

Why Wind Won't Work?

- it's Weaker than Water.

A Submission on

"The social and economic impacts of rural wind farms."

by

The Carbon Sense Coalition

www.carbon-sense.com

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A print friendly pdf of this report can be found at:

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Submissions to be sent to: community.affairs.sen@aph.gov.au

Executive Summary.

Wind power is very dilute, and thus a large area of land is required to gather significant energy. Wind energy needs a wide network of roads, transmission lines and turbines which degrades any area containing wind farms. It has a huge land footprint.

The operating characteristics of turbine and generator mean that only a small part of wind energy can be captured.

Wind power is also intermittent, unreliable and hard to predict. Therefore large backup or storage systems are required. This adds to the capital and operating costs and increases the instability of the network.

Wind farms are uniformly hated by neighbours and will not be willingly accepted without heavy compensation payments. Their noise, flicker, fire risk and disturbing effect on domestic and wild animals are well documented.

The wind is free but wind power is far from it. Its cost is far above all conventional methods of generating electricity. Either taxpayers or consumers will pay this bill.

Wind farms are promoted as a way to decarbonise energy generation. This is supposed to reduce global warming. There is no evidence that there is any need or benefit in chasing this rainbow.

There is no justification for continuing the complex network of subsidies, mandates and tax breaks that currently underpin construction of wind farms in Australia. If wind power is sustainable it will be developed without these financial crutches.

Introduction and Scope

The Leader of the Family First Party, Senator Fielding, has initiated a Senate Enquiry into: "The social and economic impacts of rural wind farms."

Submissions are due by 10 February 2011. The reporting date is 30 April 2011.

This submission is presented under section (e) Any other relevant matters.

Wind Power is NOT New or Innovative

The use of sails goes back at least 5,000 years, and wind powered boats transported Pharaohs, Romans, Vikings, Polynesians and English privateers. Sailing clippers took wool and butter to England in the early days of Australian settlement.

The use of windmills goes back almost as far as sails. They were being used in China and Persia at least 2,000 years ago. The Dutch perfected the use of wind power to pump water and grind cereals. The "modern" windmill with fins on a metal wheel and a tail to keep the fan facing the wind was manufactured in early America about 1850. A giant wind powered generator was supplying electric power to the Central Vermont Grid 70 years ago.

Wind power is the technology of the past. It still has some uses like pumping water but largely belongs in the history books with wooden ploughs, horse-drawn coaches, reaping hooks, candles, water wheels and bullock teams.

The Nature of Wind Power

Wind derives its energy from the sun - the sun heats the earth's surface which warms the overlying air. The warming air rises and cooler air moves in to take its place. The rotation of the earth then diverts the winds thus playing a part in determining wind direction.

Some winds, such as the trade winds and the roaring forties, are generally predictable in direction and constancy in certain seasons and places. These winds were used by the sailing clippers. In upper levels, jet streams are sometimes used by international airlines to assist their flights.

In contrast to these relatively predictable winds, there are often large windless areas such as the doldrums over equatorial waters, high pressure areas over Australia or in pools of frigid air over Europe.

Local hot spots over tropical seas can create violent local storms or cyclones and hurricanes that affect large areas.

Despite centuries of study, particularly by sailors, the prediction of wind strength and direction in any area is still impossible. Even in events such as the America's Cup, where no expense is spared to get correct forecasts, the yachtsmen are often surprised by what happens on the day.

Wind is thus a very variable and unpredictable source of energy.

Wind Power is Dilute

Like the solar energy it is derived from, usable wind power is very dilute.

A wind turbine is a machine designed to extract energy from the moving tube of air that strikes the propeller of the wind tower. The energy in this moving tube of air depends on two things – the mass of air, which depends mainly on the span of the propeller catching the air, and the speed of the air, which gives kinetic energy to that mass of moving air. But even high speed wind does not mean high kinetic energy because air has a low density - there is far less energy in a tube of moving air than in water with the same volume and speed (the water has 780 times more kinetic energy than wind). That is why wind turbines need to be so large – to tap a bigger tube of moving air. The bottom line is that for a given fan size and design, the maximum power it can generate depends mainly on the velocity and constancy of the wind.

(As an aside, hydro power is another energy source derived from solar power. But hydro does work – the water is far denser than air and the direction and speed is far more constant and easier to control. Water power works, but wind is weaker than water.)

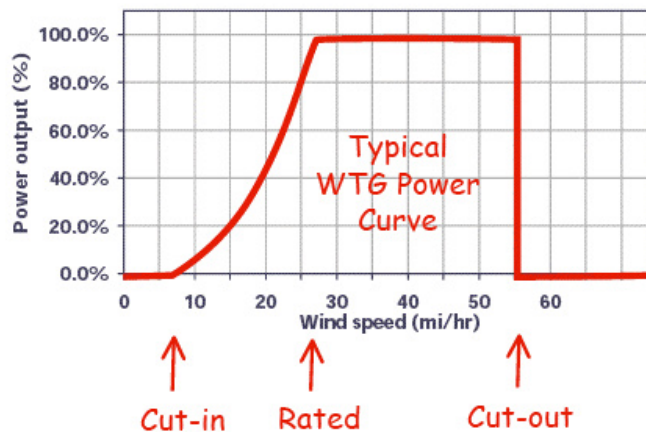
Unfortunately the blades cannot extract all of the energy from the wind – to do that the propeller would have to make the wind come to a dead stop, which is clearly impossible. A sail may almost achieve this, but a propeller never can. The blades can only extract part of the energy, thus slowing down the wind in the process. The maximum proportion of the energy that can be extracted by a perfect propeller in a perfect wind is given by the Betz limit and that limit is about 59%. This is referred to as the Power Co-efficient. In the real world the very best turbines in an ideal wind could maybe peak at about 50%. Most large wind turbines built today have a Power Coefficient (PC) of no more than 37%.

If the wind speed is higher or lower than ideal, the PC will be lower. If the wind blows too fast, much kinetic energy slips between the blades and is lost. And in very high winds, the turbines are shut down completely so they do not shake themselves to bits.

But that is not the end of the weaknesses of wind power generation.

The spinning turbine has to be converted into electrical energy at each turbine. This is done using an electric generator. Electrical generators have been used for over 100 years so their technology is mature and their performance well known.

Electric generators achieve maximum efficiency at their design capacity. This is planned to suit the "average" wind speed, and the generator produces maximum safe output at this speed. If the wind drops, so does the power generated. If the wind rises, the energy generated is limited to the design capacity of the generator (by varying the pitch of the blades) and at some point the generator is shut down to prevent burnout. So the generator cuts off all the high-energy infrequent wind, in order to capture the maximum energy from the winds expected by the turbine designers at that location. These unavoidable operating characteristics of the turbine also reduce the power generated.



Power Curve for a Typical Wind Tower Generator.

Another problem for wind farms is that noise levels become very intrusive as wind speed increases. Noise complaints have forced some operators to shut down the turbines at about the speed that they begin to generate significant power. And build up of mashed bugs, salt or ice can greatly affect efficiency and safety of turbines.

Wind energy promoters usually quote the maximum attainable output as the capacity of the wind farm. This is the maximum power that could be produced if ideal winds blew all the time at all turbines (the 100% level in the figure above). However, this needs to be multiplied by the "capacity factor" to get the actual power likely to be generated. Because of the variable winds and the energy unable to be captured by the generator, the capacity factor lies in the range 25% - 35%. However it can be much lower. UK offshore wind rarely exceeds 20%.

In summary, wind power is very dilute and it takes a huge area of land to collect significant quantities of energy. Then vagaries of the wind mean that only a small proportion of the wind energy can be captured by the blades. Then only a proportion of this energy is converted by the electrical generator into electrical energy.

See: Wind Power Facts and Fallacies''

<http://carbon-sense.com/2011/02/02/wind-power-hayden/>

Wind Power is Unreliable

In the recent frigid snap in Britain end 2010, when power demand was at a record high, the average power generation from Britain's wind developments – the majority of which are in Scotland – was just about 11% of the total possible of 2,430 MW. On 30 Dec 2010 UK's 3,000 operational wind turbines produced only 0.04% of the country's power. There were days when the contribution from Scotland's forests of wind turbines was precisely nothing.

At times it was even worse than that. As the temperature fell to record lows, the wind turbines had to be heated to prevent them seizing up. So, at a time when all Britain needed every bit of power, the wind industry was using more electricity than it generated.

Britons kept warm because of the old reliables - coal, gas and French nuclear power.

Source:

<http://www.dailymail.co.uk/debate/article-1342032/You-dont-need-weatherman-know-way-wind-blows.htm#ixzz1CEM1mpmm>

Wind turbines are prominent in Texas, but a cold snap in early 2008 caused power demand to soar and winds to drop. This sudden loss of wind power (from 1,700 MW to 300 MW) just as demand reached the evening peak caused the grid operator to declare a power emergency and start shedding load and cutting power to customers. The operator cut supply by 1,100 MW within ten minutes.

Source:

<http://www.dailykos.com/story/2008/2/28/1303/48225/299/465497>

Wind also fails during heat waves because turbines have to be limited to prevent overheating and the higher the temperature the less power wind produces. While Britons were suffering their Arctic weather just after Christmas 2010, South Australia had a heat wave. Wind power was cut to less than 3% of design capacity.

Source:

<http://www.adelaidenow.com.au/news/south-australia/wind-power-heat-warning/story-e6frea83-1225978916924>

Imagine what will happen to wind power when the likes of cyclone Yasi hits a wind farm with turbines on every hill connected by a spider-web of transmission lines. Not only will the power transmission lines come down, as they do now, but the turbines too will come down. When did you last hear of a conventional power station blown down by wind?

So now we know. If you have a cold snap or a heat wave, or high winds or no winds, do not rely on your wind turbine - go back to proven, reliable and safe sources.

Wind apologists have a solution to this. They want the ability to turn off individual appliances, homes or suburbs when they are unable to produce the power. This is the road to third world status. Energy ration cards are already being discussed in UK.

Keep some candles in the cupboard.

Unreliable Wind Power needs 100% Backup

Depending on the vagaries of the weather, wind power produces anything from zero to 100% of design capacity. This change can come in a short time and affect large areas of land.

Therefore, to maintain grid stability and the ability to supply customer demand for continuous electricity, every wind farm has to have a backup generating facility for 100% of the wind capacity, and this backup must be able to swing into production immediately.

It is even worse than that.

Suppose a wind farm is producing an average of 50 MW, but varying from zero to 100 MW. The backup has to be able to handle both changes, namely a drop of 50 MW and an increase of 50 MW. So basically, you have to have 100 MW capacity on spinning reserve, but running at 50% so that you can increase or decrease power by 50 MW. So the backup facility has to have TWICE the real rated capacity of the wind farm. Imagine what this does to the capital, operating and maintenance costs if the power company is forced to include wind power in its inventory.

Only hydro power and gas have the ability to sit idle until needed and then swing into production swiftly. Coal and nuclear could do it but at great cost – all fired up, idling, using fuel, but not producing saleable electricity.

Even for gas or hydro, a backup facility incurs the full additional capital cost which has to be recovered from a lower output of electricity. Any sensible person would say "If we have to spend all that capital to build a gas/hydro power plant, why not use the reliable plant full time and forget about the costly, intermittent and unpredictable power from wind towers?"

The unreliable Danish wind farms only survive because they call on hydro power from Norway and Sweden to step in at short notice when wind fails. Then they sell excess wind power produced at times of low demand back into the Scandinavian grid. Australia has no such fall back support.

Providing electricity to hospitals, airports, high rise lifts, trains, refrigerators, traffic lights, water pumps and metal smelters is not a part time job. Wind power is not the solution – in very large measure, it is an unsustainable addition to the problems of supplying useful energy to mankind.

Finally, few wind farms produce peak output at times of peak demand. No wind farm anywhere has allowed the closure of a conventional power plant. Thus they duplicate a job already being done, at great economic and environmental cost, and in an unreliable fashion.

Wind Energy is Hard to Store.

Any type of energy can be stored, but storing it without losing too much or costing too much is the problem. Probably the easiest way to store wind energy is to combine wind and hydro power with two dams and a pump station/generator between them. If the wind blows when power is not wanted, the wind energy is used to pump water up. When power is needed but the wind won't blow, water is released to drive water turbines.

Danish wind turbines and Scandinavian hydro plants work something like this (transferring money from the Danes to the Scandinavians in the process.)

A similar system could be set up with compressed air. Or use a million car batteries. They all work in theory, but the economic cost is horrendous and energy is lost in every conversion.

Wind Power has a Huge Land Footprint and large Capital Cost

Because wind is such a dilute energy source, it requires a large area of land to collect significant energy. Moreover wind towers cannot be built behind one another or the front turbine "steals" the wind of any others that happen to be downwind at that time. Thus anyone foolish enough to embark on large scale wind power developments will find he needs wind towers on every hilltop, on every headland and also out in the lakes and seas.

Construction of so many towers in so many awkward places is a costly engineering and logistics exercise. Substantial roads will have to be dozed to every site, and left there for maintenance vehicles over the life of the wind farm.

Then, every turbine has to be connected to the power grid requiring another large scale land disturbance for construction and maintenance of the far flung network of transmission lines.

Then every wind farm needs a backup power facility - in Australia it is likely to be gas. This effectively doubles the capital cost of producing that slab of power and runs the whole system inefficiently. And because the backup has to be "on call", the operating and maintenance costs of the whole network are increased.

Too much wind also adds to the instability and of the whole electricity grid.

All of these politically imposed costs have to be paid by consumers or taxpayers.

There are no more Economies of Scale

Unless we propose to build wind towers over 20,000 feet tall to reach the generally reliable high speed winds of the jet stream, we have probably seen most of the technical improvements that can be made to wind farm towers, blades or generators. To get more wind power we just build more towers the same as the last ones. This is unlike coal or nuclear power stations, where a larger facility has a lower capital cost per unit of energy than a small plant.

Wind power has very few economies of scale. What we have now is as good as it gets.

Wind Power is a Hazard Hated by most Neighbours

Why won't they live next door?

"In 18 years of daily researching and campaigning against industrial wind turbines, I have never heard of a proponent of this destructive industry who has chosen to buy a house in the vicinity of a wind farm. All I receive are requests from people who want to know where they can buy a house which is not threatened by a wind farm."
Angela Kelly, Hay-on-Wye, Wales.

Modern wind turbines are not quaint benign rustic additions to a distant rural landscape. A wind tower is a massive industrial plant. Each turbine requires a foundation of almost 1,500 tonnes of concrete and a base of about 5 acres. Each structure stands nearly 200 metres tall and they could be as close as 140 metres apart. UK has a plan to generate 30% of its electricity from renewables by 2020. For wind power to do this would require about 15,700 wind towers. At 140 metres apart, they would stretch from the north of Scotland to the south of Spain.

(Source: *Steve Goreham, Climatism p 276*).



Do you want this Panorama on every Skyline?

Wind farms are so intrusive, noisy, dangerous and ugly that most rural people all over the world are starting to oppose them vigorously. Some landowners are paid so handsomely that they accept these monsters but neighbours not getting paid see the value of their property fall quickly, while towers can be so close that the throbbing noise, ground vibrations and flicker of the blades proves very annoying, even debilitating.

And to reduce risk to aircraft, most turbines have blinking lights on top, thus making them intrusive even at night.

Wind towers are a danger to workmen forced to work on small platforms at great heights sometimes in high winds.



Not just a Friendly Farm Windmill.

Source: http://www.cleveland.com/business/index.ssf/2010/06/ge_to_double_investment_in_ene.html

And it is unsafe anywhere near them. Lumps of ice, burning embers, and broken blades get slung off and towers collapse. In one case, a broken blade was flung through the window of a house over 5 km away.

The international wind industry will face one of its biggest challenges in Canada in February 2011. In response to a recent approval of an industrial wind development, an appeal has been submitted to a Tribunal. The appeal is based chiefly on the issue of serious harm to human health from noise and low-frequency sound. The appeal raises other issues such as the government's apparently admitted inability to predict, measure, or assess noise levels.

Opponents of wind power have produced figures that reveal that at least one in six wind farms have had complaints about noise causing a lack of sleep or just been "dreadfully irritating". Neighbours complain of a noise like someone is "mixing cement in the sky" or a "clog is stuck in the tumble dryer". Another described the noise as like a train that never arrives or a helicopter landing outside. Sub-audible sounds seem to have a deleterious effect on mental health. There is growing concern about the health impacts of wind turbines with neighbours reporting symptoms such as "sleep disturbances, stress, inner ear symptoms, headaches and loss of enjoyment of life."



Would you like to live with a noisy dangerous Power Plant in your Backyard?

Photo by Sheri Kimbrough, Wyoming.

Neighbours also need to give wind towers wide berth. Some are blown down, some catch fire, and in others a blade, which may be 150 feet long weighing 14 tonnes, may snap off in high winds.



Ooops!

There are other real dangers of having towers on your land. They start fires, they can collapse in a high wind, and many are struck by lightning or damaged by hail.

Electricity is generated when a magnetic field sweeps past a coil of wire. The faster it moves, and the stronger the magnetic field, the higher the voltage.

The wind turbine turns slowly (10-20 RPM) but a conventional electric generator needs to turn fast (typically 1,800 RPM) to generate electricity efficiently. This problem is usually solved by gearboxes that convert the slow turbine to high speeds. But this brought a problem – the huge forces generated in these large gearboxes caused overheating, and no lubricant was able to withstand the gearbox forces in high winds. Many overheated and caught fire.



Here is what happens when transmission failures occur in windmills.
To date no gear oil has been invented to withstand the pressures produced.
Many gearboxes, designed for a 20-year life, are failing after 6 to 8 years of operation.

So a new type of generator was developed with many permanent magnets set around the rotor. With a somewhat increased diameter and very strong rare-earth magnets, it is possible to generate electricity at the low rotation rate (RPM) of the turbine without need for a gearbox. However, the resulting need for about two tonnes of rare-earth elements for each wind turbine has caused a huge increase in demand for rare-earth minerals. (Conventional power plants can control their RPM to match what the generator needs and do not need rare earth magnets.)

There is another problem of having a large spinning wheel on top of a long stem in a high wind. The turbine becomes a gyroscope and if the wind direction changes suddenly, gyroscopic forces tend to bend and sometimes break the supporting tower. Others disintegrate if not shut down in very high winds even without changing wind direction.

Here is a video of one that disintegrated in a high wind:
<http://www.snopes.com/photos/accident/windmill.asp>

During times of high bush fire hazard, thousands of wind turbines, most of them in very remote places, will pose a big increase in the risk of bush fires.

See: "Fire in the Sky – Wind Towers and Bush Fire Risk in Australia".
<http://carbon-sense.com/2011/02/03/fire-in-the-sky/>

A countryside peppered with huge aerial hazards will also prove a danger to crop dusting, aerial spraying, water bombing, emergency helicopters, gliders, gas balloons and small planes. Even a parachutist has crashed into one. And will every offshore wind tower have to have a lighthouse on top to reduce the hazard to shipping during storms?



Wind Tower destroyed by Wind in Windy Wyoming

Full story:

<http://wattsupwiththat.com/2011/02/02/wind-power-gets-bent-out-of-shape-in-wyoming/#more-33030>

In every country, opposition to wind farms from landowners and other residents has grown so large that wind farms are being forced offshore where capital costs, transmission costs and maintenance costs are far larger.

The capital costs of offshore wind facilities are estimated to be 90% higher than for coal plants.

In August 2010, without any fanfare, Denmark, the Pied Piper of the Wind lemmings, announced that it would abandon future onshore wind farms.

"Every time we were building onshore, the public reacts in a negative way and we had a lot of criticism from neighbours," said a spokesman for the government owned wind company. "Now we are putting all our efforts into offshore wind farms."



Thanet Wind Farm off the coast of Kent.

This should stop the Armada and maybe the Luftwaffe too.

Source: <http://www.telegraph.co.uk/earth/energy/windpower/8028328/Britains-offshore-windpower-costs-twice-as-much-as-coal-and-gas-generated-electricity.html>

Wind Power kills Bats and Birds

According to a California study in 2004, wind turbines at Altamont Pass were killing up to 4,000 birds annually, including over 1,000 raptors such as golden eagles, hawks, falcons and owls.

As a result of this study and the public outcry, the largest wind energy producer agreed to replace 2,400 wind turbines within four years and pay US\$2.5 million in a legal settlement to reduce deaths of eagles, hawks and other raptors hacked by turbine blades.

Similar battles over bird kills were reported in Ireland and Scotland.



Sliced Griffon Vultures, Navarre, Spain.



Wedge tail Eagle Maimed, Starfish Hill, Australia.

Source and more info on Eagle kills in Australia: <http://www.iberica2000.org/Es/Articulo.asp?id=4382>

Birds get killed because, although the turbine may be rotating slowly, the tip of the very long blade can be travelling at 300 kph. Slow flying birds are hit before they realise the danger is approaching.

Look here at a video where a griffon vulture gets hacked by a wind turbine in Greece. <http://www.epaw.org/multimedia.php?lang=en&article=b2>

The turbines also kill bats by exploding their lungs and frighten horses with noise and flicker.

It is true that most of man's activities have effects on other species. However we must seek to minimise that impact. There needs to be significant human benefits to justify the damage that wind towers do. In the case of wind power, there are ZERO human benefits except green tokenism. Imagine the outcry if pictures such as above were the result of operation of a coal fired power plant? Why the double standards?

Wind Power triggers new Emissions and degrades the Environment.

The most obvious environmental degradations caused by wind power are the landscapes scarred and vistas uglified by the thousands of massive turbines with their high impact roads and transmission lines.



Imagine the Roads needed to install thousands of these Monsters

Source: <http://www.newsfirst5.com/news/pueblo-wind-turbine-factory-builds-first-tower/>

Look at these pictures from California: <http://ludb.clui.org/ex/i/CA4977/>

And: <http://realneo.us/content/tehachapi-turbines-while-clevehoga-studies>

The main reason given for the rush to wind is "to reduce emissions of carbon dioxide". But governments have not produced credible figures to show that this occurs. In fact UK wind promoters have been told to halve the savings they claim for carbon dioxide emissions.

http://mvwind.10.forumer.com/a/wind-developers-using-bogus-carbon-saving-figures_post666.html

It is true that the energy turning the turbine does not directly produce carbon dioxide. But imagine the emissions from all the manufacture, transport, installation and maintenance of thousands of roads, transmission lines and turbines, none of which allows the closure of even one carbon energy plant.

Wind power also triggers many mining and metallurgical operations each with its own emissions and environmental effects.

There is the concrete needed for the massive foundations, which require mining of limestone and its calcining to produce cement. All aspects of those operations, including the transport of the concrete to the site, cause carbon dioxide emissions. In some places demand for concrete is so great that special quarries and calcining and batching plants are set up locally.

Then iron ore has to be mined, smelted with coke, made into steel with carbon, fabricated and transported – all more carbon dioxide emissions.

Then there is the large quantity of copper or aluminium used for transmission lines and generators – more mining, smelting, refining, fabricating and transport all using mainly carbon fuel.

But the big environmental sleeper is the rare earth metal used to make the permanent magnets in modern electric generators. A direct-drive permanent-magnet generator for a top capacity wind turbine would use about 2 tonnes of neodymium-based permanent magnet material.

Inner Mongolia has most of the world's known reserves of rare earth metals, including neodymium. Production is booming to meet the force-fed growth of wind power. China has already given indications that it may use its market power here to reduce supply and force up the price of these raw materials. Do we want to be hostage to Chinese power brokers?

Have a look at the article below which describes the real pollution involved in these booming Chinese mines and processing plants.

Read more:

<http://www.dailymail.co.uk/home/moslive/article-1350811/In-China-true-cost-Britains-clean-green-wind-power-experiment-Pollution-disastrous-scale.html#ixzz1CYU3lfS8>

The complex ore is extracted and separated using acid leaching and roasting. Seven million tons per year of chemical waste is discharge untreated into a huge five-mile wide tailing dump. Visiting reporters say it has killed farmland for miles around, made thousands of people ill and put one of China's key waterways in jeopardy.

People will say that all electric generators need metals for wire and magnets. This is true. But introducing wind power brings a large increase in metal needed for generators and transmission lines because wind uses its capital so inefficiently and because using wind does not allow closure of existing plants. And because of the force feeding of wind power by politicians, the growth of wind power is unnaturally large in some countries. This has created a boom in this rare metal which is causing this real pollution problem in out-of-sight Inner Mongolia.

The sleeper problem with wind turbines is the question of who is going to clean up the mess when the operators go broke, as many of them assuredly will. Netherlands decommissioned 90 turbines in 2004. Others were closed by decree in California because of an unacceptable number of bird deaths. Others are closed and abandoned in Hawaii. Who pays for the cleanup? Many nations are already reducing subsidies and mandates that support this unsustainable industry so the trickle of bankruptcies and closures may become a flood. Scrap metal dealers may remove the above ground clutter, but who removes the thousands of 1,500 tonne concrete bases and rehabilitates the sites?

The Wind is Free, but Wind Power is NOT FREE.

All natural resources including solar energy are "free" – man did not create them and they are available "free" to the first who discovers or claims them.

Coal is "free" – but it costs a lot to acquire the land access and then mine it, transport it, burn it and convert its energy into electricity. And of course pay the taxes. All this expenditure is required to produce usable energy from a "free" natural resource.

The wind is also "free" – but it costs a lot to acquire the land access, and build, maintain and replace the turbines, transmission lines and backup generating capacity. Only after all of these costs are incurred is usable energy produced from the "free" wind. Wind power can only appear to be "free" where government pays huge subsidies.

Steve Goreham ("Climatism") quotes US and UK electricity generating costs (excluding the cost of carbon permits and the cost of backup generating facilities for wind and solar):

<i>Energy Source</i>	<i>USA cents per Kwh</i>	<i>UK pence per Kwh</i>
<i>Natural Gas</i>	<i>8</i>	<i>8</i>
<i>Coal</i>	<i>9</i>	<i>8</i>
<i>Nuclear</i>	<i>11</i>	<i>9</i>
<i>Hydro-electric</i>	<i>12</i>	
<i>Wind</i>	<i>14</i>	<i>15</i>
<i>Wind Offshore</i>	<i>23</i>	<i>16</i>
<i>Solar Thermal</i>	<i>26</i>	
<i>Solar Voltaic</i>	<i>40</i>	
<i>Biomass</i>		<i>18</i>

Goreham (p272) also compares the planned London Array offshore wind field with the planned Kingsnorth Coal fired plant and concludes:

"The wind turbine array requires 563 times more land than the coal plant and delivers electricity intermittently at twice the cost."

The huge Cape Wind Project is planned to cover 25 square miles offshore from Cape Cod, Massachusetts with 130 massive wind turbines at a cost of US\$2,500,000,000. Its electricity will cost twice as much as the current supply from coal and gas.

The Failed Promise of Wind.

"Wind energy has been touted as the panacea for global warming and energy independence.

The promoters tell us it's renewable and wind is free.

Yes, wind is free.

But wind does not convert itself to electricity.

Therein lies the failure of the promise of wind."

Sheri Kimbrough, "Wind Power: Friend or Foe?"

Renewables will cause Australian Power Costs to triple.

"We think that, by 2020, the cost of electricity will be threefold what it is today, given the current policy of large amounts of renewables being forced into the system, un-costed charges for those renewables given the current policy settings and a substantial increase in transmission and distribution costs."

Grant King, CEO Origin Energy

<http://www.theaustralian.com.au/business/energy-prices-to-triple-says-origin-chief/story-e6frq8zx-1225853385647>

Australians have already seen soaring power costs caused by two green factors:

- forcible inclusion of high cost green energy, and
- hesitation by investors to risk construction of low cost coal power plants in such a hostile political environment with daily threats of more carbon taxes. This hesitation by nervous investors is increasing the risks of blackouts during times of peak demand.

Wind Power only survives because of Mandates and Subsidies.

It is obvious from the cost figures above, and from the intermittent nature of wind power, that wind power can never compete with conventional power from coal, gas and nuclear without significant market sharing mandates, plus price bonuses, tax benefits and/or direct subsidies.

Nowhere in the world is there a significant wind power industry that exists without special government benefits.

In France it is estimated that taxes on electricity will need to almost triple to meet the rising costs of green energy. And in Ontario the feed-in tariff for solar installations is up to 20 times the market price of power.

Finally, however, over-burdened taxpayers and electricity consumers are starting to object to feeding this infant industry that never grows up.

Europe Pulling the Plug on Green Energy Subsidies.

"The Spanish and Germans are doing it. So are the French. The British might have to do it. Austerity-whacked Europe is rolling back subsidies for renewable energy as economic sanity makes a tentative comeback. Green energy is becoming unaffordable and may cost as many jobs as it creates.

But the real victims are the investors who bought into the dream of endless, clean energy financed by the taxpayer.

They forgot that governments often change their minds."

Eric Reguly, The Globe and Mail, 27 Jan 2011. Reported in CCNet 28 Jan 2011.

Even the Dutch, who have had a long love affair with their windmills, have recently seen the light and are "cutting subsidies for most forms of renewable energy drastically and even putting an end to all subsidies for offshore wind, solar power and large scale biomass".

See: <http://www.europeanenergyreview.eu/index.php?id=2656>

Governments always make a mess when they get involved with subsidies, picking winners, mandating what sort of energy we should use and forcing us to share their value judgements and pay for their mistakes. Left to itself, a properly free market with respect for property owners will choose the best energy options and decide where power plants are best situated.

Green Rorts

***If it requires subsidies, market mandates, price support or special tax breaks,
it isn't an industry,
it isn't profitable
- it's an unsustainable political rort.***

Viv Forbes

Big Wind is pushing a Carbon Tax

There is a big vested interest pushing for more carbon taxes in Australia. At the forefront of these market manipulators are the Wind Power speculators and those such as America's GE and the Chinese who are making a fortune building wind turbines.

Ironically, gas producers are not adverse to carbon taxes or wind power because carbon taxes will hit coal more than gas, and promotion of wind automatically promotes the gas power needs as backup for intermittent wind power production. Gas companies know that Green Energy is a great boost to gas markets, and will cripple their great competitor, coal - the other carbon fuel. So Big Gas loves wind power and carbon taxes.

Carbon taxes will never improve the climate, but they will make production of electricity from coal and gas more expensive, thus reducing the cost disadvantage of wind power. It is unlikely that the electorate would tolerate carbon taxes high enough to make wind power look economic but "every little bit helps". And there is zero chance that wind power can replace all carbon fuelled electricity generation.

Thus the main effect of a carbon tax will be to increase the costs of most consumer goods and services. These costs will fall heaviest on the battlers.

Wind Power creates Paupers not Jobs

A pauper is someone reduced to living on handouts from the government.

A real job is one that earns its way by providing goods or services that other people will pay for freely without being coerced to do so.

Wind power exists on subsidies, mandates and tax breaks. Those who work in the industry are thus welfare recipients. The country would be better off if they were on the dole. These people, and those made destitute by high costs for electricity and food are the paupers created by wind power.

We keep getting told about Green Jobs. Most of the technology and equipment for wind towers is imported. So Australian tax payers and electricity consumers are paying handsomely to create green jobs overseas.

And the construction and maintenance jobs created in wind power are in specialised professions already in short supply for competitive Australian industries.

That is only part of the sad story of green jobs.

There is no doubt that make-believe "jobs" are created in the wind industry.

However, the experience of Spain and California has shown that, for every green job created in wind power, about 2 jobs are destroyed by high taxes and power costs in the real economy.

A very poor bargain.

For a cutting comment on how green job cronyism works see:

<http://www.huffingtonpost.com/ernest-istook/green-jobs-cronyism-and-c b 817067.html>

Minimising Renewables Damage

"Environmentally speaking, simply mailing checks to the workers who would have been involved in building turbines would be far better than actually putting in the turbines. Less fuel would be used in mining, construction, employees driving to work, etc. Less electricity would be required for manufacturing and maintenance. And those who were not working on projects that have yet to prove their worth might actually come up with a solution to the energy problems. We could rename the "green jobs" from wind installation to "R & D" and pay people to sit home and think. Thinking is very environmentally friendly, as long as you don't move into the action category too soon."

Sheri Kimbrough, Wyoming " Wind Power: Friend or Foe"

Wind Power in Denmark

Denmark claims to produce 20% of its electricity from wind. – there is one tower for every 1,000 people and the tiny Kingdom is dotted by 5,200 of the whirling scythes. But the paltry power they produce could be replaced by one small coal or nuclear plant.

As in every other country, the Danish wind power industry was built on government subsidies and special feed-in tariffs. However, the chief beneficiaries of Danish generosity are not Danish consumers of electricity, or Danish taxpayers. Half of Denmark's wind power is exported to Norway and Sweden. Scandinavian power consumers get cheap power and Danish wind turbine manufacturers have a thriving business.

Scandinavia is powered mainly by hydro power which is linked to Denmark's wind power generators. Wind seldom blows at times of peak demand (and prices), so 50% of Denmark's wind power is exported to Scandinavia and it receives generally low off-peak prices. At times of peak demand and poor winds, Denmark imports Scandinavian hydro power at high prices. So 50% of all the subsidies paid by Danish taxpayers and consumers goes to benefit Scandinavian electricity consumers.

It gets worse.

Danish electricity consumers pay higher prices than any other Europeans. And well before they could repay the initial capital, the wind towers are reaching the end of their life and will need to be replaced. **Not one** coal power plant has been replaced by wind power. It is doubtful if all this community pain and suffering has reduced carbon dioxide emissions. It has certainly caused no measurable improvement to global climate and has brought great environmental damage and human worry.

The sorry story of wind power in Denmark is mirrored in Spain, Hawaii and California.

Surely Australia, with abundant resources of coal, gas and uranium, need not sacrifice our taxpayers, consumers, industry, environment and eagles on the barren wind power altar.

The Global Warming Justifications

The key propositions of the global warming alarmists are:

- There has been unusual and alarming warming since the start of the industrial revolution.
- This has been caused mainly by man's contribution of carbon dioxide to the atmosphere.
- The current levels of carbon dioxide in the atmosphere are unprecedented.
- Unless human emissions are curbed they will cause dangerous runaway global warming.
- Now any extreme weather event is blamed on this innocent trace gas.
- Carbon dioxide is a pollutant in the atmosphere.

There is no evidence whatsoever to support any of these beliefs and considerable evidence from geological records, from scientific observations and from logical deduction to say these are all wrong.

- The warming is not unusual and the current warming trend started well before man's production of carbon dioxide became significant.
- Carbon dioxide is a very minor player in determining surface temperature. The sun, the clouds, cosmic rays and the oceans are the dominant determinants of surface temperature and weather events.
- Earth's atmosphere has had far higher levels of carbon dioxide in the past without causing runaway global warming. There is no reason to expect this time will be different.
- There is considerable evidence (including experimental data) to indicate that more carbon dioxide poses no danger and has considerable benefits for life on earth. It is a sick joke to refer to carbon dioxide as a "pollutant". It is the supporter of all life on earth. More carbon dioxide produces more plant food and supports more life. Without carbon dioxide in the atmosphere there would be no life and we would not be having this debate.

The policies being proposed to control emissions of carbon dioxide will have major effects on the cost of power, transport, steel, cement and food, and cause big distortions in the economics of all the fuel industries for no benefits. Green jobs are being created overseas where the turbines are made and jobs are being destroyed here in Australia. Subsidies and other featherbedding from tax payers are increasing and the generous market mandates and feed-in tariffs are being reflected in rapidly rising electricity charges.

All of this is publicly justified by an increasingly discredited theory that green energy will create a better climate for mankind.

Privately, some alarmists may be motivated by other considerations entirely. They prefer to see expensive power, reduced industrial activity and reduced population. A worldwide shortage of cheap energy will help achieve these destructive goals.

If it's not broken, don't fix it.

"Global Warming is part of a natural cycle and there's nothing we can do to stop these cycles. The world faces spending a vast amount of money to try to solve a problem that does not actually exist."

Professor David Bellamy

The final claim that carbon dioxide is an atmospheric pollutant is a good example of the lie so huge that people think it must be true.

Carbon dioxide, along with water vapour, oxygen and nitrogen, are essential and beneficial natural gases in the atmosphere. They have always been in earth's atmosphere in varying concentrations. Carbon dioxide is presently in such small trace amounts in the atmosphere that the natural world is in danger of carbon starvation.

There are many actual studies (not manipulated computer models) on the effect on plant life if carbon dioxide levels are increased. The report below lists 55 benefits of carbon dioxide. There is no justification whatsoever to use carbon dioxide as a scapegoat to cripple carbon energy and provide crutches to support a real energy cripple like wind power.

See: "The Many Benefits of Atmospheric CO₂ Enrichment":

http://scienceandpublicpolicy.org/images/stories/papers/other/55_benefits_of_co2_pamphlet.pdf

And: "Carbon Dioxide feeds the World":

<http://carbon-sense.com/wp-content/uploads/2010/12/carbon-dioxide-feeds-the-world.pdf>

The earth emerged from the last ice age about 15,000 years ago and for 10,000 years has been in a generally stable pattern with minor warming and cooling periods. Current conditions are not unusually warm. Moreover there is little to fear from warm eras – they have always been beneficial for life. What we need to fear is the next Ice Age – and carbon dioxide will not cause that either. But when it comes, humans will have better chance of survival if there is plenty of carbon dioxide in the atmosphere and many operating base-load power stations using reliable fuels like coal, gas or uranium.

Any skeletal wind towers that remain will, like the statues on Easter Island, be symbols of a failed society which worshipped false green gods.

Wind Power does not reduce Carbon Dioxide Emissions.

Superficial commentators think that because wind itself does not rely directly on carbon fuel, its introduction thus reduces carbon dioxide emissions. This is not necessarily so, and promoters should be required to prove their case.

Firstly wind requires backup to maintain steady power generation when wind power fails. The best backups are probably hydro power or gas power, both of which can be turned on and off as quickly as the wind changes. Coal and nuclear can provide backup, but it is very expensive to do it that way. Nuclear is forbidden in Australia and coal of course emits the dreaded carbon dioxide.

Secondly, wind farms are usually in remote locations and the turbines themselves are necessarily spread over a large area. Each turbine has 1,500 tonnes of concrete, 2 tonnes of rare earth metals, and lots of steel and copper and requires much heavy transport and earth moving equipment to construct the towers, the access roads and the transmission lines. They also need maintenance over this large area. Every one of these activities emits carbon dioxide.

There is no proof that there is any need to take action to reduce carbon dioxide emissions from man's activities. However, even if that were a sensible aim, wind power is unlikely to achieve it. Several careful studies have been done and reported. These conclude that wind power saves virtually no emissions.

For more details see:

<http://www.masterresource.org/category/windpower/emissions-reduction-wind/>

Global Warming Is a Religion

"Manmade global warming, for many, is an Earth-worshipping religion. The essential feature of any religion is that its pronouncements are to be accepted on the basis of faith as opposed to hard evidence. Questioning those pronouncements makes one a sinner. No one denies that the Earth's temperature changes. Millions of years ago, much of our planet was covered by ice, at some places up to a mile thick, a period some scientists call "Snowball Earth." Today, the Earth is not covered by a mile of ice; a safe conclusion is that there must have been a bit of global warming. I don't know the cause of that warming, but I'd wager everything I own that it was not caused by coal-fired electric generation plants, incandescent light bulbs and SUVs tooling up and down the highways."

Dr Walter Williams



Why Environmentalists love Wind Power

It is hard to believe that, after an objective look at the engineering and economics, anyone could seriously believe that wind power could supply reliable and economical electricity to a modern society.

Some believers are honest but naive earth lovers who long for some rustic rural past with no nasty engines. Others will support anything that they think reduces the obvious pressures put on the environment by large populations. These true environmentalists are honest and straightforward and can be reasoned with.

Others are central control freaks who will use any "crisis" to impose more controls on every person and all land and property. They are the "Watermelon Greens" – green on the outside red in the centre.

But deep in the heart of the Environmental movement is a group of people who hate humans, hate children, hate industrial society, hate free enterprise and free trade, and recognise the key role played by coal and oil in building modern society and supporting its large populations. These extremists would support any proposals that destroy industrial capacity or cause significant reduction in population. Climate Alarmism is just another tool in their long war. They have no interest in finding cheap "clean" fuels, which is why they oppose feasible emission-free energies such as nuclear and hydro power. They eagerly support every fad new energy source as long as it is costly or unproven or economically destructive. They love wind power and solar power for the very reason that sacrificing savings on such pipe dreams will reduce or kill off economic growth and human progress. Politicians should recognise these enemies of society and not promote their schemes.

Some people find it hard to believe there are people whose aim is destroy our society, deny its access to energy and reduce earth's human population by almost any means.

Don't believe me? Then read what they say below:

"Isn't the only hope for the planet that the industrialized civilizations collapse? Isn't it our responsibility to bring that about?"

- Maurice Strong, founder of the UN Environment Programme

"A massive campaign must be launched to de-develop the United States. De-development means bringing our economic system into line with the realities of ecology and the world resource situation."

- Paul Ehrlich, Professor of Population Studies

"Unless we announce disasters no one will listen."

- Sir John Houghton, first chairman of IPCC

"Global Sustainability requires the deliberate quest of poverty, reduced resource consumption and set levels of mortality control."

- Professor Maurice King

"The only hope for the world is to make sure there is not another United States. We can't let other countries have the same number of cars, the amount of industrialization, we have in the US. We have to stop these Third World countries right where they are."

- Michael Oppenheimer, Environmental Defence Fund

"We need to get some broad based support, to capture the public's imagination... So we have to offer up scary scenarios, make simplified, dramatic statements and make little mention of any doubts... Each of us has to decide what the right balance is between being effective and being honest. I hope that means being both."

- Stephen Schneider, Stanford Professor of Climatology, lead author of many IPCC reports

"It doesn't matter what is true, it only matters what people believe is true."

- Paul Watson, co-founder of Greenpeace

"We've got to ride this global warming issue. Even if the theory of global warming is wrong, we will be doing the right thing in terms of economic and environmental policy."

- Timothy Wirth, President of the UN Foundation

"No matter if the science of global warming is all phony...climate change provides the greatest opportunity to bring about justice and equality in the world."

- Christine Stewart, former Canadian Minister of the Environment

"The only way to get our society to truly change is to frighten people with the possibility of a catastrophe."

- Emeritus Professor Daniel Botkin

"We require a central organizing principle - one agreed to voluntarily. Minor shifts in policy, moderate improvement in laws and regulations, rhetoric offered in lieu of genuine change - these are all forms of appeasement, designed to satisfy the public's desire to believe that sacrifice, struggle and a wrenching transformation of society will not be necessary."

- Al Gore, Earth in the Balance

"Current lifestyles and consumption patterns of the affluent middle class - involving high meat intake, use of fossil fuels, appliances, air-conditioning, and suburban housing - are not sustainable."

- Maurice Strong, Rio Earth Summit

"Complex technology of any sort is an assault on human dignity. It would be little short of disastrous for us to discover a source of clean, cheap, abundant energy, because of what we might do with it."

- Amory Lovins, Rocky Mountain Institute

"The prospect of cheap fusion energy is the worst thing that could happen to the planet."

- Jeremy Rifkin, Greenhouse Crisis Foundation

"Giving society cheap, abundant energy would be the equivalent of giving an idiot child a machine gun."

- Prof Paul Ehrlich, Stanford University

"The big threat to the planet is people: there are too many, doing too well economically and burning too much oil."

- Sir James Lovelock, BBC Interview

"My three main goals would be to reduce human population to about 100 million worldwide, destroy the industrial infrastructure and see wilderness, with its full complement of species, returning throughout the world."

- Dave Foreman, co-founder of Earth First!

"A total population of 250-300 million people, a 95% decline from present levels, would be ideal."

- Ted Turner, founder of CNN and major UN donor

"... the resultant ideal sustainable population is hence more than 500 million but less than one billion."

- Club of Rome, Goals for Mankind

"I suspect that eradicating small pox was wrong. It played an important part in balancing ecosystems."

- John Davis, editor of Earth First! Journal

"The extinction of the human species may not only be inevitable but a good thing."

- Christopher Manes, Earth First!

"Childbearing should be a punishable crime against society, unless the parents hold a government license. All potential parents should be required to use contraceptive chemicals, the government issuing antidotes to citizens chosen for childbearing."

- David Brower, first Executive Director of the Sierra Club

Conclusions

Our conclusions are:

- Pursuit of wind power will have very bad social and economic impacts on Australians. It is a very dilute and unpredictable source of energy and this can never be changed. Thus it will always have a very heavy environmental impact, high capital and operating costs and will require permanent subsidies from taxpayers or consumers.
- Because wind power is also unreliable it will always need expensive 100% backup power or power storage facilities.
- All over the world, wind towers are hated by neighbours and have a negative effect on human health, happiness and property values. This is forcing wind power offshore where capital costs and maintenance costs are much higher.
- Wind turbines are a fire hazard made worse by the widespread distribution of towers and power lines in remote and often inaccessible locations.
- Wind turbines are a danger to planes, gliders and eagles, and if offshore, to shipping.
- The slogan "Wind Power is Free" is a myth. Wind is no more free than coal or uranium. All natural energy resources are "free" – you just have to dig them up and build facilities that can extract their energy. In the case of wind this is a very expensive operation compared to the energy obtained.
- Nowhere in the world is wind power economic. In all cases it requires massive government interventions and subsidies. Wind power promoters are thus great supporters of carbon taxes which will hobble carbon energy and thus make it appear that wind is "economic".
- Taxpayers everywhere are waking up and wind power subsidies are being rolled back. It would be very foolish for Australia to continue on the dead-end road of perpetual subsidies for wind power.
- The justification for supporting such an unreliable and costly energy source is the myth that it will reduce carbon dioxide emissions and thus somehow magically improve future climate. There is no evidence, no experimental data and no proof that these beliefs have any basis.
- Many of the key leaders of the environmental movement who support wind power have no interest in the economies or the industries of our society or the future for our children. They are anti-human and anti-children. They will promote any idea that cripples industrial society and shackles it with controls, taxes, high energy costs and an uneconomic technology like wind power.

Recommendations

The Senate should find that:

1. Rural wind farms have harmful social, economic and environmental impacts on all Australians, especially those forced to live near them.
2. There is no justification for the continuation or extension of mandates, subsidies or tax breaks favouring wind power over other proven and cheaper electricity generation options.
3. Wind power promoters should compete on an equal basis with all other power options.

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Submitted on behalf of the Carbon Sense Coalition by:

Viv Forbes

Chairman, The Carbon Sense Coalition

www.carbon-sense.com

Phone 07 5464 0533

Email: Info@carbon-sense.com

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Disclosure: The above report was produced by Viv Forbes with assistance from several other members of the Carbon Sense Coalition. No one prompted or paid us to produce it.

Viv Forbes is a geologist, mineral economist, investment analyst and political commentator. He is a non-executive director of an Australian coal exploration company and has had experience in the technology and economics of all energy minerals. He has also had a lifetime of experience with relying on intermittent wind power to pump water for stock and domestic use – because of the vagaries of the wind, every wind mill and its storage tank needed checking at least weekly. Then, as now, fierce winds sometimes blew off the fan or blew the whole mill down. His childhood was spent relying on green energy like wind, solar, evaporative cooling, candles, firewood, recycled paper, bicycles, ponies and draught horses. He says "Good riddance to those Good Old Days".

But he has resumed the old time practice of keeping candles in the cupboard.