation Act and also under any local regulator. These measures address the avoidance of principal bird migration routes and protection of wetlands and other specific areas of environmental importance and sensitivity

Bird kills are generally a serious problem.

The main human-induced threats to birds are habitat destruction, pet cats, buildings, motor vehicles and powerlines. Only two wind farms out of thousands around the world have been a serious problem for birds.

With modern wind turbines and careful siting, both bird and bat kills are rare. In comparison, on a single foggy night, about 3000 birds were killed when they collided with the chimneys of a thermal power station in Florida, USA7

Noise is a common problem.

Modern wind turbines are much quieter than people have been led to believe. A normal conversation can be held at the foot of a wind turbine going at maximum speed, without raising one's voice. The main sound is a 'swoosh' as each blade passes in front of the tower.

A listener's perception of the sound depends on the level of background noise and declines with the inverse square distance from the source. In other words, double the distance means one-quarter of the noise level. As wind speed increases, both the wind turbine noise and background noise (from wind passing through vegetation) increase as well, and the background tends to mask the wind turbine noise.

Noise is rarely a problem beyond a distance of 500 m and very few dwellings in Australia are within 400 m of a large wind turbine. Licence conditions for wind farms should, and mostly do, set objective, measurable noise limits. On the rare occasions where these limits are surpassed, for example, resulting from a faulty turbine or sound propagation resulting from peculiar topography, affected residents can have the problem fixed or the offending turbine shut down.

Infra-sound used to be a problem with some of the early wind turbines in Europe. However, according to recent European studies, modern wind turbines emit generally very low levels of infra-sound, virtually undetectable at a range of 500 m and much less than comes from motor vehicles on nearby roads. Although there have been several studies, there is no scientific evidence that infra-sound from wind turbines located at a distance greater than 500 m is a health hazard.

To substitute for one 1000 MW coal-fired power station, wind power would need vast areas of land.

Wind farms are highly compatible with agricultural and pastoral land use. While they span approximately 25 ha per megawatt (MW) of installed capacity, only about 1–3% of that land 5 (0.25–0.75 ha/MW) is actually taken up

by their towers, access roads and other equipment, while 97–99% of the land can continue to be used for crops or grazing.

For comparison, a fossil-fuelled 1000MW power station has an average power output of about 850 MW. To substitute for this, about 2600 MW of wind power capacity would have to be installed, spanning 65 000 ha (650 square km), but only occupying physically 650–1950 ha (6.5–19.5 square km). This is less than the area of a typical open cut coal mine required to serve the coal-fired power station (50 –100 km2)

Wind farms don't work.

If this myth were true, wind farm developers would go bankrupt, because they are paid for generating electricity, not just for erecting wind turbines

Wind turbines are inefficient.

Large wind turbines convert into electricity about 45% of the wind passing through the area swept out by the blades.

For comparison modern black coal-fired power stations convert into electricity only 35% of the energy stored in the coal. Taking into account the electricity used in operating the coal station reduces this to about 32%. Some brown coal stations are only 20-25% efficient. So wind turbines are more efficient at converting their primary energy source into electricity than coal power stations.

Wind farms are subsidised.

This claim is a partial truth, but misleading, because coal-fired electricity receives much greater de facto subsidies through the refusal of many governments to include the costs of coal's massive environmental and health damage in the price of coal-fired electricity.

Coal also receives huge direct economic subsidies in several countries. Nuclear power in the UK and USA is generally more expensive than wind power and receives much bigger subsidies.

Wind power is the least-cost of the non-hydro renewable energy sources. To reshape the energy market to response to the greenhouse problem, carbon pricing must be introduced and renewable energy sources also should receive temporary direct subsidies, for example through an extended and expanded Renewable Energy Target.

To maintain a steady state of voltage and frequency requires much additional expense.

Modern large wind turbine generators, with variable speed drives and power electronics, can control voltage and frequency locally at no extra cost.

Furthermore, sudden changes in wind speed, or a sudden shut-down or start up of large amounts of wind power capacity, can be ameliorated by installing wind farms separated by large distances in different wind regimes, and by using computer control to stagger start-ups and shut-downs of individual wind turbines in a wind farm.

Since the rate of growth of electricity demand is higher than the rate of growth of renewable energy supply in some States, they should stop building renewable energy and focus their efforts on efficient energy use and demand reduction.

This recommendation assumes incorrectly that we have to choose between the implementation of efficient energy use and demand reduction on one hand and renewable energy on the other. In reality, the two courses of action are complementary, requiring different strategies, and both must be implemented simultaneously for effective reduction of CO2 emissions.

Solar electricity could replace wind power.

Not for at least 20–30 years.

Although solar electricity has huge potential in Australia, the generation cost of grid-connected solar power (40–50 c/kWh for photovoltaics; 20–40 c/kWh for concentrated solar thermal electricity) is currently several times that of wind power (7–10 c/kWh depending upon siting).

Wind power makes insignificant contributions to electricity generation.

Of course, if one averages over the whole world, in which many countries have no wind power, the total is small. But the rate of growth is high, 25-30% per year, and has been high for the past 25 years. If this growth rate continues, wind power will overtake nuclear power as a global source of electricity within a few decades.

In Denmark wind power has supplied 20% of electricity since 2003 and the Danish government plans to expand this to 50% by 2025.

Wind farms should be located in valleys or industrial zones where they cannot be seen from the distance.

Wind turbines must be located at sites that are exposed to the wind, since wind power increases with the cube of the wind speed. Strong and consistent winds are very rarely found in valleys. In industrial zones, other buildings slow the wind, making these zones unsuitable for wind power.

By its very nature wind power has a visual impact, which most people accept and a small minority dislikes. To resolve these differences, community onsultation on individual wind farm proposals and State planning processes with clear guidelines are needed.

Public opinion surveys have found that the vast majority of respondents support wind power. Some surveys find that those who originally opposed a wind farm in their district find them acceptable several years after their installation. Many respondents say that the alleged environmental impacts, noise and bird kills, are not a problem, despite initial fears.

Some surveys find that people who live closer to wind farms are even more supportive towards wind power than people who live further away.

Wind farms cause bushfires.

It has never happened. Indeed, the opposite is true.

Fossil fuels cause global warming and, in some regions, drought, and so increase the prevalence and severity of bushfires. In so far as wind power substitutes for fossil fuels, it reduces the risk and intensity of bushfires.

Since wind power is an intermittent source, it cannot replace coal-fired power unless it has expensive, dedicated, long-term storage. Variants are: ‘Wind power is not base-load’ and ‘Wind farms don't reduce CO2 emissions, because coal-fired power stations have to be kept running to back up the fluctuations in wind.’

All these statements are wrong. The short answer is: With or without wind power, there is no such thing as a perfectly reliable power station or electricity generating system. Electricity grids are already designed to handle variability in both demand and supply.

To do this they have different types of power station (base-load, intermediate-load and peak-load) and reserve power stations. Wind power adds a third source of variability that can be integrated without major technical

difficulties into such an already variable system. For several dispersed wind farms, total wind power generally varies smoothly and therefore cannot be described accurately as ‘intermittent’.

As the penetration of wind power increases substantially, so do the additional costs of reserve plant and fuel used for balancing wind power variations. When wind power supplies up to 20% of electricity generation, these additional costs are still relatively small.

This has been verified recently by detailed separate computer simulations of both the east coast and west coast electricity grids in the US.