

# Wind Energy Myths and Facts



## **Myth: Tens of thousands of wind turbines will be cluttering the British countryside**

**Fact:** Government legislation requires that by 2010, 10% of electricity supply must come from renewable sources. Wind power is currently the most cost effective renewable energy technology in a position to help do that. Around 3,500 additional modern wind turbines are all that would be needed to deliver 8% of the UK's electricity by 2010, roughly 2,000 onshore and 1,500 offshore.

## **Myth: Wind farms won't help climate change**

**Fact:** Wind power is a clean, renewable source of energy which produces no greenhouse gas emissions or waste products. The UK currently emits 560 million tonnes of carbon dioxide (CO<sub>2</sub>), the key greenhouse gas culprit, every year and the Government target is to cut this by 60% by 2050<sup>1</sup>. Power stations are the largest contributor to carbon emissions, producing 170 million tonnes of CO<sub>2</sub> each year<sup>2</sup>. We need to switch to forms of energy that do not produce CO<sub>2</sub>. Just one modern wind turbine will save over 4,000 tonnes of CO<sub>2</sub> emissions annually<sup>3</sup>.

## **Myth: Building a wind farm takes more energy than it ever makes**

**Fact:** The average wind farm will pay back the energy used in its manufacture within 3-5 months of operation<sup>4</sup>. This compares favourably with coal or nuclear power stations, which take about six months. A modern wind turbine is designed to operate for more than 20 years and at the end of its working life, the area can be restored at low financial and environmental costs. Wind energy is a form of development which is essentially reversible – in contrast to fossil fuel or nuclear power stations.

## **Myth: Wind farms are inefficient and only work 30% of the time**

**Fact:** A modern wind turbine produces electricity 70-85% of the time, but it generates different outputs depending on the wind speed. Over the course of a year, it will typically generate about 30% of the theoretical maximum output. This is known as its load factor. The load factor of conventional power stations is on average 50%<sup>5</sup>. A modern wind turbine will generate enough to meet the electricity demands of more than a thousand homes over the course of a year.

## **Myth: Wind energy needs back-up to work**

**Fact:** All forms of power generation require back up and no energy technology can be relied upon 100%. The UK's transmission system already operates with enough back-up to manage the instantaneous loss of a large power station. Variations in the output from wind farms are barely noticeable over and above the normal fluctuation in supply and demand, seen when the nation's workforce

goes home, or if lightning brings down a high-voltage transmission line. Therefore, at present there is no need for additional back-up because of wind energy.

Even for wind power to provide 10% of our nation's electricity needs, only a small amount of additional conventional back-up would be required, in the region of 300-500 megawatts (MW). This would add only 0.2 pence per kilowatt hour to the generation cost of wind energy and would not in any way threaten the security of our grid<sup>6</sup>. In fact, this is unlikely to become a significant issue until wind generates over 20% of total electricity supply.

**Myth: Installing wind farms will never shut down power stations**

**Fact:** The simple fact is that power plants in the UK are being shut down, either through European legislation on emissions or sheer old age. We need to act now to find replacement power sources: wind is an abundant resource, indigenous to the UK and therefore has a vital role to play in the new energy portfolio.

**Myth: Wind power is expensive**

**Fact:** The cost of generating electricity from wind has fallen dramatically over the past few years. Between 1990 and 2002, world wind energy capacity doubled every three years and with every doubling prices fell by 15%<sup>7</sup>. Wind energy is competitive with new coal and new nuclear capacity, even before any environmental costs of fossil fuel and nuclear generation<sup>8</sup> are taken into account. The average cost of generating electricity from onshore wind is now around 3-4p per kilowatt hour, competitive with new coal (2.5-4.5p) and cheaper than new nuclear (4-7p)<sup>9</sup>. As gas prices increase and wind power costs fall – both of which are very likely – wind becomes even more competitive, so much so that some time after 2010 wind should challenge gas as the lowest cost power source.

Furthermore, the wind is a free and widely available fuel source, therefore once the wind farm is in place, there are no fuel or waste related costs.

**Myth: The UK should invest in other renewable energy technologies and energy efficiency instead of wind power**

**Fact:** Wind energy's role in combating climate change is not a matter of either/or. The UK will need a mix of new and existing renewable energy technologies and energy efficiency measures, and as quickly as possible. Significant amounts of investment have been allocated for wave and tidal energy development, and these technologies, along with solar and biomass energy, will have an important role in the UK's future energy mix. However, wind energy is the most cost effective renewable energy technology available to generate clean electricity and help combat climate change right now. Furthermore, developing a strong wind industry will facilitate other renewable technologies which have not reached commercialisation yet, accumulating valuable experience in dealing with issues such as grid connection, supply chain and finance.

**Myth: Wind farms should all be put out at sea**

**Fact:** We will need a mix of both onshore and offshore wind energy to meet the UK's challenging targets on climate change. At present, onshore wind is more economical than development offshore. However, more offshore wind farms are now under construction, with the first of the large-scale projects operational at the end of 2003, and prices will fall as the industry gains more experience. Furthermore, offshore wind farms take longer to develop, as the sea is inherently a more hostile environment. To expect offshore to be the only form of wind generation allowed would therefore be to condemn us to missing our renewable energy targets and commitment to tackle climate change.

**Myth: Wind farms are ugly and unpopular**

**Fact:** Beauty is in the eye of the beholder, and whether you think a wind turbine is attractive or not will always be your personal opinion. However, studies regularly show that most people find turbines an interesting feature of the landscape<sup>10</sup>. On average 80% of the public support wind energy, less than 10% are against it, with the remainder undecided. Surveys conducted since the early 1990's across the country near existing wind farms have consistently found that most people are in favour of wind energy<sup>11</sup>, with support increasing among those living closer to the wind farms.

**Myth: Wind farms negatively affect tourism**

**Fact:** There is no evidence to suggest this. The UK's first commercial wind farm at Delabole received 350,000 visitors in its first ten years of operation, while 10,000 visitors a year come to take the turbine tour at the EcoTech Centre in Swaffham, Norfolk. A MORI poll in Scotland showed that 80% of tourists would be interested in visiting a wind farm. Wind farm developers are often asked to provide visitor centres, viewing platforms and rights of way to their sites.

**Myth: Wind farms harm property prices**

**Fact:** There is currently no evidence in the UK showing that wind farms impact house prices. However, there is evidence following a comprehensive study by the Scottish Executive that those living nearest to wind farms are their strongest advocates<sup>12</sup>.

**Myth: Wind farms kill birds**

**Fact:** The RSPB stated in its 2004 information leaflet *Wind farms and birds*<sup>13</sup>, that "*in the UK, we have not so far witnessed any major adverse effects on birds associated with wind farms*". Wind farms are always subject to an Environmental Impact Assessment and BWEA members follow the industry's Best Practice Guidelines and work closely with organisations such as English Nature and the RSPB to ensure that wind farm design and layout does not interfere with sensitive species or wildlife designated sites. Moreover, a recent report published in the journal *Nature* confirmed that the greatest threat to bird populations in the UK is climate change<sup>14</sup>.

**Myth: Wind farms are dangerous to humans**

**Fact:** Wind energy is a benign technology with no associated emissions, harmful pollutants or waste products. In over 25 years and with more than 68,000 machines installed around the world<sup>15</sup>, no member of the public has ever been harmed by the normal operation of wind turbines. In response to recent unscientific accusations that wind turbines emit infrasound and cause associated health problems, Dr Geoff Leventhall, Consultant in Noise Vibration and Acoustics and author of the Defra Report on Low Frequency Noise and its Effects<sup>16</sup>, says: *"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."*

**Myth: Wind farms are noisy**

**Fact:** The evolution of wind farm technology over the past decade has rendered mechanical noise from turbines almost undetectable with the main sound being the aerodynamic swoosh of the blades passing the tower. There are strict guidelines on wind turbines and noise emissions to ensure the protection of residential amenity. These are contained in the scientifically informed ETSU Working Group guidelines 1996<sup>17</sup> and must be followed by wind farm developers, as referenced in national planning policy for renewables<sup>18</sup>. The best advice for any doubter is to go and hear for yourself!

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**Note**

The 'average modern wind turbine' referred to in this document has a rated capacity of 1.8 megawatts (MW) onshore. Data on consented projects and applications currently being progressed shows that this will increase to over 2 MW in the near future. Offshore, turbines currently being installed are rated at 3 MW, and it is expected that this will rise to a typical 5 MW per machine by 2010.

**References**

<sup>1</sup> Energy White Paper (2003), Our Energy Future - Creating a Low Carbon Economy, available online at [www.dti.gov.uk/energy/whitepaper/ourenergyfuture.pdf](http://www.dti.gov.uk/energy/whitepaper/ourenergyfuture.pdf)

<sup>2</sup> DTI (2004), DUKES, Annex E - Energy and the environment, available at [www.dti.gov.uk/energy/inform/dukes/dukes2004/annexe.pdf](http://www.dti.gov.uk/energy/inform/dukes/dukes2004/annexe.pdf)

<sup>3</sup> BWEA calculations at [www.bwea.com/edu/calcs.html](http://www.bwea.com/edu/calcs.html)

<sup>4</sup> Milborrow, Dispelling the Myths of Energy Payback Time, as published in Windstats, vol 11, no 2 (Spring 1998).

<sup>5</sup> DTI (2004), Digest of United Kingdom Energy Statistics 2004, Table 5.10 Plant loads, demand and efficiency, available online at [http://www.dti.gov.uk/energy/inform/energy\\_stats/electricity/dukes5\\_10.xls](http://www.dti.gov.uk/energy/inform/energy_stats/electricity/dukes5_10.xls)

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<sup>6</sup> See The Carbon Trust and DTI (2004), Renewables Network Impact Study and National Grid (2004), Seven Year Statement, available online at [www.carbontrust.org.uk/carbontrust/about/publications/Renewables Network Impact Study Final.pdf](http://www.carbontrust.org.uk/carbontrust/about/publications/Renewables_Network_Impact_Study_Final.pdf) and [www.nationalgrid.com/uk/library/documents/sys\\_04/default.asp?sNode=SYS&action=&Exp=Y](http://www.nationalgrid.com/uk/library/documents/sys_04/default.asp?sNode=SYS&action=&Exp=Y) respectively

<sup>7</sup> Milborrow (2003), The Economics of Wind Energy, WREN International Seminar

<sup>8</sup> ExternE (2003) External Costs, Research Results on Socio-Environmental Damages due to Electricity and Transport, available online at [www.externe.info/externpr.pdf](http://www.externe.info/externpr.pdf)

<sup>9</sup> See PIU (2002), Renewables Innovation Review, available online at [www.dti.gov.uk/energy/renewables/policy/oxeraresults.pdf](http://www.dti.gov.uk/energy/renewables/policy/oxeraresults.pdf); Hansard, 21 June 2004, Column 1225W, available online at [www.parliament.the-stationery-office.co.uk/pa/cm200304/cmhansrd/cm040621/text/40621w14.htm](http://www.parliament.the-stationery-office.co.uk/pa/cm200304/cmhansrd/cm040621/text/40621w14.htm); Oxera (2003), The Non-market value of Generation Technologies; Oxera (2004), Results Of Renewables Market Modelling; DTI (2003), Economics Paper No 4; and Milborrow D, Becoming Respectable in Serious Circles, Windpower Monthly, Jan 2004

<sup>10</sup> RBA (1998), Stroud District Residents Survey, RBA for Triodos Bank, The Gloucestershire Water & Energy Forum, BWEA and Western Windpower.

<sup>11</sup> For latest national study, please see TNS (2003), Attitudes and Knowledge of Renewable Energy amongst the General Public, On behalf of: Department of Trade and Industry, Scottish Executive, National Assembly for Wales and Department of Enterprise, Trade and Investment Northern Ireland.

<sup>12</sup> Mori (2003), Public Attitudes to Windfarms a Survey of Local Residents in Scotland, Scottish Executive Social Research.

<sup>13</sup> RSPB (2004), Information leaflet on Wind Farms and Birds.

<sup>14</sup> Extinction risk from climate change, Nature 427, 145 - 148 (08 January 2004).

<sup>15</sup> EWEA: 68,000 turbines installed worldwide by the end of 2003.

<sup>16</sup> Defra (2003), A Review of Published Research on Low Frequency Noise and its Effects, Report for Defra by Dr Geoff Leventhall Assisted by Dr Peter Pelmear and Dr Stephen Benton. Available online at [www.defra.gov.uk/environment/noise/lowfrequency/pdf/lowfreqnoise.pdf](http://www.defra.gov.uk/environment/noise/lowfrequency/pdf/lowfreqnoise.pdf)

<sup>17</sup> The Working Group on Wind Turbine Noise, The Assessment and Rating of Noise from Wind Farms, September 1996. ETSU-R-97

<sup>18</sup> For a copy of PPS22, see [www.odpm.gov.uk](http://www.odpm.gov.uk)