



Wind Power

Myths and Facts

Joe Hallenstein

Engineers Australia, 14 May 2014

About Me

- Electrical engineer and project manager.
- 10 years working in the power industry in Australia and Canada.
- Lots of experience developing, building and operating wind farms.



Wind power myths

- Birds
- Noise
- Low frequency noise, infrasound
- Visual amenity
- Community support
- Property prices
- Energy payback
- Health
- Incentives and subsidies
- Electricity prices
- Efficiency & reliability, backup
- Investment and jobs

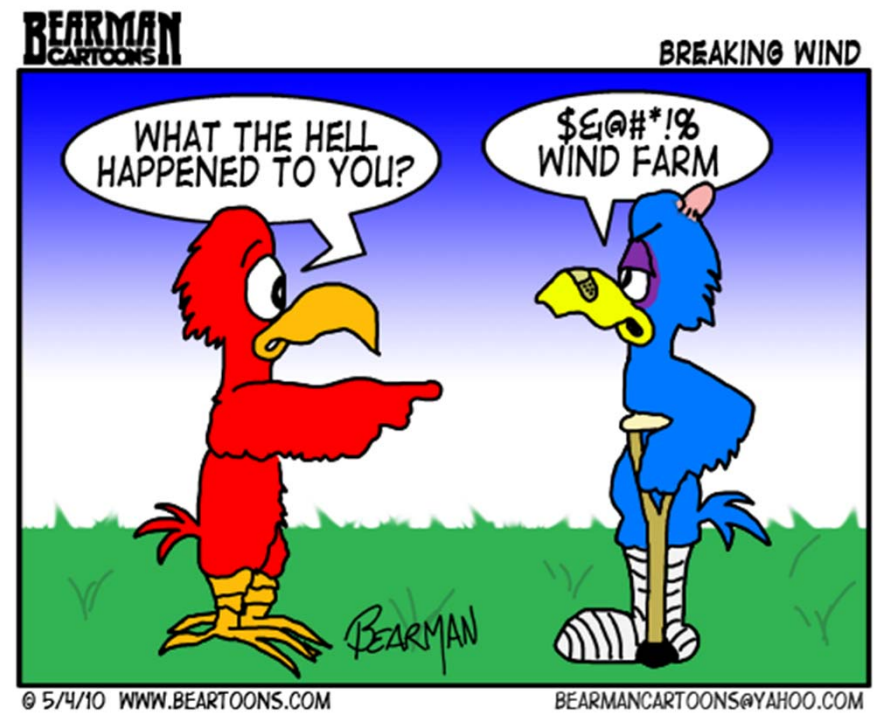


The INDEPENDENT

Are wind farms a health risk? US scientist identifies 'wind turbine syndrome'

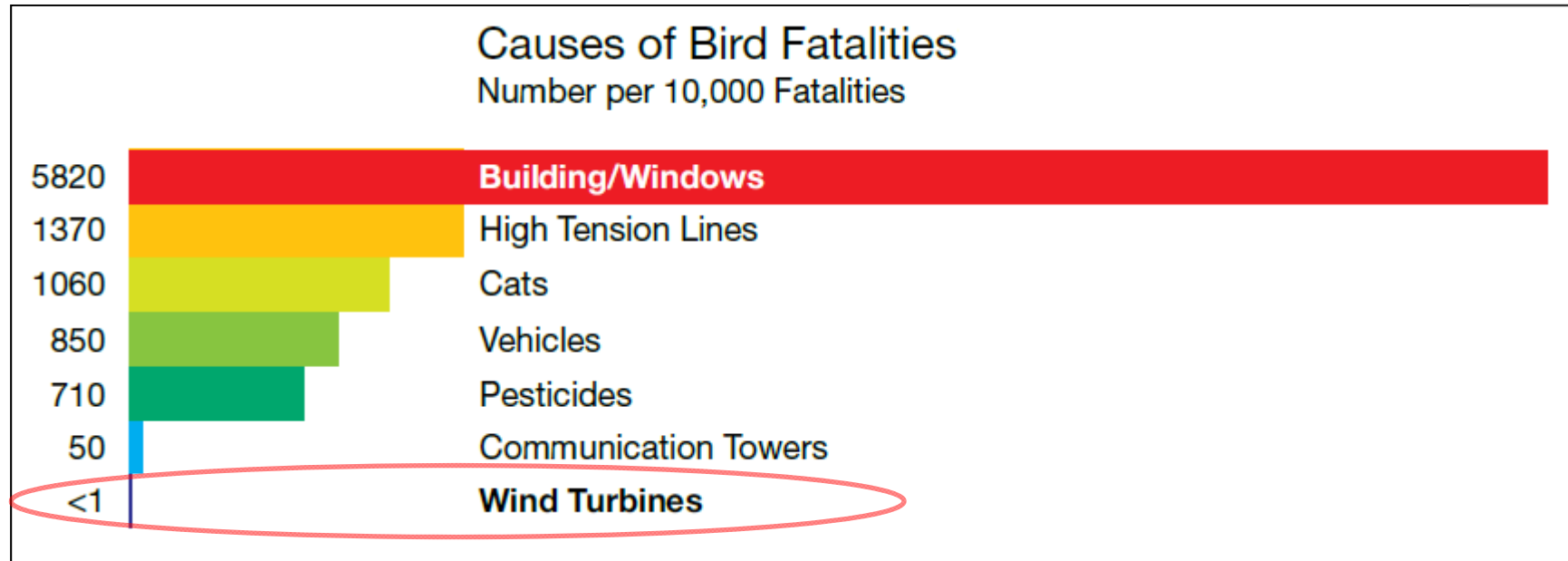


YOUR editorial, 'Green energy drive's black mark' (DebateNL) There is increasing evidence of serious adverse health effects associated with wind farms. Emerging international consensus points to a minimum of grossly inadequate. Your editorial proposes that consumers and



Wind power myths

Do wind turbines kill birds?



Source: A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions, Erickson, et. Al; USDA Forest Service 2005

- Bird protection charity builds a wind turbine, sends a message. RSPB noted that it believes “renewable energy is an essential tool in the fight against climate change, which poses the single biggest threat to the long term survival of birds and wildlife.”
- 2004: Up to a quarter of all bird species could become extinct by 2054 due to global climate change – Nature magazine.
- 2013: 24 to 50% of bird species are highly vulnerable to climate change – New Scientist.

Wind power myths

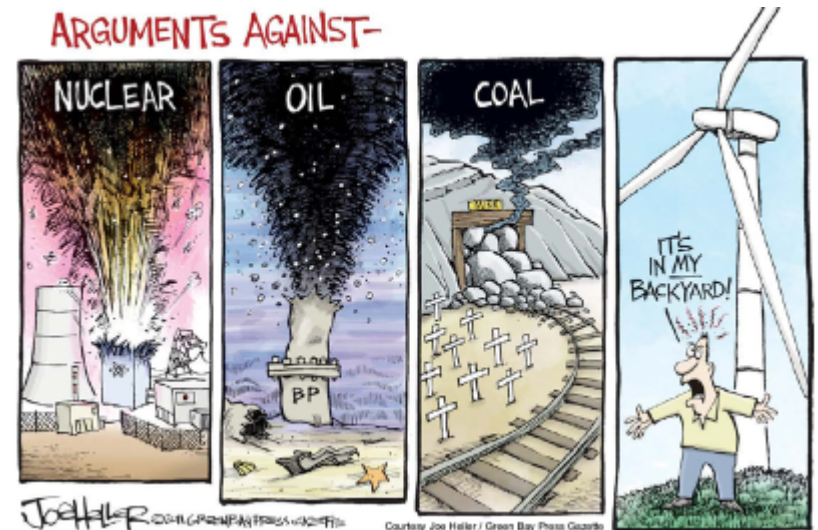
Are wind turbines noisy?

Car at 60km/h at 100m



Wind farm at 350m

Generally accepted noise limit from wind turbines outside a house



Wind power myths

Do turbines emit dangerous low frequency noise or infrasound?

- Infrasound emissions from wind farms are well below the perception threshold and are not detectable to humans – confirmed by several Australian and international studies.
- Natural and manmade human sources generate infrasound of the same order to that measured in close proximity to wind farms.

Infrasound Measurements from Wind Farms and Other Sources, Sonus Pty Ltd, Adelaide, Nov 2010

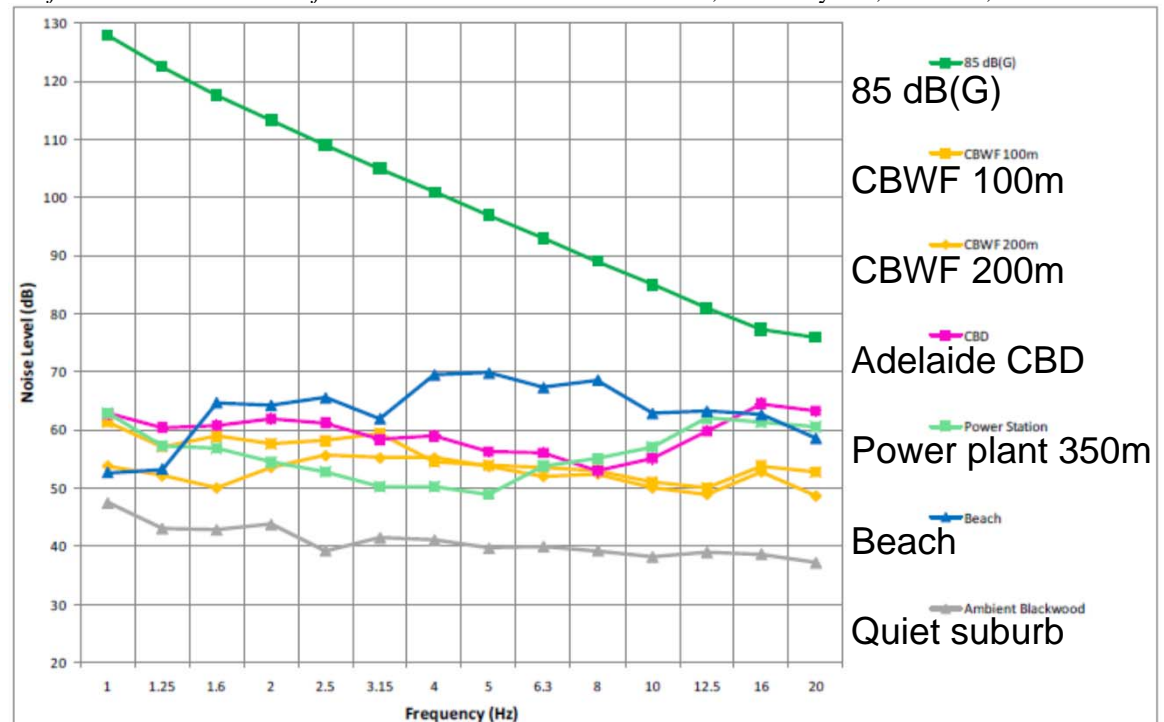


Figure 12 - Summary of Measurements Cape Bridgewater Wind Farm (CBWF)

- "I can state quite categorically that there is no significant infrasound from current designs of wind turbines. To say that there is an infrasound problem is one of the hares which objectors to wind farms like to run. There will not be any effects from infrasound from the turbines."

– Dr Geoff Leventhall, Consultant in Noise Vibration and Acoustics and author of the Defra Report on Low Frequency Noise and its Effects (2003)

Wind power myths

Are wind farms ugly and unpopular?

- Studies regularly show that most people find turbines an interesting feature of the landscape.
- On average 80% of the public support wind energy, less than 10% are against it, the remainder are undecided.
- Surveys conducted near existing wind farms have

consistently found that most people are in favour of wind energy.

Go and see for yourself!



Wind power myths

Do wind farms affect property prices?

- There is no statistical evidence that operating wind turbines have had any impact on home sales prices.
- “In another major study released today on wind farms and property values, Lawrence Berkeley National Laboratory (Berkeley Lab) analyzed more than 50,000 home sales near 67 wind facilities in 27 counties across nine U.S. states, yet was unable to uncover any impacts to nearby home property values.”
- Similar results from NSW Valuer General study in 2009.
 - Heard otherwise? Financial Review - Waubra Foundation unpublished ‘study’ with sample size of 2 homes.

Reference:
A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States, Lawrence Berkeley National Laboratory, Aug 2013.



Wind power myths

Does building a wind farm take more energy than it ever makes?

- The “energy payback” time of a typical wind turbine is 3-6 months.
- As a comparison, fossil-fuelled generation requires an ongoing supply of non-replaceable fossil fuel.



Video - *The Way the Wind Blows*

*To watch video, visit:
www.vicwind.org.au/waubra-videos*

Wind power myths

Do wind turbines cause health problems?

There is no credible evidence of a causal link between the physical outputs of a turbine and adverse effects on health.

With over 100,000 turbines around the world, there has been no World Health Organisation, no National Academy of Science, no recognized medical journal, not even a vet report supporting views that wind turbines cause any health effects whatsoever.

Anti-wind groups vs The rest of the population

- Landscape Guardians
- Waubra Foundation

The Landscape Guardians is a small but well-funded secretive group who also make preposterous claims about climate science and who have apparent vested interests in fossil fuels.



References:

The Ugly Landscape of the Guardians,
Independent Australia, 24 Jul 2011.

Wind turbine syndrome: farm hosts tell very different story, The Conversation, 18 Sep 2013.

Wind farms, the Waubra Foundation and a post-office box, Crikey, 9 Feb 2012.

The Landscape Guardians and the Waubra Foundation, Independent Australia, 6 Mar 2012.

Wind power myths

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Anti-wind groups vs The rest of the population

Landscape Guardians

- Secretive – no listed phone number nor physical address. No information about its funding or sponsorship. Claims no income nor expenditure.
- No issues with anything other than wind farms – no mention of coal-seam gas or open cut coal mining or coal-fired power stations. No comment on any other renewable technology – geothermal, solar.
- Made up of many ‘local branches’, spokespeople for various branches are mostly the same.
- Not looking for members, don’t hold public meetings.

Waubra Foundation

- A front group for the Landscape Guardians, none of its ‘directors’ live anywhere near Waubra.
- None of the farmers at Waubra have ever met any of the members of the Waubra Foundation; they have not talked to farmers who host turbines on their land and its use of the town’s name has upset Waubra residents.
- Most of the Foundation’s directors appear to have close connections to anti-wind groups, to the Liberal party and to have interests in or connections to the fossil fuel industry.

Wind power myths

Do wind turbines cause health problems?

Anti-wind groups vs The rest of the population

- Good news is: you can contact them all at the same address – Landscape Guardians, Waubra Foundation, and Lowell Resources Funds Management Limited (oil & gas investment company) all share PO Box 1136, South Melbourne, Victoria 3205.



References:

- * *The Ugly Landscape of the Guardians*, Independent Australia, 24 Jul 2011.
- * *Wind turbine syndrome: farm hosts tell very different story*, The Conversation, 18 Sep 2013.
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Wind power myths

Do wind turbines cause health problems?

Anti-wind groups vs **The rest of the population**

Wind turbine hosts



- Watch *The way the wind blows* by Neil Barrett. None of the locals are bothered by them or suffer from any health problems they attribute to the turbines.

Experts and enquiries

- National Health and Medical Research Council
- Doctors for the Environment
- Two Australian Senate enquiries
- South Australian EPA
- Victorian Civil and Administrative Tribunal
- etc



There has *never* been any credible evidence cited that wind farms have any effect on health.

Wind power myths

Electricity incentives, subsidies and interventions

Incentives for Renewables

- Renewable Energy Target – Bi-partisan supported 20% renewables by 2020. No payments made – simply a requirement for retailers to source from renewables a percentage of the power they sell. Big generators, who are also retailers, have vested interest in existing fossil-fuelled generation, pushing for watering down of RET. Future uncertain.
- Carbon Tax – Large emitters required to pay for their emissions. But inefficient coal-fired generators were directly compensated for the payments and the carbon price wasn't high enough to make new renewables attractive. Big business and new Gov't pushing for removal. Future uncertain.
- Solar feed-in tariff – 8c/kWh in Qld, distributed generation, no transmission losses. Utilities and retailers pushing for higher charges for solar customers to recoup their loss of income from selling power. Cancelled by Qld govt from Jul 2014.



Wind power myths

Electricity incentives, subsidies and interventions

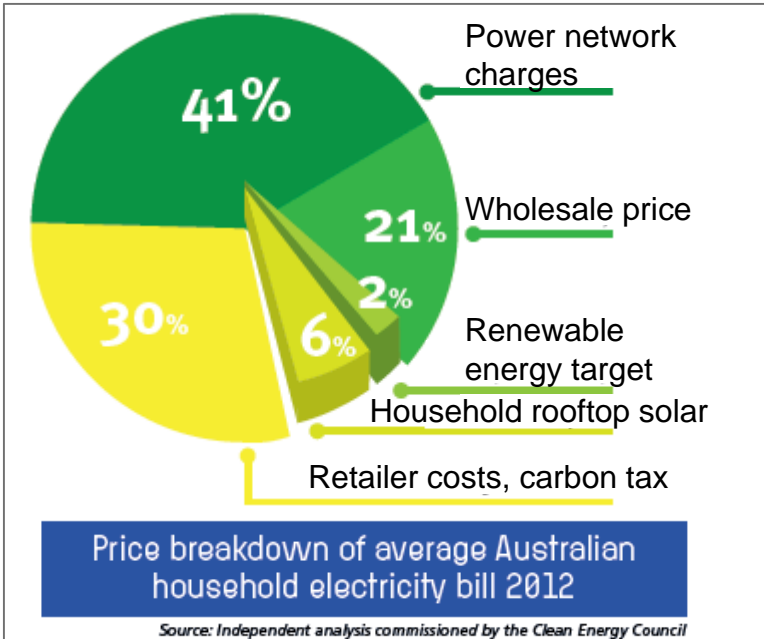
Incentives for Fossil Fuels

- Coal price subsidies (eg NSW Govt generators) - The Tamberlin inquiry into the NSW energy privatisation found that the gentrader assets would not have attracted any buyers were it not for a massively subsidised coal supply. It also found that NSW coal-fired power stations depend on those subsidies to maintain their place in the merit order of the National Electricity Market.
- The inquiry found an effective subsidy of **\$4 billion** to the gentraders that were sold by the government for just **\$1.5 billion** - \$31/tonne for coal versus \$100-120 export price, which is not even enough to cover the cost of production.
- Note that 2 years later, the new NSW Gov't paid \$300m to Origin, one of the buyers of the gentrader contracts, in return for removal of the coal contract.
- Big problem: Majority of Australia's coal plants and electricity infrastructure was built by Gov't. It's already paid for, makes it hard for new generators to compete.

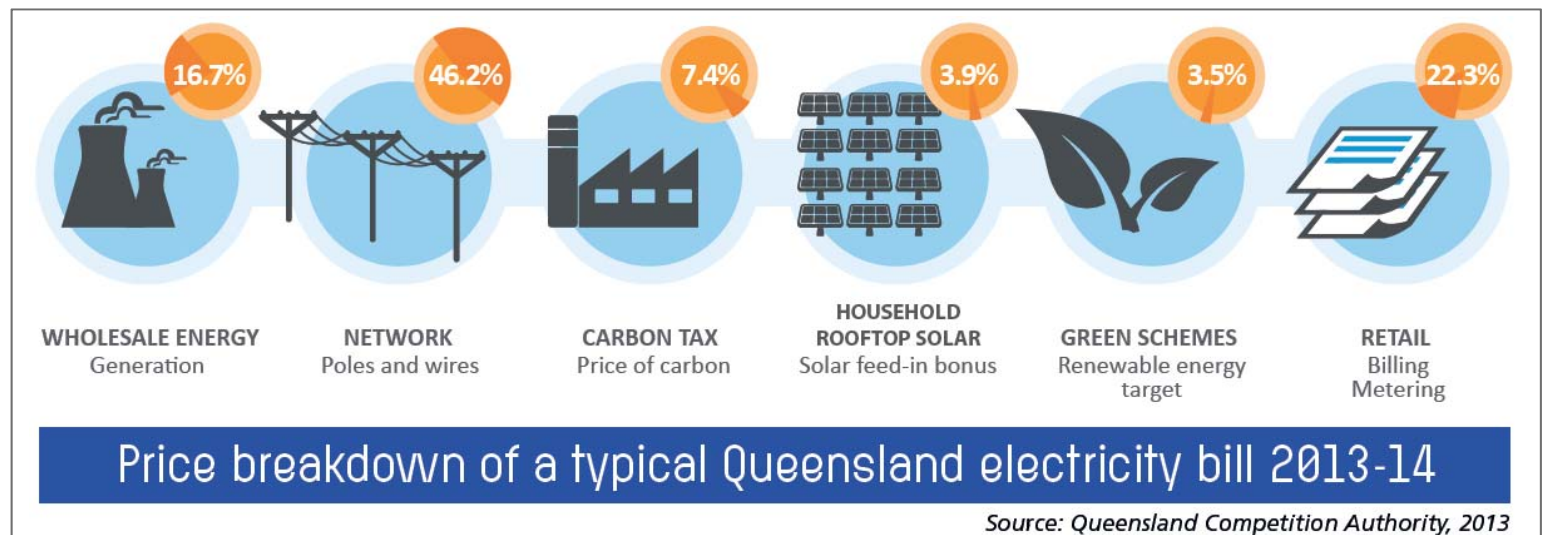


Wind power myths

Have wind farms increased the price of electricity?

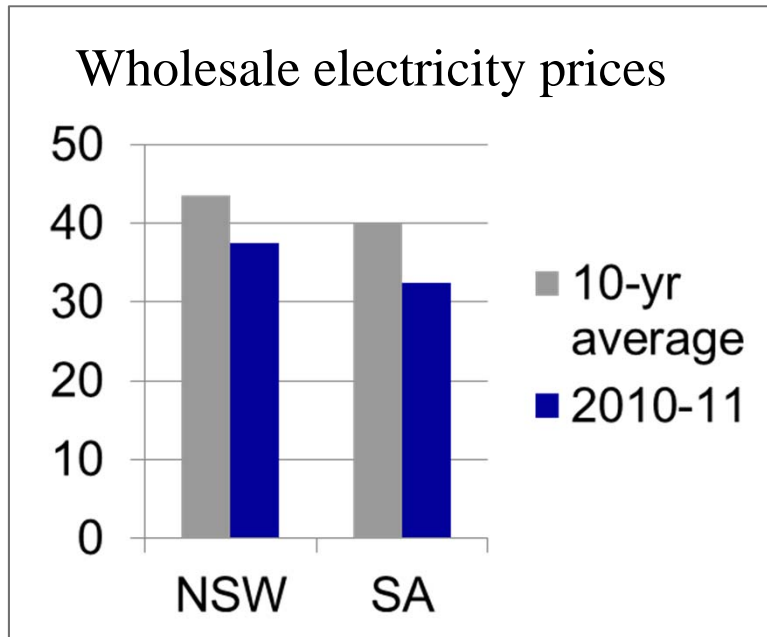


- Maintaining the power network (poles and wires) is by far the biggest contributor to household electricity bills.
- Government support for renewable energy only contributes a small amount to the average household power bill.



Wind power myths

Have wind farms increased the price of electricity?



Source: *South Australian Wind Study Report*, Australian Energy Market Operator, 31 Oct 2013.



Wind in SA (2013):

- 27% of nameplate capacity and 25% of total energy production.
- Displacement of brown coal power from Victoria, closure of SA coal plants, reduction in amount of power produced by gas peaking plants.
- The best thing we can do to combat rising electricity prices is for consumers to manage 'peak demand'.
- Every single 2 kilowatt reverse-cycle air conditioner installed in a home adds around \$7000 to the cost of infrastructure required to manage peak demand. This is a cost spread across all consumers.

Wind power myths

Are wind farms inefficient, unreliable, or need backup?

	Efficiency (fuel->electricity)	Capacity factor	Availability	LCOE (USD) (new project)
Fossil Fuels				
• Coal	25 – 35 %	0 – 85 % (falling)	70 – 90%	\$80 per MWh
• Gas	40 – 60 %	0 – 85% (falling)	80 – 99%	\$70
• Nuclear	30 – 32 %	60 – 90 %	70 – 90%	\$95
Renewable Fuels				
• Hydro	80 – 95 %	10 – 75 %	80 – 95%	\$70
• Wind	40 %	35 – 45 %	97 – 99 %	\$80
• Solar PV	6 – 20 %	12 – 20 %	97 – 99%	\$125
• Solar Thermal	3 – 33 %	20 – 40%	97%	\$180-280
• Geothermal	15 – 20 %			\$70-100
• Biomass				

Most important metric: cost of generation, \$/MWh.

Note that new wind is as cheap as new coal.

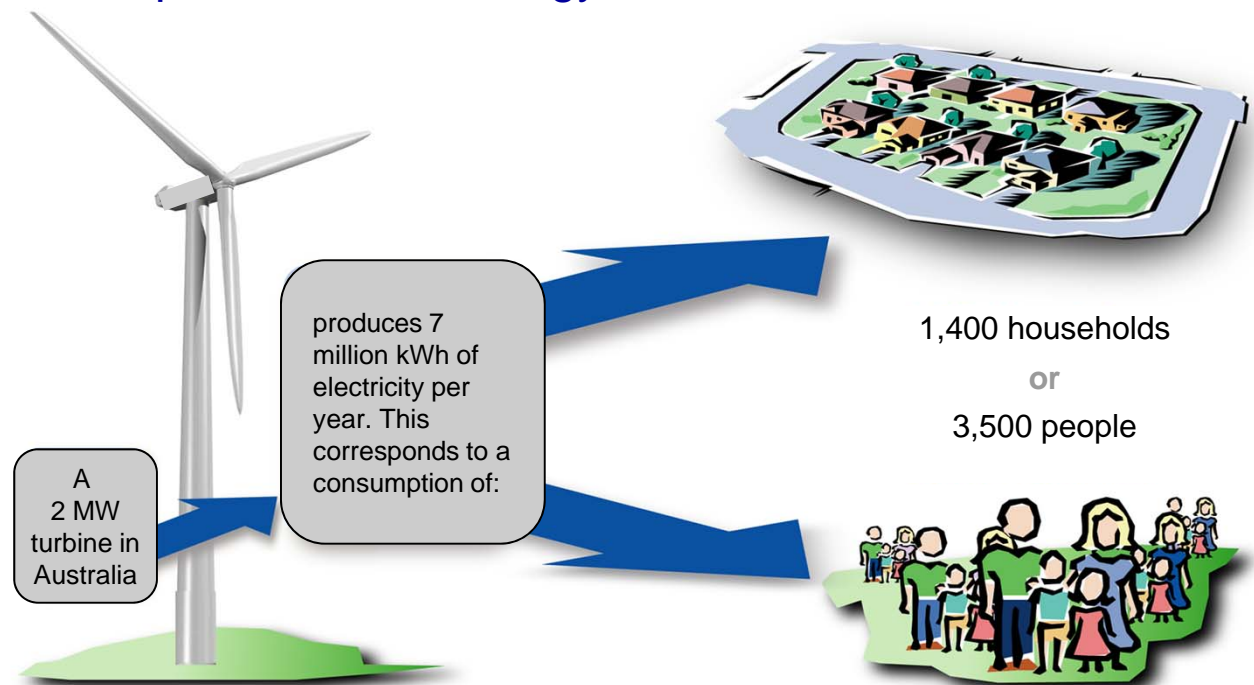
Note that cost of pollution and water use not considered.



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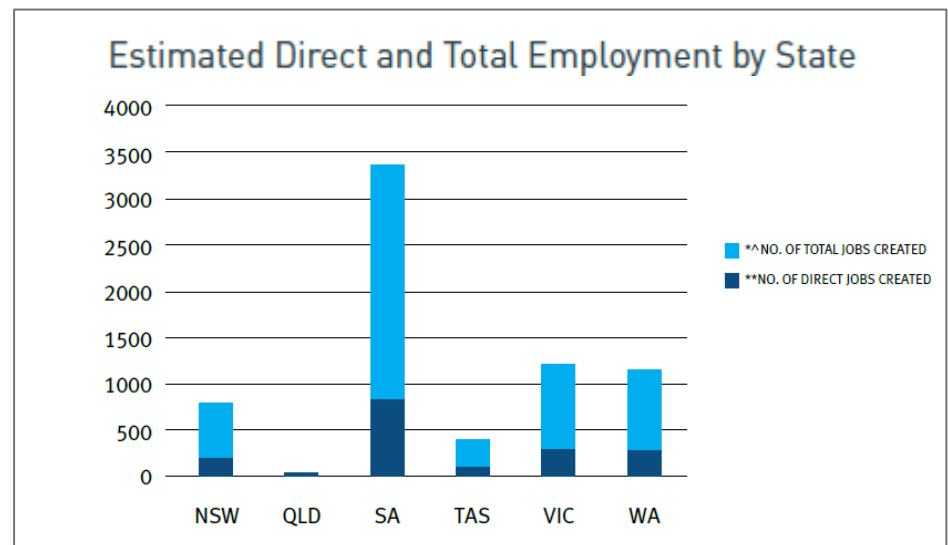
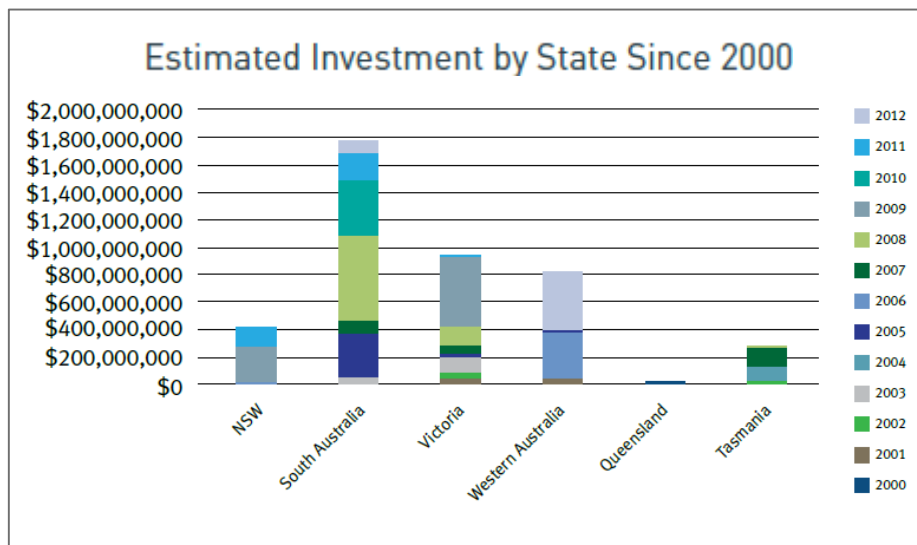
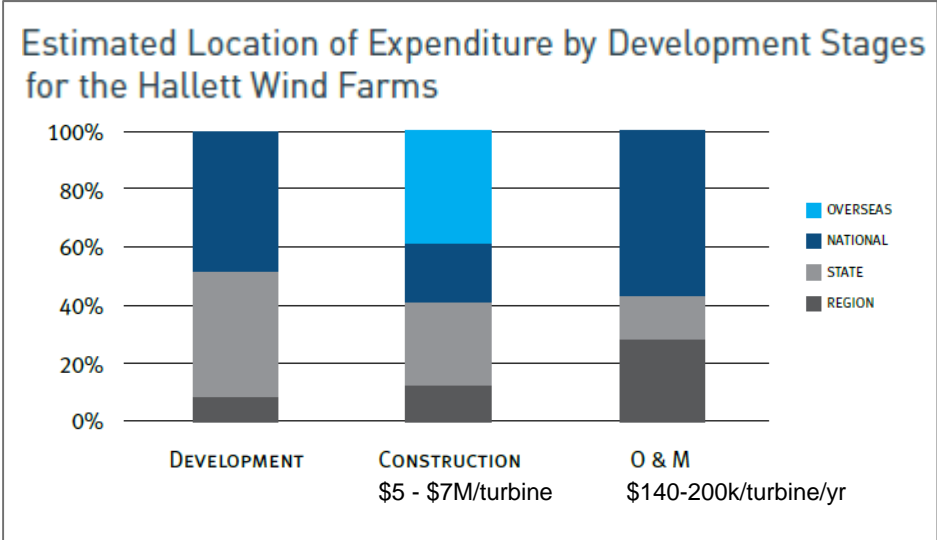
- Geographic distribution and wind forecasting mean output is reliable and predictable long before construction.
- Produce electricity 70 – 85% of the time.
- One turbine generates enough electricity for 1,400 – 2,100 homes over the course of a year.
- All power stations need backup. To date there has been no need for additional backup due to wind energy.



Wind power myths

Does wind power create investment and jobs?

- The renewable energy industry employed approximately 24,300 people in Jan 2013.
- Wind power seen generating up to 18% of global power by 2050 (IEA 2013) compared to 2.6% today.



Support Renewables:

Buy 100% Accredited GreenPower

- Generation is only from new renewable energy facilities.
- Retailers' GreenPower sales and purchases are audited on an annual basis to ensure you get what you pay for.
- GreenPower is additional to the Renewable Energy Target. If you purchase 10% GreenPower it is 10% renewable energy in addition to the amount of renewable energy purchased under the RET.



greenpower.gov.au

Household Power Prices

6 cents/kWh for black power (wholesale)
5000 kWh/yr used by medium sized household
\$300 price per year (wholesale) for power for a medium house

3.4 cents/kWh extra for 100% green power
5000 kWh/yr used by medium sized household
\$170 price per year extra for 100% GreenPower, medium house

**100% GreenPower
= \$170 per year for an average home**



This is a true story.

According to the enthusiastic but not particularly scientific anti-wind turbine lobby, wind turbines are part of a conspiracy and they are trying to kill us.

Simon Chapman, Professor of Public Health at the University of Sydney, is collating all of the claims about diseases, medical conditions, symptoms and weird phenomena that result from proximity to wind turbines.

He has found 127 different effects so far.

Please note - these are all genuinely claimed to be caused by wind turbines.

In this cartoon in order to further the scientific debate and also to show off, we illustrate 121 of them.

Accelerated aging 	Air quality damage 	Angina pectoris 	Anxiety disorder 	Atherosclerosis 	Aspergers worsens 	Arthritis worsens
Autism worsens 	Balance disturbance (falling off horses) 	Bowel cancer 	Bowels "loss of" 	Brain tumours 	Cancer 	Cardiovascular disease
Cardiac arrhythmids 	Chest pain 	Spontaneous cattle abortions 	Unhealthy litters of kittens 	Mutated chickens 	Chickens stop laying 	Chicken eggs are all weird
Childhood behavioural problems 	Children's hearts affected 	Herpes! 	Colon cancer 	Cows electrocuted 	Cows dying 	Crickets disappear
Depression 	Deaths 	Diabetes 	Diarrhoea 	Disrupted relationships 	Dizziness 	Dogs staring at walls
Dogs refusing to work 	Earthworms leave the soil 	Ear pain 	Late onset Epilepsy 	Chronic disease exacerbated 	Excess collagen 	Eye pain
Eye discharge 	Fatigue 	Falling over 	Gastro 	Mass death of goats 	Migraine 	Hearing loss
Heart attacks 	Hemorrhaging Cattle 	Hips vibrating 	Horse weirdness 	Horses with club feet 	Heart palpitations 	Hyperacusis

Hypertension 	Inability to conceive 	Inflammatory bowel disease 	Irritability 	Itching 	Joint and muscle pain 	Kidney damage
Laboured breathing 	Reduced learning ability 	Leukaemia 	Loss of energy 	Lung cancer 	Lymphoma 	Memory loss
Meniere's disease 	Mutant cows 	Motion sickness 	Mouth ulcers 	5 periods per month 	Muscle twitches 	Multiple sclerosis
Nausea 	Nerve pain and tingling 	Nosebleeds 	Nonconvulsive mental defects 	Non-hodgkins lymphoma 	Pain 	Panic
Paralysis 	Peacock relationship problems 	Perforated eardrum 	Pericardial thickening 	Personality change 	Dying piglets 	Poor appetite
Poor concentration 	Poor wound healing 	PTSD worsens 	Rage attacks 	Sheep upset 	Poor wool quality 	Sheep birth defects
Sick building syndrome 	Sinusitis 	Electromagnetic skull spasms 	Sleep disturbance 	Stomach ulcers 	Stomach acid 	Stress
Stroke 	Suicidal ideation 	Sweating at night 	Symptoms, indescribable 	Tachycardia 	Tinnitus 	Peeing a lot more
Triglycerides elevated 	Vertigo 	Vibrations in body systems and cavities 	Vibroacoustic disease 	Vomiting blood 	Weight gain 	Weight loss

Also: Whale migration affected and finally actual Wind Turbine Syndrome
Look I have had enough of this draw your own affected whale if you want.

Source:
First Dog on the Moon,
firstdogonthemoon.com.au/

Wind power myths

Further References

Clean Energy Australia Report 2012, CEC, 2013

International Energy Agency, 2013

Australian Electricity Market Commission, 2012, 'Power of choice review - giving consumers options in the way they use electricity', Final Report, 30 November 2012, Sydney

Energy in Australia 2013 – BREE, May 2013.

