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Pöyry Energy Consulting Study Gives First In Depth View Of Future Electricity Market

A ground-breaking study by leading global energy analysts Pöyry Energy Consulting has revealed for the first time how the electricity markets will be profoundly affected by the growth of wind energy.

The report, called 'Impact of Intermittency', provides a unique insight into how the electricity sector in the UK and Republic of Ireland could look by 2030.

Both countries have set ambitious targets to reduce their carbon dioxide emissions by 2020, and wind energy is expected to be the greatest contributor. But the impact of the dramatic amounts of wind generation capacity needed to meet the challenge has largely remained uncertain.

This new study highlights the potential hurdles and opportunities facing operators and investors in the energy sector.

Encompassing more than 20,000 hours of work and a budget of almost £1million, the year-long project used an unprecedented quantity of data. Hourly statistics for each of the years from 2000 to 2007 were taken from observations in 36 locations, totalling more than 2.5 million pieces of data.

Pöyry's findings have now been presented to relevant government organisations including the Department of Environment and Climate Change (DECC) as well as a number of high profile energy companies.

James Cox, Principal Consultant at Pöyry Energy Consulting, said: "At the outset we believed that it was vital to inform the debate about the importance of wind in decarbonising the electricity supply, by informed, quantitative analysis.

"This has proved to be a major challenge but the richness of the information has surprised even the project team. And, while the answers we now have are often complex, we believe that any debate on the role of wind can now be properly informed."

Estimates of the amount of wind needed to meet the carbon reduction targets range from 6-8GW for the Irish electricity market and 35-45GW for the British electricity market by 2030.

The markets in each country – the Single Electricity Market (SEM) in Ireland and the British Electricity Trading and Transmission Arrangements (BETTA) differ considerably. The SEM is designed with a capacity payment and pool-type structure as opposed to the bilateral trading philosophy of BETTA.

Pöyry's study shows that accommodating such large amounts of wind will test them in very different ways, and gives the electricity market a rare opportunity to compare and contrast.

The study looks at:

- the likely scale of future wind power and the impact on thermal plant;
- the reserve needed on the system to maintain current reliability standards;
- how market prices will be affected and whether too much wind could collapse prices to zero;
- whether interconnection between the two markets can provide the golden bullet;
- how the each country's market arrangements will cope; and
- whether power station investment is an attractive proposition.

Stephen Balint, Strategy Director at RES, said: "The results from this study represent a step forward in increasing understanding about what a high renewables world may look like. The highly complex analysis undertaken by Pöyry has given a real insight as to how the electricity markets - and how prices - may change in the future**"**

Researchers examined the extremes of low and high wind over 2000-2007, and found that even at an annual level wind generation output varied by almost 25% in the Irish market and 13% in the British market.

Using data from January 2000 to model a repeat of conditions in 2030, a classic dilemma was illustrated – electricity demand rocketed on frosty nights when there was virtually no wind and low output but, when the temperature rose in strong south–westerlies and there was less need for electricity, there was almost full wind generation output.

Although it has previously been suggested that this intermittent output could be mitigated by greater interconnection between the two markets, Pöyry believes its finding have underlined the critical importance of the Irish market having interconnection to the British market, although the opposite is not true.

However, stronger interconnection would also make British market price spikes become a feature of the Irish market. And the study suggests that interconnectors cannot be the golden bullet to solve the intermittency challenge, although they are extremely important.

As far as investment is concerned, the drivers for new thermal plant are not encouraging. According to Pöyry, such plants will have to operate at low and highly uncertain loads and, under current market arrangements, the likely returns do not appear good.

The report says: "If significant wind energy is achieved**,** along the lines required by the 2020 renewable targets, we predict power stations which are built now will face much more uncertain revenues in the future. For example, any generation built before 2016 to cover closure, under emission regulations, of

existing coal-fired power stations, would face a volatile future, uncertain to the point that plant may only operate for a few hours one year and then hundreds of hours the next year."

And with the level of wind energy envisaged on the system by 2030, the variation in prices will be extreme. There will be periods of negative prices and very short periods with prices at almost £8000/MWh.

James Cox added: "Although additional detailed work needs to be carried out to properly model the behaviour of the grid systems in both countries, our worry at the outset of the study that the very dynamics of variable wind output would challenge the system operators, has moved to concern that the economic environment for thermal plant will be highly challenging."

A summary of the Impact of Intermittency report was today made public. It can be accessed by visiting www.ilexenergy.com.

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Issued on behalf of Pöyry Energy Consulting by Weber Shandwick. For further information please contact Alison Cran on 01224 806600 or at acran@webershandwick.com.

Note to Editors

This project has been supported by the following Steering Committee members: Centrica, DONG Energy, EirGrid, ESBI, National Grid and RES. Data from the Meteorological Office and Met Eirann was also invaluable.

Pöyry Energy Consulting is Europe's leading energy consultancy providing strategic, commercial, regulatory and policy advice to Europe's energy markets. Our team of 250 energy specialists, based in fifteen European offices in twelve countries, offers unparalleled expertise in the rapidly changing energy sector.

Based in Helsinki, Pöyry is a global consulting and engineering firm focusing on the energy, forest industry, infrastructure and environment sectors, with over 8,000 staff operating from offices in 47 countries.

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