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The Winds of Change

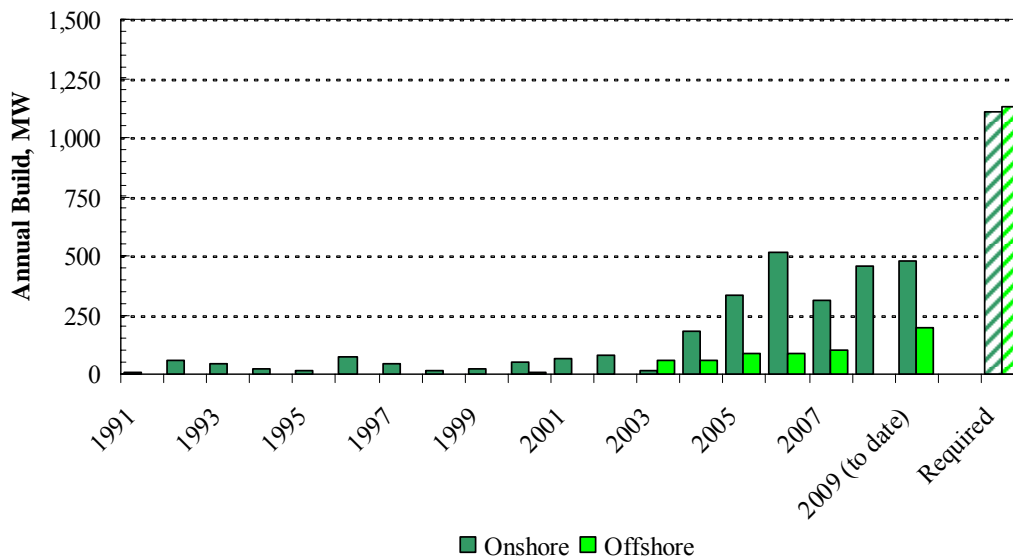
The Government’s Renewable Energy Strategy, published last week, puts considerable emphasis on a move to renewable generation for the UK electricity sector with a high-level goal of increasing the renewable component in the electricity generation mix from 5.5% currently to 30% in 2020. Analysis by IPA Energy + Water Economics suggests the increased growth required for wind (as detailed in the strategy) could require a total investment of over £50 billion and would be a step-change from current annual growth levels. Such build rates have been observed elsewhere in Europe but in a markedly different incentive and regulatory regime. Steps will be needed in a number of other areas to facilitate achievement of this ambition.

‘The UK Renewable Energy Strategy 2009’ states, based on projections of total electricity demand, a total of 117 TWh of renewable generation will be required in 2020 in order to achieve the goal of 30% of demand being met by renewables. In order to meet this target, the report envisages the target would be met by having a total of around 15 GW of onshore wind capacity and 13 GW of offshore wind capacity on the system by 2020¹.

Currently, there is around 3 GW of onshore wind and around 0.6 GW of offshore wind capacity in the UK and as such, a further 12 GW of onshore wind and over 12 GW of offshore wind capacity is required to be added to the system in a little over 11 years. This works out at an average of 1,100 MW of capacity for each of the technologies for every year between now and the end of 2020.

The historical annual build rates for both onshore and offshore wind are shown in the graph below.

Historic UK Annual Wind Build



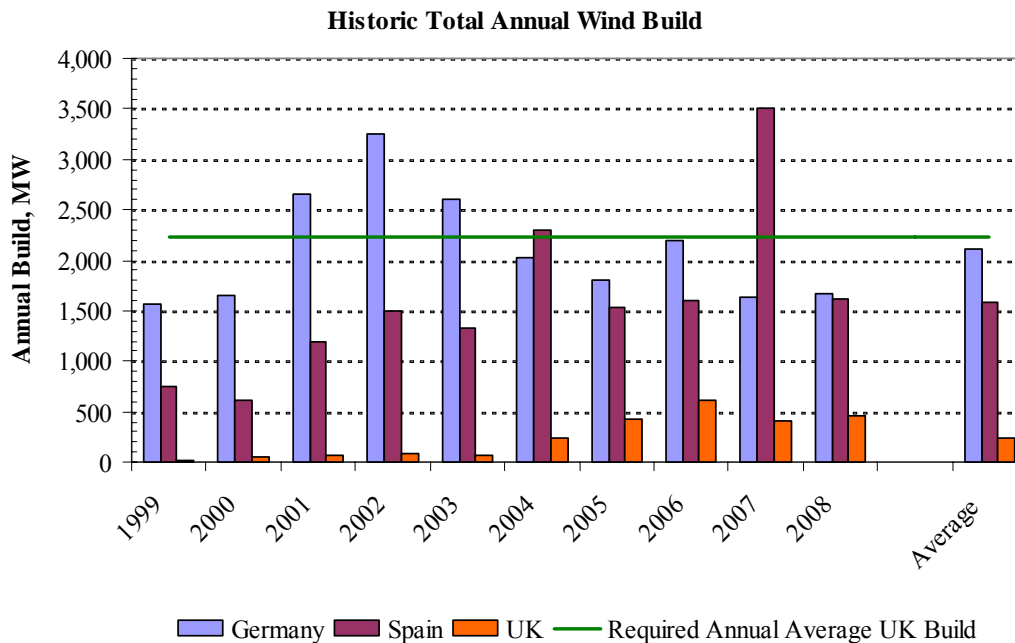
¹ Chart 2.4, ‘The UK Renewable Energy Strategy 2009’

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So the required rates to meet the Government’s target are around double the highest of any of the previous year’s build rates for onshore wind and five times the highest previous year for offshore wind. There is 900 MW of onshore and 1,700 MW of offshore wind currently under construction, some of which may become operational over the remainder of this year, but the increases required are nonetheless considerable and, more importantly, are required to be sustained for a consistently long period.

Germany and Spain have the highest levels of wind capacity in Europe as a result of the more supportive regulatory environment and the generous feed-in tariffs² which are available in both countries which provide a much more transparent and certain revenue stream for investors (with tariffs known and fixed for the life of each project) than the market-based Renewables Obligation³ (RO) support mechanism adopted in the UK. The feed-in tariff compensates for the lower level of wind resource available in Spain and Germany and the higher capacity targets.

The annual total wind build rates for these two markets over the past ten years are shown below.



The UK’s required total wind build of over 2 GW/yr is comparable to Germany’s average growth rate over the last decade and around one-third higher than the average growth observed in Spain over the same time period. For comparison, the USA, a considerably larger market than the UK, was adding no more than 2 GW to the system per year until 2007.

Therefore, the Government is looking for a step-change in wind generation capacity growth and is requiring a consistent level of investment to achieve this. However, there is precedent in other European countries for a similar level of consistent wind capacity development.

² Feed-In tariffs signify a premium that is paid to producers of energy from renewable sources on top of the normal energy price.

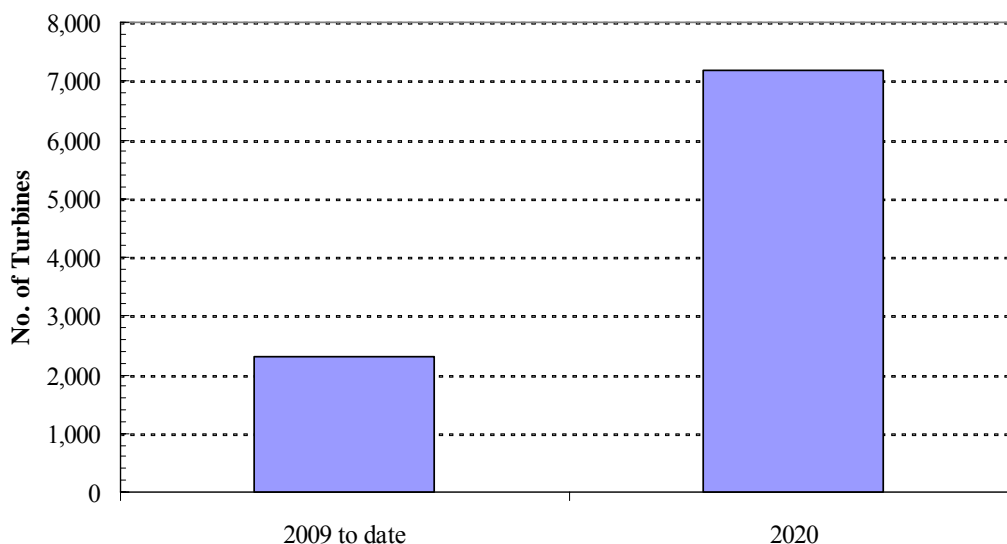
³ The Renewable Obligation is described at the end of this report

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This required step-change in build puts increased pressure on a number of key areas:

- **Planning Process:** Wind farm developments have experienced considerable delays as a result of the complicated existing planning process (currently, applications take on average 14 months to be determined compared to the target of 16 weeks). It is hoped the Government's reforms as part of the recent Planning Bill will serve to alleviate these issues.
- **Public Opinion:** Currently, there are around 2,300 onshore wind turbines in the UK with an average size of 1.3 MW. Assuming a unit size for the new capacity of around 2.5MW (which is the size of the newest turbines) then the additional 12 GW of onshore capacity would require close to an additional 5,000 much larger turbines (or over 9,000 if the current average size is continued). This will have serious implications on the landscape and is likely to face significant public opposition particularly since the best sites for wind farms, both in terms of location and wind resource, have already been taken.

Current and Required Onshore Wind Turbines



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- **Transmission Access:** The Government has taken over responsibility for establishing a new transmission access regime. It is likely that, in conjunction with the renewable energy strategy, this will result in enhanced connections for new entrant renewable capacity. In addition, The Government earlier this year outlined the network development that would be required to support the connection of considerable new renewable build (as well as the replacement of old fossil fuel and nuclear stations with new gas and, potentially, new nuclear that would be required, in part, to manage wind intermittency). These re-enforcements are estimated to cost £4.7 billion in addition to the current network refurbishment plan of around £4-5 billion⁴.
- **Supply-Chain/Construction:** The closure this month by Vestas of the only turbine factory in the UK will mean that developers will need to compete internationally for the supply of wind turbines.
- **Funding:** This new wind capacity would require a significant investment. Offshore wind projects are expected to cost between £2,500-3,100/kW and the 12 GW of offshore wind required would need an investment of £31-38 billion. Similarly the investment required for 12 GW of on-shore wind, with capital costs of £1,500-1,800/kW, would be between £19-22 billion. This gives a total capital requirement expectation of around £50-£60 billion – which in the current economic climate may prove difficult to fund.
- **Support Mechanism:** As highlighted in IPA's recently-released paper '*The Law of Unintended Consequences*'⁵, the changes to the Renewables Obligation announced in the Budget to incentivise early offshore wind could result in a reduction in the future value of the support for renewable generation which would therefore deter future build. This is because the unit value of the subsidy available decreases as the amount of renewable generation approaches the predetermined target. Hence, all else being equal, the faster early build as targeted by the Budget would cause ROC values to be up to £5/ROC lower in 2016 than would otherwise have been the case, imposing a formidable barrier to further development. Therefore, to incentivise the sustained new build required under the renewable energy strategy, future amendments to the RO mechanism may be necessary to ensure adequate levels of support through to 2020 – for example through an increase in the Obligation level. Further details on the Renewables Obligation are included below.

Any short-term delays in the deployment of new capacity would increase the future rate at which plant would need to be added to achieve the target, putting even greater pressure on these factors.

While it may be true that the UK has the largest wind resource potential in Europe, understanding how to access that potential and the associated investment, in the timescales required, may become the more important consideration.

Contributors: Robert Yates, Nikhil Venkateswaran, Ken Miller and Marcus Wicovsky

⁴ Section 4.107, '*The UK Renewable Energy Strategy 2009*'

⁵ <http://www.ipaeconomics.com/downloads&publications/thoughtsfromipathelawofunintendedconsequences.pdf>



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Annex: The Renewables Obligation

The primary support mechanism for renewable energy in the UK is the Renewables Obligation (RO). Eligible renewable generation is credited with one or more Renewable Obligation Certificates (ROCs) for each unit of output (MWh) produced.

The RO places an obligation on licensed electricity suppliers to present a number of ROCs equivalent to an increasing percentage of the electricity they have supplied, or pay a “buy-out” price for any shortfall. Funds accumulated from the buy-out are then “recycled” back to those suppliers based on the number of certificates presented. Thus, the value of a ROC is the buy-out price + the expected recycle price.

This mechanism means that the market price for ROCs is set by supply of renewable generation and demand (as defined by the obligation). If the amount of renewable generation increases and the supply of ROCs relative to the obligation rises, fewer payments will be made into the buy-out fund and the expectation of recycle benefit will fall. This will result in a lower ROC price. Conversely, if the growth in ROCs falls behind the growth in the obligation then expected payments into the buy out fund will rise, increasing the value of ROCs.

Generators of renewable energy are therefore able to sell ROCs to suppliers and this additional revenue provides financial support to the initial investment.

Although the Renewable Obligation has provided renewable generation with a significant additional income stream, the future income from ROCs is subject to both market and political uncertainty since the level of the Obligation is only defined to 2015 at present.

Notes to Editors

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