

## WIND ENERGY: FREQUENTLY ASKED QUESTIONS

1. **Question: Will shifting to renewable energy mean thousands of wind turbines in the British countryside?**  
Government legislation requires that by 2015, 15% of electricity supply must come from renewable sources. Wind power is currently the most cost effective renewable energy technology. 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.
2. **Question: Will Wind farms help slow climate change?**  
The UK currently emits 560 million tonnes of carbon dioxide (CO<sub>2</sub>) 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>. Just one modern wind turbine will save over 4,000 tonnes of CO<sub>2</sub> emissions annually<sup>3</sup>.
3. **Question: What is the payback in energy terms of a modern wind farm?**  
**Fact:** The average wind farm will pay back the energy used in its manufacture within 3-5 months of operation<sup>4</sup>. A modern wind turbine will 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.
4. **Question: How efficient is a wind turbine?**  
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.
5. **Question: Do we need back up supplies for when the wind does not blow?**  
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. 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>.
6. **Question: Is wind power expensive?**  
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>. Because of worldwide demand the prices for wind turbines have risen over the last two years.
7. **Question: What about other renewable energy sources such as solar or biomass?**  
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. Significant amounts of investment have been allocated for wave and tidal energy, 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 right now.
8. **Question: Why do we need onshore wind when we can build offshore?**  
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 significantly more economical than development offshore. Offshore wind farms take longer to develop, as the sea is inherently a more hostile environment.
9. **Question: Aren't wind farms are ugly and unpopular**  
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% against it, with the remainder undecided.
10. **Question: Don't wind farms harm property prices**  
A new report from the Royal Institute of Chartered Surveyors (RICS) and Oxford Brookes University found no clear relationship between the proximity of wind farms and property prices, and suggested that any effect may be an urban myth with apparent changes in value disappearing when examined closely<sup>11</sup>.
11. **Question: What is the impact on birds?**  
The RSPB stated in its 2004 information leaflet *Wind farms and birds*<sup>12</sup>, that "*in the UK, we have not so far witnessed any major adverse effects on birds associated with wind farms*". Wind farms developers 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>13</sup>.
12. **Question: Are wind farms dangerous to the public?**  
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>14</sup>, no member of the public has ever been harmed by the normal operation of wind turbines.
13. **Question: Are wind farms noisy?**  
The evolution of wind farm technology over the past decade means that the main sound people hear is 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>15</sup> and must be followed by wind farm developers, as referenced in national planning policy for renewables<sup>16</sup>. The best advice for any doubter is to go and hear for yourself! 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>17</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.*"

**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 <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> See BWEA calculations.
- <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).
- <sup>6</sup> See The Carbon Trust and DTI (2004), Renewables Network Impact Study, available online at [http://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 National Grid (2004), Seven Year Statement, available online at [http://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)
- <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 <http://www.externe.info/externpr.pdf>.
- <sup>9</sup> See PIU (2002), Renewables Innovation Review, available online at <http://www.dti.gov.uk/renewables/policy/oxeraresults.pdf>;
- Hansard, 21 June 2004, Column 1225W, available online at <http://www.parliament.the-stationery-office.co.uk/pa/cm200304/cmhansrd/cm040621/text/40621w14.htm>;
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- <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> [www.rics.org/Environmentalandlandconsultancy/Energy/Renewableenergy/Wind%20farms%20FiBRE.html](http://www.rics.org/Environmentalandlandconsultancy/Energy/Renewableenergy/Wind%20farms%20FiBRE.html)
- <sup>12</sup> RSPB (2004), Information leaflet on Wind Farms and Birds.
- <sup>13</sup> Extinction risk from climate change, Nature 427, 145 - 148 (08 January 2004).
- <sup>14</sup> EWEA: 68,000 turbines installed worldwide by the end of 2003.
- <sup>15</sup> The Working Group on Wind Turbine Noise, The Assessment and Rating of Noise from Wind Farms, September 1996. ETSU-R-97.
- <sup>16</sup> For a copy of PPS22, see <http://www.odpm.gov.uk>.
- <sup>17</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 Pelmeare and Dr Stephen Benton. Available online at <http://www.defra.gov.uk/environment/noise/lowfrequency/pdf/lowfreqnoise.pdf>.