Campaign to Protect Rural England
Standing up for your countryside

Finding out more about onshore wind

There are many important scientific and technical issues that surround the political and planning debates about onshore wind. This short note provides members with a starting point for exploring some of the available, useful information on onshore wind. This includes landscape impacts, costs, efficiency, intermittency and noise. All the references can be regarded as reliable well researched sources. It does not necessarily represent CPRE National Office's views on the evidence.

Overall contribution

A report by AEA for the Department for Energy and Climate change (DECC) analyses the potential for renewable energy technology development to 2020.[i] DECC's renewable energy roadmap is based on this research. The estimates are industry driven based on what it thinks it can deploy. Figures for onshore wind are expressed in GW rather than turbine numbers.[ii]

Landscape impacts

There are a number of guidance documents on assessing the landscape visual impact (either individual or cumulative) of onshore wind turbines. The Highland Council, for example, has published visualisation standards to ensure that photomontages (photographic panorama images overlaid visual representations of a wind farm to create realistic views of the proposal) in planning applications are accurate.[iii] Scottish National Heritage has produced a number of useful guidance documents including a good practise guide on visual representation of wind farms[iv] and guidance on the cumulative effects of wind farms.[v]

The Landscape Institute also have guidelines for landscape and visual impact assessment.[vi] A new book by Alan MacDonald explores the science behind the visualisation of wind energy developments.[vii]

Costs, incentives and subsidies

The most commonly cited reports on the costs of onshore wind are sourced from assessments undertaken for the DECC and the Committee on Climate Change (CCC).[viii] These reports determine levelised costs which take into account the capital cost of constructing a power plant, the cost of the fuel, of operating the plant and any costs imposed on emissions of carbon dioxide. The assessment does not include costs involved in connecting renewables to the grid, or backing them up. A report by the UK Energy Research Centre (UK ERC) goes some way to addressing this. It looks at the costs and impacts of intermittent generation on the British electricity network.[ix]

In terms of the impact subsidies for onshore wind have on energy bills, Ofgem's factsheet 'household energy bills explained', released in May 2012 outlines the latest figures.[x] DECC also has data on the estimated future impacts of energy and climate change policies on energy prices and bills.[xi]

Efficiency and intermittency, and grid issues

A good explanation of the efficiency and intermittency of onshore wind is provided in David Mackay's book, Sustainable Energy – without the hot air.[xii] These issues are also discussed in a paper from the Grantham Research Institute at the London School of Economics (LSE)[xiii] and the UK ERC's report on intermittency (see above). An analysis of the impact of investment in new energy infrastructure has been undertaken by the Electricity Networks Strategy Group. Their report outlines views of the Transmission Owners, with input from the ENSG, on what network reinforcement might be required to accommodate the new generation needed to meet the Government's 2020 renewable energy targets.[xiv]

Noise

A study by Hayes McKenzie in 2011 investigated the way in which the noise of wind turbines is assessed in England.[xv] Guidance for rating of noise from wind farms is provided by ETSU-R-97.[xvi] This is, however, a contentious piece of guidance and as such the Institute of Acoustics recently ran a consultation on "Good Practice Guidance to the application of ETSU-R-97 for wind turbine noise assessment". The aim of the consultation is to produce a final version of the Good Practice Guide for publication early in 2013, which will supplement the ETSU-R-97 document where used for wind turbine noise assessments. Alternative guidance on rating industrial noise affecting mixed residential and industrial areas can be found in BS 4142: 1997.[xvii]

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[i] Analysis of renewables growth to 2020, AEA, March 2010 (http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/renewable-energy/2185-analysis-of-renewables-growth-to-2020-aea-report.pdf)

[ii] UK Renewable energy roadmap, DECC, July 2011 (http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/renewable-energy/2167-uk-renewable-energy-roadmap.pdf)

[iii] Visualisation standards for wind energy developments, The Highland Council, January 2010 (http://www.highland.gov.uk/NR/rdonlyres/3AB93631-8D75-46C7-B4E2-07B1FE3842FE/0/VisualisationStandardsforWindEnergyDevelopmensamended200510.pdf) An updated version of the standard will be published at the end of October 2012 (see their website for more information (http://www.highland.gov.uk/cgi-bin/MsmGo.exe?grab_id=0&page_id=4213&query=visualisation%20standard&hiword=STANDARDS%20VISUALISATIONS%20VISUALISE%20VISUALISING%20standard%20visualisation%20)

[iv] Visual representation of wind farms, good practise guidance, prepared for Scottish National Heritage, March 2006 (http://www.snh.gov.uk/docs/A305436.pdf)

[v] Assessing the cumulative impact of onshore wind energy developments, Scottish National Heritage, March 2012 (http://www.snh.gov.uk/docs/A675503.pdf)

[vi] Guidelines for landscape and visual impact assessment, Landscape Institute, 2002

[vii] Alan Macdonald (2012) Windfarm visualisation: perspective or perception? Whittles Publishing

[viii] Review of the generation costs and deployment potential of renewable electricity technologies in the UK, Arup, October 2011 (http://www.decc.gov.uk/assets/decc/11/consultation/ro-banding/3237-cons-ro-banding-arup-report.pdf) and Costs of low-carbon generation technologies, Mott MacDonald, May 2011 (http://hmccc.s3.amazonaws.com/Renewables%20Review/MML%20final%20report%20for%20CCC%209%20may%202011.pdf)

[ix] The costs and impacts of intermittency: an assessment of the evidence on the costs and impacts of intermittent generation on the British electricity network, UK ERC, March 2006 (http://www.ukerc.ac.uk/support/Intermittency)

[x] Updated household energy bills explained, Ofgem, May 2012 (http://www.ofgem.gov.uk/Media/FactSheets/Documents1/household-bills.pdf)

[xi] Estimated impacts of energy and climate change policies on energy prices and bills, DECC, November 2011 (http://www.decc.gov.uk/assets/decc/11/about-us/economics-social-research/3593-estimated-impacts-of-our-policies-on-energy-prices.pdf)

[xii] David Mackay (2009) Sustainable Energy – without the hot air. An online version can be found at (http://www.withouthotair.com/)

[xiii] The case for and against onshore wind energy in the UK, Grantham Rresearch Institute on Climate Change and the Environment and the Centre for Climate Change Economics and Policy, June 2012 (http://www2.lse.ac.uk/GranthamInstitute/publications/Policy/docs/PB-onshore-wind-energy-UK.pdf)

[xiv] Our electricity transmission network: a vision for 2020, ENSG, February 2012 (http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/future-elec-network/4263-ensgFull.pdf)

[xv] Analysis of How Noise Impacts are Considered in the Determination of Wind Farm Planning Applications, Hayes McKenzie partnership ltd, April 2011 (http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/wind/2033-how-noise-impacts-are-considered.pdf)

[xvi] ETSU-R-97, The assessment and rating of noise from wind farms, The working group on noise from wind turbines, September 1996 (http://regmedia.co.uk/2011/08/02/etsu_r_97.pdf)

[xvii] BS 4142:1997, Method for rating industrial noise affecting mixed residential and industrial areas, British Standards Institute, September 1997 (http://shop.bsigroup.com/en/ProductDetail/?pid=000000000001154363)