DEPARTMENT OF ENERGY & CLIMATE CHANGE

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Dear

RE: Freedom of Information Request

Thank you for your enquiry of 30 April asking for information related to wind turbines statistics and policy. I am treating your request under the Environment Information Regulations.

For ease of reference, I will set out your questions again:

Could the department please confirm how many wind turbines there are in the UK.

To DECC's knowledge at the end of April 2012, there are 568 offshore and 3254 onshore turbines over 50KW with an installed capacity of 6.7GW (1.9GW Offshore and 4.8 GW onshore) . There are a further 375 onshore turbines of less than 50KW size, with an installed capacity of 2.2MW.

Could they also confirm:

1. **How many are connected to the National Grid?**

All the turbines mentioned are connected to the National Grid. We do not have information on the numbers of smaller turbines which are used off-grid eg for charging batteries on boats, caravans or for providing power at isolated properties and businesses.

2. **How much energy they produce for the domestic and commercial markets?**

This information is in the public domain. In 2011, onshore wind produced over 10 Terawatt hours of renewable electricity, which is enough to meet the average electricity needs of almost 2.4 million households. This figure includes electricity generated by smaller wind turbines under the Feed-in Tariffs scheme.

More details of the Feed-in Tariffs scheme are available at http://www.decc.gov.uk/media/viewfile.ashx?filetype=4&filepath=11/stats/publications/energy-trends/articles/4786-feed-in-tariffs-201011-gen-data-article.pdf&minwidth=true

Offshore wind farms provided a further 5 Terawatt hours in 2011. More recent monthly and quarterly updates on the actual outputs of electricity from the different energy generating technologies are published on the DECC Statistics website at http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/energy_stats.aspx

3. **If the strategy for wind farms requires conventional energy production, such as fossil fuels, as a back-up.**

Wind energy is intermittent but as the UK has exceptional wind resource it tends to generate at least 70% of the time in this country, more or less strongly depending on wind speeds and locations. As such, wind energy requires back-up (not necessarily from fossil fuels) but that back-up is not specific to wind energy. In the interests of energy security, rather than relying on any single energy technology, energy policy in the UK has always been based on a mix of technologies. Coal, gas, renewable and nuclear power stations all need to be shut down for maintenance or repairs from time to time, and back each other up as none can operate 100% of the time.

4. **How many more wind turbines are needed to meet EU targets on renewable energy?**

There are no targets for numbers of turbines in the UK or in the EU. EU targets are for the percentage of renewable energy as a whole across electricity, heat and transport sectors. The Government considers that up to 13GW (39 TWh) of onshore wind energy and up to 18GW of offshore wind is needed by 2020 to maintain UK energy security and meet UK legal obligations most affordably, and even without renewables targets would want this contribution from onshore wind in particular as it is cheaper than most other renewables . The number of onshore turbines will depend on the size and capacity of those that are installed. As turbine sizes are increasing it may be little more than the number already in operation.

Offshore, turbine sizes are larger and it is expected that sizes will continue to grow. Offshore wind will become increasingly important over the next decades

as a means to decarbonise the economy. Onshore it is expected that the availability of suitable sites will constrain development over this period.

DECC's Renewable Energy Roadmap gives more details on the possible future scenarios for the proportion of our energy that may be met by renewable energy sources and is available at the following web page http://www.decc.gov.uk/en/content/cms/meeting_energy/renewable_ener/re_roadmap/re_roadmap.aspx

5. How much will this cost to enact ?

Around a fifth of UK electricity capacity is set to close over the decade and the total cost of replacing it – not just for wind energy – is an estimated £110bn of investment in electricity generation and transmission this decade alone.

The Government wishes to maintain energy security in a way that protects consumers as much as possible from rising energy bills. The updated report by Arup consultants which DECC published alongside the Renewables Obligation Banding Review consultation[1], shows the costs of electricity produced from renewable sources. The table below shows the current and projected levelised costs for onshore wind and offshore wind, including in 2020.

Levelised costs of wind technologies, £/MWh

		2010 financial close	2015 financial close	2020 financial close	2025 financial close	2030 financial close
Onshore >5MW	low	75	72	**71**	69	68
	medium	91	88	**86**	84	82
	high	108	105	**103**	101	99
Offshore Round 2	low	149	123	**95**	87	81
	medium	169	139	**107**	98	91
	high	191	158	**121**	111	104
Offshore Round 3	low	N/A	168	**127**	113	92
	medium	N/A	192	**145**	129	105
	high	N/A	225	**170**	151	122

Source: Arup (2011)

[1] Arup (2011), *Review of the generation costs and deployment potential of renewable electricity technologies in the UK*, available at: http://www.decc.gov.uk/en/content/cms/consultations/cons_ro_review/cons_ro_review.aspx

For comparison, the levelised costs of fossil fuel generation were updated by PB Power (2011) in a report[1] to DECC. These show the cost of electricity from

[1] PB Power (2011), *Electricity Generation Cost Model - 2011 Update Revision 1*, available at: http://www.decc.gov.uk/en/content/cms/about/ec_social_res/analytic_projs/gen_costs/gen_costs.aspx

combined cycle gas turbine in 2011 as being nearly £77 per Megawatt hour, rising to £88 in 2017. The corresponding figures for new nuclear generation are £74 and £65.

6. **How much will landowners be paid for having wind turbines built on their land.**

DECC does not hold this information. Rents are a private commercial matter agreed between the landowner and generator.

I hope you find this response helpful. If you are dissatisfied with the handling of your request, you have the right to ask for an internal review. Internal review requests should be submitted within two months of the date of receipt of the response to your original letter and should be addressed to: Information Rights Unit (foi@decc.gov.uk)
Please remember to quote the reference number above in any future communications.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF

Yours sincerely

Office for Renewable Energy Deployment