

BWEA



Delivering the UK's wind, wave and tidal energy



UK Offshore Wind: Staying on Track

Forecasting offshore wind build for the next five years



Introduction

The work reported here has been undertaken under contract to arrive at a picture for the delivery of offshore wind energy capacity in the UK until 2015. This work is an update of some aspects of two prior BWEA studies – *Offshore Wind: At a Crossroads*¹ and *Moving Up a Gear*². For UK offshore wind projects, it aims to:

- summarise the project delivery to date and specifically summarise progress with build-out of projects in Crown Estate Leasing Rounds 1 and 2;

- provide forecasts for project build-out to 2015;
- identify industry reaction to the 2009 Budget proposal to give a short-term boost to energy sales revenues for projects placing major contracts before April 2011.

This work has relied on a combination of survey feedback from UK offshore wind developers (interviews conducted during May and June 2009) and public announcements of project progress.

Unlike the previous BWEA studies this work has not sought to address supply chain issues, although, of course, any future project build forecast relies on underlying assumptions of the development of that supply chain to deliver projects in a timely cost-competitive fashion – a point repeatedly stressed by interviewed developers.



¹ www.bwea.com/pdf/OffshoreWindAtCrossroads.pdf, April 2006

² www.bwea.com/pdf/offshore/movingup.pdf, 2007

Context

The global build rate of offshore wind in Figure 1 shows the growing importance of the UK, which in 2009 became the leading country for offshore installed wind capacity. It is also worth noting that, despite strong growth over the past few years, 0.8 GW of offshore capacity installed during 2008 remains a small part of the wider wind industry - 28 GW of onshore wind power was built in 2008.

Turning specifically to the UK, Figure 2 summarises the current status of Round 1 and Round 2 projects.

The build rate during 2008 and 2009 has marginally exceeded the 2007 Moving Up a Gear forecast – unusual as the offshore wind industry has historically under-performed against delivery expectations – unlike the onshore wind industry which outperforms on that front.

Historically, projects have been beset by delays caused by a number of sources, including:

- planning delays;
- developer resource limits;
- waiting for transmission grid upgrades;
- weak economics;
- construction delays;
- Shortage of wind turbines.

Even though the UK offshore wind sector is currently on the 2007 forecast curve, the past two years have been no exception in terms of the above - at least one project was delayed when Vestas temporarily withdrew its V90-3.0MW product from sale following technical reliability issues, and another has been beset with construction delays.

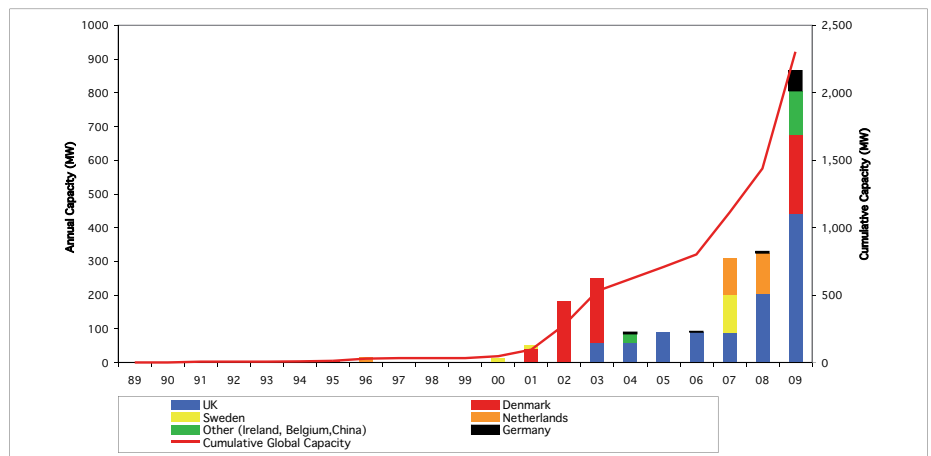


Figure 1 Global offshore wind build

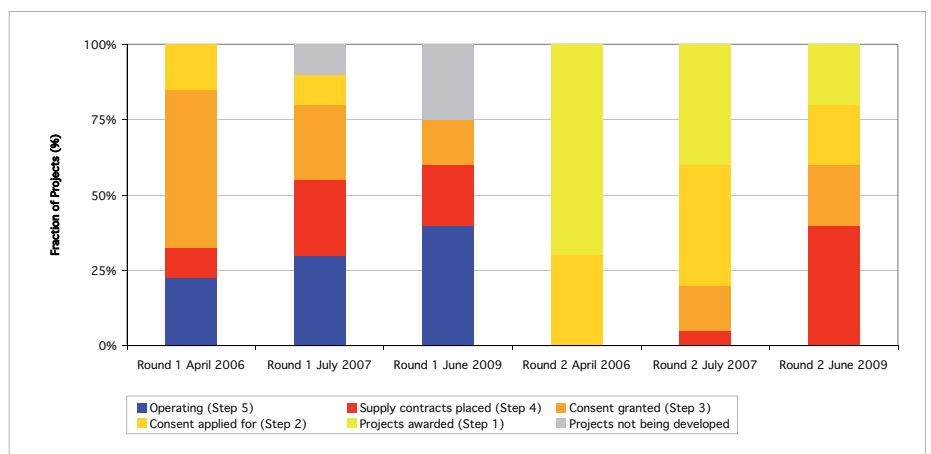


Figure 2 UK offshore project status – June 2009

³ In this report, installation year for a project is taken to be when wind turbine installation is completed, and where turbine installation spans more than one calendar year, the capacity is allocated proportionately.

Five year capacity projections

Methodology

The following developers of UK offshore wind projects were consulted by email, with follow-up by telephone:

- RWE npower renewables
- E.ON Climate and Renewables
- Centrica
- Vattenfall
- DONG Energy
- Scottish Power Renewables
- EDF Energy Renewables
- StatoilHydro
- Airtricity
- Mainstream Renewable Power
- Fred Olsen Renewables
- Warwick Energy

Turning specifically to the UK, Figure 2 summarises the current status of Round 1 and Round 2 projects.

This list covers owners of all projects in Round 1, Round 2 and Scottish Territorial Waters although not all their joint-venture partners. Of developers approached, all but one provided response to this work.

Developers were asked to provide for their projects: current project capacity; information on the planned build programme (foundation and wind turbine installation); expectations of earlier and later build; progress with pre-construction milestones; and, factors influencing the programme.

The results were collated with some information gaps filled based on published data. The earliest likely construction programme for each project was then estimated based primarily on

feedback from developers. This captured plans for single and multi-season builds. Two filters were then applied to arrive at an overall build scenario, an approach largely in line with that used in the previous BWEA studies.

First, project capacity was scaled on a project-by-project basis to reflect likelihood of the project not proceeding at all within the timescale considered here, or being scaled back in capacity. The range of factors applied are shown in Table 1.

The impact of this capacity reduction factor is felt most significantly in projects expecting to build in the second half of the period under scrutiny – see Figure 3. It is acknowledged that there is possibility of capacity increasing in some cases but overall experience shows reduction of capacity from developers' early expectations to be more likely. Indeed, some development projects are already progressing on the basis of a

capacity reduced from that nominally-announced. Site expansion possibilities exist in some cases and it has been assumed that these would be treated as a separate leasing process, not captured here. The overall impact of this step on the nominal rated power of Round 2 as a whole is a 1GW reduction.

Second, a delay probability profile was applied to each project (again mainly based on developer responses) to represent the risk of 1, 2, 3 and 4 years delay to the earliest likely programme. The impact of this step, in arriving at the final build programme, is shown in Figure 4.

Findings

The resultant build programme for UK offshore projects out to 2015, covering Round 1, Round 2 and Scottish Territorial Waters (STW) projects, but excluding Round 3, is summarised below (shown by year of wind turbine installation).

Status	Capacity reduction factor
Contracted	100%
Tendered	100%
Possible grid constraint	75%
Economic viability in doubt	50-80%
Consented, pre-tender	80%
Un-consented	75%
Early development	60%

Table 1 Factors applied to project rated capacity declared by developers

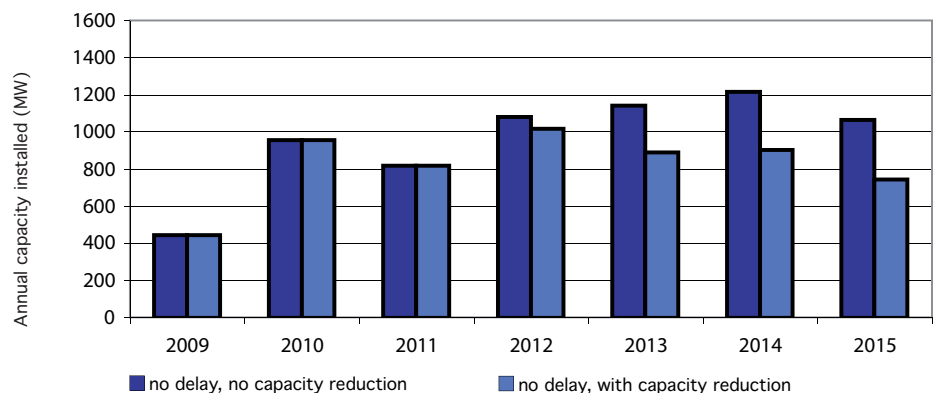


Figure 3 Impact of project capacity reduction factor (earliest programme)

This figure shows delivery rate in 2010 at an historical high, which is sustained through to 2012. The period out to 2015 proceeds then at a slightly lower build rate, after the 'hump' of early Round 2 projects. This drop off is not dramatic and could change significantly with earlier build of just one or two major projects.

Figure 5 shows the cumulative UK offshore capacity corresponding to the annual build figures. Also shown is a theoretical maximum cumulative trend, which (referring to the filtering process described above) is based on earliest conceivable build of all projects and on no reductions in project capacity, although still with no allowance for any contribution from Round 3 projects.

The potential for these results to be supplemented by Round 3 projects is unclear. Many of the developers approached are bidding for capacity in Round 3 but the identity of many bidders is not in the public domain. No bidders are aware of the capacity likely to be allocated to them in the Round 3 process. Crown Estate were approached but due to the sensitive stage of the Round 3 process, were unable to disclose any national deployment projections.

As in previous BWEA studies, the forecast has evolved in response to circumstances and the succession of BWEA forecasts is presented in Figure 6.

Against the 2007 forecast, the forecast delivery rate through to 2012 has held firm – due in no small part to the 2009 Budget proposals keeping a significant number of projects on track.

After 2012, the current forecast falls away from the 2007 forecast (by 800MW cumulative in 2015) because of the drop in installation rate shown in Figure 5. In the 2007 forecast, a nominal assumption was made on post-Round 2 deployment.

From discussions with developers, the drop in installation rate appears to be a result of three factors:

- future rounds (represented only by STW in the current forecast) coming into play later than previously expected;
- round 2 delivery having a longer 'tail' than previously foreseen with our projections having around 1.5GW of Round 2 capacity remaining to be built after 2015;
- project rated power not reaching nominal levels, with Round 2 falling around 1GW short of the nominal figures announced in the Crown Estate leasing process.

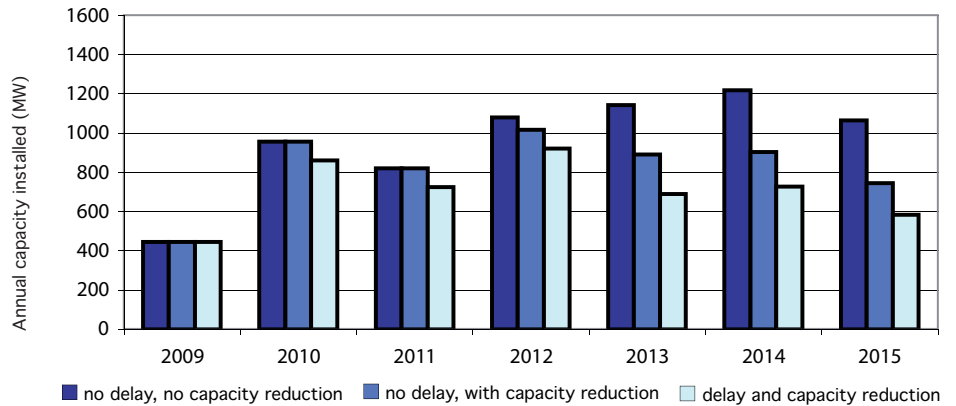


Figure 4 Impact of delay profiles to earliest programme

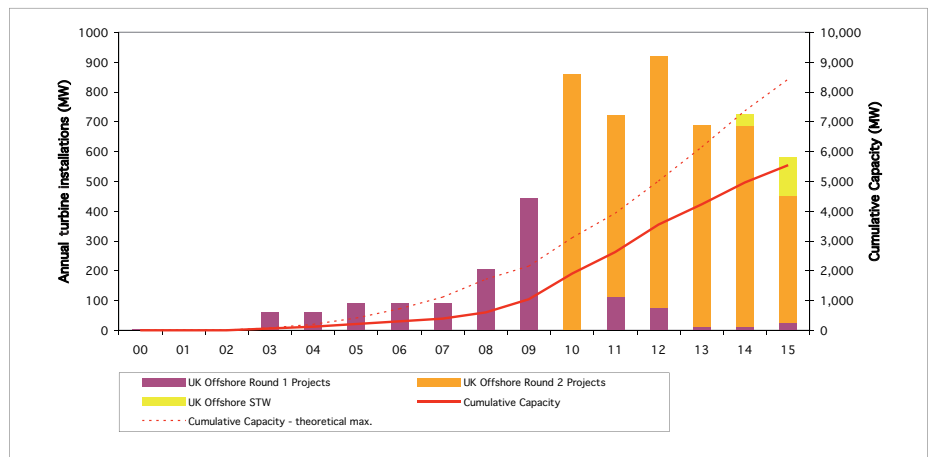


Figure 5 UK offshore wind capacity delivery (excluding Round 3)

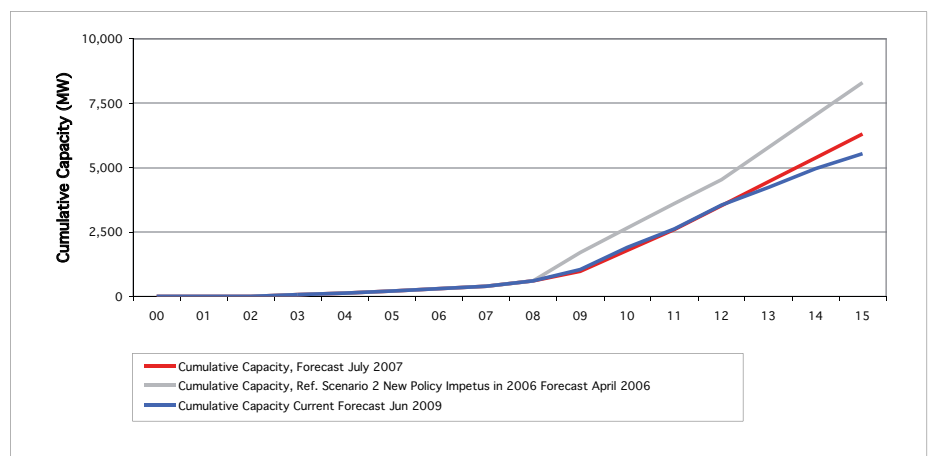


Figure 6 UK offshore wind capacity delivery – evolution of forecasts

Consultation commentary

This consultation attempted to tease out some more information than the bare delivery prognosis.

Has the 2009 Budget managed to maintain momentum in the short-term?

The message on this was clearly, “yes”, with projects issuing contracts or proceeding towards sanction with renewed vigour after a slow-down in the wake of sterling devaluation in the second half of 2008. The industry perception is definitely that more than one project has been ‘pulled out of the freezer’ since the Budget announcement.

However, some developers expressed concern about the impact it had on certainty in the overall investment environment.

What obstacles are impeding progress?

The long tail evident in Round 2 projects and trimming back of project capacity begs this question. Developers offered the following answers during consultation:

- grid access and limitations;
- reaching financial hurdle rates;
- availability of capital;
- cumbersome and unproven OFTO regime;
- consenting compromises on site area and capacity.

“Good to see ‘bubble’ of R2 projects getting going – even if our project doesn’t benefit directly.”

“We see the recent budget announcement as strongly positive for offshore wind. We are, however, concerned over the Government’s understanding of the environment necessary to make major investment decisions.”

“The 2009 Budget proposals will help our project a lot... shows the Government is willing to make decisions to move the industry forward. However, this does absolutely nothing to bring certainty to the UK as an environment for investment.”

“We take confidence from the ongoing commitment the UK Government shows in developing the offshore wind industry.”



Conclusions

This work has identified the installation programme for UK offshore wind until 2015, which predominantly captures the delivery of Crown Estate Round 2 projects. This shows installation, by 2015, of 5.5 GW of total capacity.

The build rate of offshore wind since 2007 has slightly exceeded the previous BWEA forecasts (2007) and the forecast out to 2012 sees no significant change from the 2007 forecast.

This 'steady as she goes' prognosis for the UK offshore wind sector in the medium term sees the build-out of a substantial majority of Round 2 in the five year to 2015 at a reasonably consistent rate (0.6 to 1GW annually).

Unless action is taken to influence plans, this analysis shows a 'gap' developing in installation activity in the period 2013 to 2015 as the bulk of Round 2 developments are completed before all but the most advanced Scottish Territorial Waters projects approach construction. This gap is unhealthy for the maturing market and risks losing momentum and therefore supply chain investment.

Although offshore wind will be a much more substantial market in the next 5 years than it was in the past 5 years, the absolute level of annual installation will remain inadequate to bring the industry to maturity (in terms of contractor competition) and provides limited potential for inward investment in UK facilities.

For both reasons, sustained growth out to at least 2015 is important. The options open on this front are:

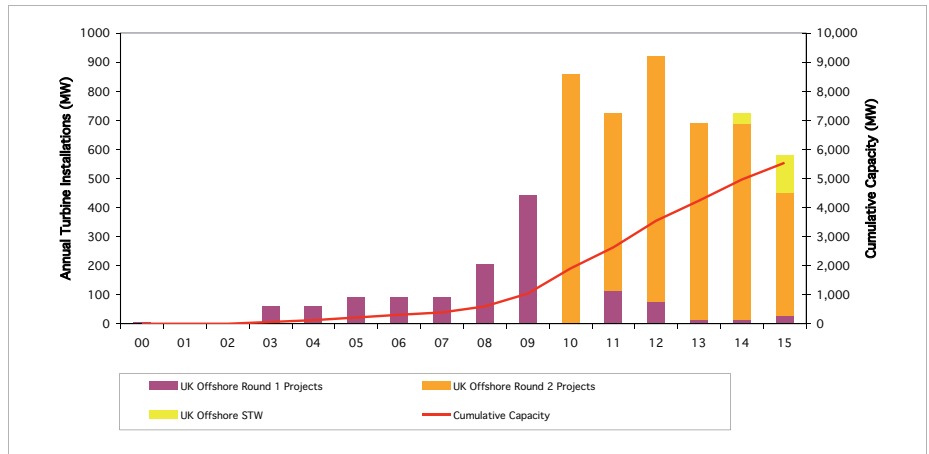


Figure 5 UK offshore wind capacity delivery (excluding Round 3)

- do nothing and rely on other EU offshore wind markets (most obviously Germany combined with Denmark for 2013-15) to provide continuity of demand through this lull;
- act on the factors which are reducing project capacity (by 1 GW in the case of Round 2) and extending the Round 2 installation programme (with 1.5 GW of Round 2 projects still to be built after 2015);
- pursue extensions to Round 1 and 2 projects where opportunities exist for prompt delivery of these plans.

barriers that slow roll-out. Whilst several significant obstacles remain, the first decade of UK experience in offshore wind has endowed the industry with the insight needed to take effective co-ordinated action. Grid, consenting and supply chain issues must now be targeted for projects beyond Round 2 to ensure industry momentum is maintained and offshore wind achieves its potential at the heart of the UK energy mix.

The projection underscores the importance of an accelerated development phase for both Scottish Territorial Waters and Round 3. Painful experience over the last decade has allowed the industry to identify the key technical, regulatory and commercial



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Garrad Hassan is the world's leading renewable energy consultancy serving the wind, wave, tidal and solar sectors. Headquartered in the UK, with offices across the globe, it offers a full range of engineering consultancy, industry advice, specialist software and training – dedicated to renewables. This report has been led by the company's Offshore Wind Department - a multi-disciplinary team focused on contributing to offshore wind project development.

BWEA is the trade and professional body for the UK wind and marine renewables industries. Formed in 1978, and with over 470 corporate members, BWEA is the leading renewable energy trade association in the UK. Wind has been the world's fastest growing renewable energy source for the last seven years, and this trend is expected to continue with falling costs of wind energy and the urgent international need to tackle CO₂ emissions to prevent climate change.