REF
RENEWABLE ENERGY FOUNDATION
DE MORGAN HOUSE, 57-58 RUSSELL SQUARE
LONDON, WC1B 1HS

Press Release

19 December 2012

Wear and Tear Hits Wind Farm Output and Economic Lifetime

The Renewable Energy Foundation [1] today published a new study, *The Performance of Wind Farms in the United Kingdom and Denmark,*[2] showing that the economic life of onshore wind turbines is between 10 and 15 years, not the 20 to 25 years projected by the wind industry itself, and used for government projections.

The work has been conducted by one of the UK's leading energy & environmental economists, Professor Gordon Hughes of the University of Edinburgh[3], and has been anonymously peer-reviewed.

This groundbreaking study applies rigorous statistical analysis to years of actual wind farm performance data from wind farms in both the UK and in Denmark.

The results show that after allowing for variations in wind speed and site characteristics the average load factor of wind farms declines substantially as they get older, probably due to wear and tear. By 10 years of age the contribution of an average UK wind farm to meeting electricity demand has declined by a third.

This decline in performance means that it is rarely economic to operate wind farms for more than 12 to 15 years. After this period they must be replaced with new machines, a finding that has profound consequences for investors and government alike.

Specifically, investors expecting a return on their investment over 20-25 years will be disappointed. Policymakers expecting wind farms built before 2010 to be contributing towards CO_2 targets in 2020 or later must allow for the likelihood that the total investment required to meet these targets will be much larger than previous forecasts have suggested. As a consequence, the lifetime cost per unit (MWh) of electricity generated by wind power will be considerably higher than official estimates.

Other important findings are:

a. The decline in the performance of Danish offshore wind farms is greater than that of UK onshore wind farms. This has worrying implications for the very large investment being made by the UK in offshore wind.

b. Analysis of site-specific performance reveals that the initial load factor of new UK onshore wind farms, normalized for wind availability and size, declined significantly from 2000 to 2011, especially in Scotland. It seems that progressively worse sites are being developed.

continued

c. Larger wind farms have a systematically worse performance than smaller ones. Since the average size of wind farms has increased, this has reinforced the deterioration in the performance of new wind farms.

The author, Professor Hughes, said: "The study has three important implications for policy towards wind generation in the UK:

1. Some investors will be aware of the decline in performance, but nevertheless continue to invest, suggesting that the subsidies are so generous as to compensate for the fall in output. Therefore this is probably room for further subsidy reductions to cut cost to the consumer.
2. The structure of contracts offered to wind generators under the proposed Electricity Market Reform (EMR) should be modified since few wind farms will operate for more than 12–15 years.
3. Meeting the UK Government's targets for wind generation will require a much higher level of wind capacity and capital investment than current projections imply."

Dr John Constable, director of Renewable Energy Foundation, commented: "This study confirms suspicions that decades of generous subsidies to the wind industry have failed to encourage the innovation needed to make the sector competitive. Bluntly, wind turbines onshore and offshore still cost too much and wear out far too quickly to offer the developing world a realistic alternative to coal."

For further information contact Diana Beatty: 0207 637 4847, diana.beatty@ref.org.uk, or John Constable: john.constable@ref.org.uk.

Notes for Editors

1. The Renewable Energy Foundation is a UK charity publishing data on the energy sector. It has no political affiliation and does not represent any industrial sector.
2. The study can be downloaded from www.ref.org.uk, together with the data used in the analysis.
3. Dr Gordon Hughes is a Professor of Economics at the University of Edinburgh. He was a senior adviser on energy and environmental policy at the World Bank until 2001.