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Offshore drag factor

Shaky ring of confidence: a bubble curtain dampens the noise of subsea installation work at Trianel's first phase 200MW Borkum West 2 wind farm off Germany
Photo: Trianel

Installed offshore wind capacity is growing in the industry's heartlands of Europe while potentially major new markets, such as the US, are getting ever nearer to their first megawatts. Last year's sky-high ambitions have been tempered, however, by delays to the German grid combined with policy uncertainty and construction challenges off the UK.

• See page 2 for a comprehensive list of coming projects around the world

GLOBAL PROJECT COUNTDOWN

Completed in 2012

Project, location	MW	Developer	Capex
Greater Gabbard, UK	504	SSE/RWE	£1.3bn*
Sheringham Shoal, UK	317	Statoil/Statkraft	£1bn*
Thorntonbank 2, Belgium	184.5	C-Power	€570m**
TOTAL			1005.5MW

Coming in 2013

Gunfleet 3, UK	12	Dong	£36m
Lincs, UK	270	Centrica/Dong/SPV	£750m*
London Array, UK	630	Eon/Dong/Masdar	£2.2bn*
Teesside, UK	62	EDF	£186m
Borkum West 2.1, Germany	200	Trianel	€900m*
Meerwind, Germany	288	WindMW	€1.3bn*
Riffgat, Germany	108	EWE	€350m*
Thorntonbank 3, Belgium	110.7	C-Power	€340m**
Anholt, Denmark	400	Dong	DKr10bn*
Karehamn, Sweden	48	Eon	SKr1.2bn
TOTAL			2128.7MW

2014

Gwyn y Mor, UK	576	RWE	€2bn*
Kentish Flats Extension, UK	≤ 51	Vattenfall	£153m
West of Duddon Sands, UK	389	SPR/Dong	£1.6bn***
Baltic 2, Germany	288	EnBW	€1.06bn
Bard Offshore 1, Germany	400	Bard	€3bnChK
DanTysk, Germany	288	Vattenfall	> €1bn*
Global Tech 1, Germany	400	Windreich	€1bn*
Nordergrunde, Germany	110	Energiekontor	> €300m*
Nordsee Ost, Germany	295	RWE	€1bn*
Northwind, Belgium	216	Northwind	€900m*
TOTAL			3013MW

2015

Humber Gateway, UK	219	Eon	£736m*
Narec offshore demo, UK	< 100	Narec	£300m
Westermest Rough, UK	240	Dong	£720m
Amrumbank West, Germany	288	Eon	€1bn*
Borkum Riffgrund 1, Germany	277	Dong	€1.25bn*
Butendiek, Germany	288	WPD	€1.2bn*
Deutsche Bucht, Germany	200	Windreich	> €1bn*
MEG 1, Germany	400	Windreich	€1.7bn*
Sandbank, Germany	400	Vattenfall	€1.48bn
Belwind 2, Belgium	165	InControl	€610m
Luchterduinen, Netherlands	129	Eneco	€450m*
Gemini, Netherlands	600	Typhoon	€2.6bn*
Block Island, US	30	Deepwater	\$250m*
Atlantic City, US	24	Fishermen's	\$250m*
Jeju Island, Korea	84	Samsung	€311m
TOTAL			3444MW

2016

Burbo Bank 2, UK	258	Dong	£774m
Aberdeen Offshore, UK	77	Vattenfall/Technip	£231m
London Array 2, UK	240	Eon/Dong/Masdar	£720m
Neart na Gaoithe, UK	450	Mainstream	£1.4bn*
Race Bank, UK	580	Centrica	£1.74bn
Borkum West 2.2, Germany	200	Trianel	€720m*
Innogy Nordsee 1, Germany	332	RWE	€1bn*
Nordlicher Grund, Germany	320	Blackstone	€1.2bn
Cape Wind, US	≤ 468	Cape Wind	\$2bn
TOTAL			2925MW

* Developer's stated capex ** €1.3bn investment including the cost of 30MW Thorntonbank 1, averaged over three phases *** Developer's stated capex including export cables to shore. If no capex is available from developers or other sources, we have estimated them on the basis of £3m/MW or €3.7m/MW installed. This figure excludes export cable(s) to shore.

Tidal zone wind farms are not included. A 50MW project was completed by Longyuan at Jiangsu Rudong and a 16MW development was built by Cong Ly at Bac Lieu off Vietnam.

A big ask in the age of austerity

Reality check for build rates as UK and Germany falter, writes Todd Westbrook

The offshore wind industry took a step backwards in 2012 as the demands of finance, hardware supply, planning and grid combined to slow down the major markets of the UK and Germany.

A total of 1005MW went online in Europe, falling short by 260MW of the expected figure due to delays to the German grid and construction issues at EDF's Teesside wind farm off north-east England, although that was still nearly twice last year's tally.

Build rates going forward, 2128MW in 2013 and 3013MW in 2014, are roughly 2GW shy of previous estimates for the next two years, largely due to the transmission morass in the German North Sea.

Schedules around the middle of the decade are slipping severely, in large part because the UK is failing to execute its Round 2, Round 2.5 and early Round 3 projects as originally timetabled.

A construction glut is looming in the run-up to 2020 as countries around Europe gear up to meet green energy targets. The supply chain is already warning that the demands of so many simultaneous megawatts will be challenging, particularly given the need to temper expectations and justify investment over the intervening period.

The UK is particularly guilty of raising expectations only to

find that the reality of far-horizon projects, both in time and distance from shore, require more conservative timelines to allow clearance of consenting, finance and technology hurdles. A policy environment that remains stubbornly in flux only exacerbates the situation.

German hopes for the rest of the decade rely on early adoption of new rules for the offshore grid regime, which according to sources in the country would clear the way to investment in infrastructure and a reliable build of the substations necessary to meet developer ambitions.

Finance for individual wind farms remains an issue given the number of independent and non-utility developers active in the market. Increasing comfort with a project finance approach, combined with grid certainty, should allow for orderly progress to return to the German sector post-2015, however.

France bolted into the offshore world in 2012 with a complete package of proposed projects, supply chain investment and grid provision, but sources active in the market remain sceptical of meeting 2020 targets of 6000MW. Even the Round 1 build of 2000MW by 2019 has raised industry eyebrows.

Elsewhere in Europe, the build rate in the short to medium term will be

Breaking through the 5GW barrier

Global offshore installations will total 4.6GW at the end of this year, up from 1.49GW at the end of 2008. Capacity will reach the 5GW milestone when the London Array wind farm (pictured) off the south-east coast of England goes live in 2013. The UK tops the global installed offshore wind league with 2.68GW.

Photo: reNews



2 boosted by Belgian, Danish and Dutch contributions.

New rules will then be required before a fresh generation of wind farms can be built, putting a question mark over Danish hopes of putting up 1000MW at Horns Rev 3 and Kriegers Flak, as well as Belgian plans for a quartet of sites that rely on as-yet-undetermined shared grid infrastructure.

Typhoon's efforts off the Netherlands have been hampered by fundraising issues while the long-term prospects for the sector are unclear under a new government.

Sweden is back in the offshore world thanks to Eon's decision to build a 48MW project at Karehamn. The country is pioneering a Baltic-specific "sheltered sea" style of development and construction that could cut costs and make both domestic and neighbouring markets including Finland and Poland more attractive.

The US is poised to enter the fray at a number of demonstration and commercial-scale offshore wind farms, led as always by the ambitions of the up to 468MW Cape Wind. The latter has been "four years out" for much of the recent past but appears to have lined up the elements necessary to get on the water in 2014.

Deepwater's 30MW scheme at Block Island and Fishermen's similar-scale Atlantic City project are also at an advanced stage.

Asia continues its flirtation with offshore wind. China has gone into retreat this year but will undoubtedly return once it sorts out planning and cost issues.

South Korea and Japan are applying homegrown industrial muscle to develop early-stage and then gigawatt-scale projects. Taiwan, Vietnam, India and Hong Kong have more modest initial ambitions.

Global attention, however, remains focused on Northern Europe and what can be achieved, and at what cost of energy. "Offshore wind faces a big ask in what is essentially an age of austerity," said one source. "It needs to prove that it is up to the job."

Industrialisation answer to the costs conundrum

Turbine manufacturers are ready to play a more active role in the project life-cycle to help reduce costs in the offshore wind sector.

Establishing a politically secure and high-volume market is key to attracting the investment that will bring significant economies of scale to the industry across Europe.

French company Areva's plans to industrialise and reduce costs centre on the operation of three manufacturing hubs, one of which will be in the UK. The latter plant will be located on the Firth of Forth on the east coast of Scotland and geared towards large projects in the North Sea.

The company will cover its core markets from its existing factory at Bremerhaven, a new one at Le Havre and the UK site, with each producing around 100 turbines a year.

Areva Wind director for the UK Julian Brown said the company has a high degree of "investor readiness". Even so, it stopped short of an all-out commitment and instead signed a memorandum of understanding for the Scottish site.

"Electricity market reform is a cause for concern for those looking to make industrial investments but let's carry on and work on the assumption that solutions will eventually be found," he said.

Grid delays in Germany are essentially technical in nature, he said, adding that the overall financial climate is also delaying projects so problems there are also solvable. "The underlying message from the governments in the UK and Germany hasn't changed.

"The big issue is that the more volume there is the more benefit there is in terms of learning and industrialisation. If you establish market certainty, that reassures developers, which reassures the finance community, which reassures the manufacturers and the supply chain, and so on in a virtuous circle."

Areva is already developing a

Turbine players see a future of shared risk and ever closer supply chain alliances, writes Will Wachtmeister

135-metre rotor version of its M5000 offshore wind turbine specifically with the UK market in mind. A prototype of the unit will be produced next year in line with the company's approach of evolving technology at a steady pace.

"This is a risk-averse industry," Brown said. "There is no use talking ourselves into believing in big leaps forward.

"Technology has to be bankable and I think 5MW will be roughly the average size of turbines.. for the next five years at least."

Areva prefers contractual set-ups where stakeholders share incentives for realising

cost savings on individual projects, he said. These could also span multiple projects but Brown cautioned that he expects different client needs would in the end dictate contracting strategies and would involve a range of solutions.

Areva has a long-term tie-up with the supply chain through an agreement with Hochtief and GeoSea on their next-generation installation vessel Innovation. Similar arrangements are expected in other areas.

A spokesperson said: "Areva is a turbine developer and manufacturer, not an installation company, but it is our firm belief that the success of the industry will rest on long-term partnerships between those who develop the turbine technology and the companies that take responsibility for the balance of plant, in particular foundation

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Demo sites for new technology in short supply

The Carbon Trust has highlighted the need for more next-generation turbine test sites as part of efforts to reduce the cost of offshore wind.

"There is a shortage of demonstration sites... and unless it is addressed quickly there will be a delay to cost reductions and the implementation of new technology ideas," said CT head of offshore wind Phil de Villiers.

"Innovation has the potential to deliver up to 25% cost reduction by 2020 but if big gains aren't made soon government support will stop and projects won't get built."

The trust estimates that up to 56 turbines will need to be tested offshore in the very near term for UK requirements

alone. Up to 15 different foundation designs also require demonstration sites.

In addition, de Villiers called for market certainty, without which cost reductions will prove impossible.

"Without it you see developers unwilling to place orders and the supply chain unable to step up. The uncertainty also makes it more difficult for specialised innovation companies to find investment."

According to offshore contractor Technip, early involvement in project lifecycles by all participants is key to cost-cutting.

Vice president for offshore wind David Hodkinson said the company has started offering developers an 'early contractor



• MPI jack-up Adventure has successfully installed the 103-metre anemometry platform for Narec's up to 100MW Blyth offshore wind demo, which is supported by a tripod design for deep-water turbine foundations

Photo: Narec

involvement' arrangement as part of its strategy to evolve with the market into a full-blown engineering, procurement, construction and installation contractor.

The early phase would establish clarity on package interfaces, risk mitigation and target costs before a developer goes to detailed tender. It would also set cost reduction as a goal for all stages of the project.

"Early involvement of the supply chain in projects will

tend to support wider collaboration, better designs, and win-win incentive schemes," Hodkinson said.

Technology improvements such as bigger turbines, more supply chain competition and market volume certainty are "necessary but not sufficient" to deliver the industry's £100 per megawatt-hour costs goal.

"Ultimately it means the successful delivery of individual, complex projects where typically things go wrong," he added.

Answering the costs conundrum

3 production and installation of the wind park."

German manufacturer Repower, meanwhile, is calling for supply chain collaboration approaching full-blown alliancing models.

Vice-president for offshore wind development Norbert Giese said: "The situation we face today is a young fragmented industry where suppliers and OEMs work in isolation. What we need is strategic consortiums between turbine manufacturers (and the balance of plant supply chain) and marine contractors."

He argued collaboration would optimise turbine construction and reduce installation costs. "Currently the turbine tower, foundations and the interface between them are developed independently.

"By working with our suppliers at the design,

production and installation stages of (project) development, we can produce fully optimised turbines that are highly efficient and therefore more cost effective."

Repower said it is optimistic that volumes will be sufficient to enable economies of scale through industrialisation. "We need more component suppliers to boost competition, and more demand to encourage the production of cheaper 'standard' components.

"Because demand remains relatively low, parts are often made to order, which is expensive and inefficient," Giese said.

"Like any successful sector in its infancy, industrialisation is just a matter of time. The proliferation of large-scale, 300MW to 500MW, offshore wind farms will boost demand to a level that will support an industrialised, cost-effective sector. This is a certainty."

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Careful drivers steering Round 3 into slow lane

UK Round 3 developers are adopting a flexible approach and conservative timelines as consenting, finance and technology pressures take their toll on ambitious early plans.

The exact size of the round's contribution to government offshore wind targets for 2020

 remains impossible to predict in the face of an uncertain market and ongoing schedule slippages.

Developers across the board are now planning to generate at least some power before the end of the decade following a new and ambitious timeline unveiled earlier this year for Centrica and Dong's 2.2GW Rhiannon offshore wind farm in the Irish Sea, where work on the water could kick off in 2017.

Previous Round 3 frontrunner

UK application timetables slip as developers digest hefty consultation feedback, writes Will Wachmeister

Atlantic Array is now likely to start a six-year offshore construction programme no sooner than 2017, dashing earlier ambitions for 2015.

Partner RWE said the newly firm-up timetable takes "account of all environmental and engineering considerations" in its recent draft environmental statement but does not rule out further changes as more information is gathered.

Atlantic Array is one of three early Round 3 projects that recently pushed back their development consent order

applications in response to higher-than-anticipated volumes of consultation feedback.

The first wind farm in the round to enter offshore construction is now expected to be Hornsea Project 1 in 2015, following on from possible consent in the third quarter of 2014. Developer SMartWind and partner Dong were unable to predict how long it would take to build the 1.2GW farm, however.

Hornsea Project 2, at up to 1.8GW, could be consented soon afterwards. Timescales are fluid here because Dong has yet to decide whether to exercise a full purchase option.

Hornsea's final phase of up to 2GW, which is also likely to be offloaded, is expected to be consented in early 2018.

First power from Dogger Bank's up to 2.4GW Creyke Beck and up to 2.4GW Teesside



• Plus points: Belfast yard Harland & Wolff tackled construction of the suction bucket foundations for a pair of innovative met masts scheduled to go up this year at Forewind's Dogger Bank Round 3 zone. Fred Olsen newbuild Brave Tern will install the units and other contractors include SeaRoc.

Photo: Carbon Trust

developments could be seen in 2017 with overall construction finishing in 2021 in best-case scenarios. No firm plans exist for the project's remaining potential of nearly 5GW.

Capacity appraisal has shown that Vattenfall and Iberdrola's East Anglia zone can deliver at least 7.2GW. "We have identified two further projects (after East Anglia 1) with an indicative size of

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EMR adds extra wrinkle to the search for finance

Huge investment needed but policy uncertainty muddies waters

The ongoing electricity market reform process is causing additional delays for projects looking to sell stakes to raise construction capital.

Law firm Pinsent Masons, which has advised on several offshore lease awards and project ownership changes, said Round 3 investors are waiting for “key regulatory uncertainty” around EMR to lift.

“The levels of investment are enormous and more players and new entrants will move into Round 3 to shoulder the (financial) burden,” said Pinsent Masons partner Jennifer Ballantyne.

Smart Wind, which is looking to attract investment for the third phase of its Hornsea zone, agrees. “EMR has created a lot of confusion and we look

forward to more clarity in the next three to six months, which should help us identify and find investors,” said general manager Barry Hopkins.

Early Round 3 developers are adopting a wait-and-see approach on finance as the scale of the required investments and stretched utility balance sheets reignite fears about a looming funding gap.

Eon was planning to finance the roughly £2bn Rampion wind farm off the south coast on balance sheet but now says it is keeping an open mind. “We have not yet set the financing strategy and have not ruled out any approaches to funding at this stage,” said a spokesperson.

“Clarity on the level of support the EMR will offer is

vital for the industry as a whole and we are actively engaging with DECC on this.”

Funding pioneer Dong, meanwhile, expressed cautious optimism about the possibilities of outside finance.

“We are on a learning curve with regards to the financial community. However, by raising more than €2.5bn from non-utility investors during the last two years we have clearly demonstrated that it is possible to attract both institutional investors and large corporations,” a spokesman said.

“Each partnership increases interest from new investors from new parts of the world but all of these players have different approaches to offshore wind and need very tailor-made solutions.”

On the technology front, grid challenges remain a widespread worry. The selection of HVDC transmission technology for the first 1200MW project in Vattenfall and SPR’s East Anglia zone recently pushed back the start of offshore construction by a year to 2017 because of four-year delivery lead times on large offshore platforms.

Dong pointed out the choice of HVDC technology has led to a general rise in upfront costs and risk in the round. UK country manager Benj Sykes said: “The process often involves large, early downpayments.”

Navitus Bay is already seeking ways to offload transmission procurement and construction risk. “We’re investigating the market for appetite to build the transmission assets using an engineering, procurement and construction (contract) but we are aware there are potentially very few companies willing to take that on,” said project director Mike Unsworth.

Developers are generally positive about cost-reductions from using



Careful drivers steer Round 3 into slow lane

around 1200MW each, and further projects will be in the pipeline,” said programme director Jason Martin (pictured).

“So we’re now at the stage of working out procurement and construction that should last for a decade.” First power is expected in 2018, around the same time as Atlantic Array.

Rampion has run into planning application delays for Eon but the single-project zone could still be finished in 2018 if it is consented in early 2014 and construction starts as planned in 2015.

Whether the up to 1200MW Navitus Bay will be fully online before 2020 depends on the developer adopting an all-year-round construction approach. Seasonal building could push completion out to 2021. A significant application delay earlier this year contributed to the project’s offshore construction start being moved back two years to 2018.

Huib den Rooijen, head of offshore wind at the Crown Estate, said the organisation is aware of Round 3 hold-ups. “In some cases these are caused by inevitable delays in the planning process and we continue our efforts to work with industry and statutory bodies to minimise such delays.

“As projects progress our focus is increasingly moving beyond consenting to delivery,” he said. “Clarity from the government on the legislative energy package is as critical as continued commitment from the sector to demonstrate economic benefits.

“There is a real risk that investors will lose confidence in the UK if the government can’t find its voice.”

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Piecemeal funding approach not fit for purpose

Attracting third-party investors will be crucial to realising the UK's offshore wind ambitions but questions remain as Round 3 moves ever closer.

Utility-developers were once thought to be prepared to spend £2bn a year for the rest of the decade.

However, even that baseline is now in doubt because of falling share prices and lower-than-expected proceeds from asset sell-offs.

Investment will need to rise steadily to an annual £8bn by 2020 if the UK's 18GW end-of-decade offshore capacity target is to be achieved.

Climate Change Capital head of advisory Ian Temperton, who oversees the investment management and advisory group's capital raising and M&A transactions, said the current approach to project-financing is a potential brake on the sector.

"Our view is that the way people are financing projects doesn't scale up," he said.

"Each deal seems to have a new structure and doesn't give

the supply chain confidence." Temperton argued construction risk, supply chain visibility and the scale of Round 3 are the main challenges.

"The money is getting bigger and the supply chain needs to see that their clients have the financing in place for a series of projects in order to have the confidence to invest significantly in its capabilities," he said.

The way forward is for portfolio deals that span five to

10 years and cover several wind projects, Temperton argued. This type of programme financing would lead to supply chain visibility, better terms and simplicity, and could be applied to Round 3 zones in their entirety instead of each wind farm individually.

RWE Innogy chief operating officer Paul Coffey said: "Utility balance sheets are under pressure and it's clear that outside investment is needed

for offshore wind. We have already seen investment by pension funds, private equity and sovereign wealth funds so I think the process has already started."

The consortium approach at the 576MW Gwynt y Mor wind farm is an example, he said, of bringing in third-party investors. The £2bn development is being funded by RWE Innogy in partnership with Stadtwerke München and Siemens.

EMR adds extra wrinkle to the search for finance



Offloading risk: Navitus Bay project director Mike Unsworth

6 next-generation turbines but none has so far firmly ruled out using current hardware.

"On East Anglia 1 we're focusing on getting proven, cost-effective technology," programme director Jason Martin said. "We've started the procurement process for turbines. We have received the first offers from manufacturers and will make a selection over the next year."

RWE has signalled it wants to use 6MW-plus machines at

Atlantic Array, partly in response to a consultation feedback-induced reduction in maximum numbers this summer.

Elsewhere in the RWE stable, chief operating officer Paul Coffey said Dogger Bank's distance from shore means it will need "new concepts" for installation and O&M.

"The conditions are such that concepts like man-made islands or converted aircraft carriers as installation bases may no longer be fanciful," he added.



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at the 576MW Gwynt
y Mor wind farm

Photo: RWE



Quick thinking keeps construction on track

Just over 1.5GW of offshore wind is currently under construction in the UK at sites including Lincs, Teesside and Gynt y Mor while London Array heads for the finish line.

A steady stream of challenges at the Thames Estuary project have put in-house capabilities at joint owners Dong and Eon to the test this year but quick thinking and the flexibility offered by a multi-contracting approach has kept progress largely on track.

Dong has applied its expertise mainly to offshore installation while Eon focused on the electrical system.

"Masdar, as investors, added rigour to risk management and this year saw an increase in the

UK project teams overcome difficult seabeds, some late installation vessels and rough weather

personnel they contributed, mainly supporting Eon with the electrical side," said project director Richard Rigg.

Barring weather-induced delays, the 630MW wind farm will complete the installation phase by the end of the year for full commissioning in early 2013.

The first hurdle to overcome was the delayed arrival of MPI Adventure last year, which was

addressed by bringing in MPI Discovery to work alongside its sister vessel.

"A second construction challenge we faced is that we did not fully understand just how difficult the site was. Water depths go from 25 metres to inter-tidal," said Rigg.

Installing infield cables in inter-tidal waters proved too much for Global Marine Systems.

Early this year, VSMC took over the cabling contract the company had earlier shared with GMS. "Visser & Smit had access to more suitable vessels," the project director said.

The inter-tidal areas also influenced the

Mid-decade doldrums hard to miss

The current batch of projects are part of a procession that will add significantly to installed UK offshore wind capacity over the next few years.

A big dip, however, is looming for 2015 and any acceleration beyond 2016 has yet to be firmed up.

Capacity will grow by roughly 820MW in 2012 with just shy of 1GW coming online in 2013 via London Array, Lincs and others.

The following year will also be reasonably strong if nearly 1GW at Gwynt y Mor and West of Duddon Sands goes live as planned, possibly bolstered by the up to 51MW Kentish Flats Extension.

However, 2015 looks like it will see just under 460MW installed, and that is an optimistic maximum.

Dong has yet to set any timelines for Westermost Rough, the first commercial project to be earmarked for the Siemens 6MW turbine, so whether it can make 2015 remains to be seen.

Eon is still committed to enter Humber Gateway into construction next year for commissioning in 2015, sources said, although its ongoing offshore wind spending review means the utility is unable to comment on timelines.

Whether Centrica's Race Bank can become operational in 2016 is touch and go with some contracting sources leaning towards 2017. A final investment decision is expected early next year.

Doubts have also been expressed about whether Dong can bring online its Walney 3 and Burbo Bank 2 sites in 2016, although the company said it remains committed to the deadline in line with Round 2.5 tender criteria.

RWE and SSE's 504MW Galloper project is tackling consenting challenges with a determination now expected in 2013.

8 foundation and turbine vessel spread, which underwent several changes. Ballast Nedam heavylift vessel Svanen was brought in to carry out monopile installation in shallower waters where the Adventure's draft was too large but also because A2Sea's Sea Worker was unable to lift the heavier monopiles.

First power was originally anticipated towards the end of 2011 but was delayed initially by late export cable delivery and then by technical problems at the Cleve Hill substation.

Without the latter hitch several turbines would have been energised by July, Rigg said.

Instead the team had to resort to the unusual solution of commissioning turbines to 80%, leaving the final 20% to be carried out after the Cleve Hill issue was finally resolved last month.

The final half of October saw the project rack up several milestones: installation of the final export cable, the final foundation and the final array cable. First power was

generated on 29 October. Further up the east coast, Centrica's 270MW Lincs offshore wind farm overcame its main hurdle, infield cabling, by bringing in new vessels and contractors to tackle a difficult seabed.

First power was generated in late August. The project has seen heavy weather but installation could be substantially complete by next March.

Another step north, EDF

Energy Renewables' 62MW Teesside project has also had its share of delays this year and now looks likely to be fully commissioned early in 2013.

The 27-turbine Round 1 wind farm, which was originally due to be fully installed in October, suffered from poor weather and from an incident where jack-up JB-114 became stuck in the seabed.

JB-114 was originally scheduled to start turbine installation in July and finish in

October but a change of vessel is on the cards to deal with rougher winter weather.

Offshore construction at RWE's 576MW Gwynt y Mor got underway this year despite the delayed arrival of the utility's own installation vessel the Friedrich Ernestine.

RWE has lined up a strong vessel spread, including SHL heavylift unit Stanislav Yudin and A2Sea's Sea Jack and Sea Worker, and full operation remains scheduled for 2014.

Dual FEED strategy surfaces at Navitus Bay

Navitus Bay's developers are considering an innovative dual front-end engineering and design process for the Round 3 site.

Two separate supply chain consortia or joint ventures will be invited to carry out parallel FEED studies for the wind farm's balance of plant with the aim of identifying cost-cutting innovation.

"Running a dual FEED process would retain competitiveness and create added value through innovation ahead of our final

investment decision," said project director Mike Unsworth.

The pre-qualification stage could start towards the end of next year after the next geotechnical campaign. The FEED would be paid for by project partners EDF Energy and Eneco.

Unsworth said he expects the winning consortia to include offshore installation companies as well as designers and hardware suppliers. They would gain the option of becoming the project's balance of plant

partner, acting as a Tier 1 supplier of foundations and possibly also cables and offshore substations.

"The alternative is to go down the more traditional route of breaking the project down into separate tendering packages," Unsworth said.

"We're not looking for an engineering, procurement and construction contractor for the wind farm because prevailing market conditions show there are very few companies willing and able to take it on."



Over 7.6GW of offshore wind.

When it comes to developing renewable plant offshore, it helps to have a smart, fast, flexible partner.

A record-breaking chunk of offshore wind capacity went live in the UK this year but the Greater Gabbard and Sheringham Shoal projects will be remembered for highlighting the sector's inherent construction challenges.

The 504MW Greater Gabbard, featuring 140 Siemens 3.6MW turbines, was commissioned in September but contractor disputes will rumble on well into 2013.

An initial arbitration was settled last week and found in favour of owners SSE and RWE. Contractor Fluor expects to take a roughly \$400m pre-tax hit in the fourth quarter in connection with the claims.

SSE and RWE have also filed a counterclaim against Fluor seeking to recover costs associated with alleged defects.

The counterclaim is currently scheduled for hearing in April 2013, according to Fluor. "To the extent the client's counterclaim is successful, there could be additional charges to the company's earnings," said the US contractor.

The disputes centre on roughly 50 defective foundations. At some point in the future the owners will need to decide whether to repair the units, replace them, remove affected turbines altogether, or undertake some combination of all the three.

RWE said it has gained valuable experience. "The EPC solution doesn't push away all the risk in the construction period," said chief operating officer Paul Coffey.

"We have learned from the Greater Gabbard construction



Learning curve: Statoil and Statkraft's 317MW Sheringham Shoal wind farm

Photo: Scira

Builders add megawatts and experience in 2012

strategy that EPC approaches can significantly reduce your influence and transparency. The second lesson is around the quality assurance from suppliers and how we manage that from the outset. This is critical to project success.

"Greater Gabbard has also highlighted challenges around cable installation and burial."

Coffey added that the required risk premium for EPC strategies in the market is "still too high" and that there are only a few suppliers potentially

able to take on entire projects. "In response, our strategy has been to build our own competences using the multi-contract approach by dividing the project into a number of lots and taking the interface management in-house like we are doing on Gwynt y Mor," he said.

Sheringham Shoal also struggled to the finish line this year, arriving nine months late but on budget. Partners Statoil and Statkraft had to deal with a full rethink on the foundation

campaign along with several installation vessel spread changes and tough winter conditions.

The Norwegian companies are now hoping to apply the lessons learned at the 560MW Dudgeon wind farm, which they purchased this year.

Gabbard and Sheringham Shoal added just over 820MW to UK offshore totals this year, bringing installed capacity to just under 2.7GW. Some 520MW was built last year and nearly 650MW in 2010.



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Subsidy cap powers set off alarms

A mechanism that could cap renewables subsidies has sparked fears policymakers will succumb to growing energy policy populism by limiting offshore wind's buildout.

The Levy Control Framework gives government powers to limit the amount that can be raised, for the Renewables Obligation or electricity market reform, through consumer bills.

"Our concern is that Levy could restrict offshore wind development," said Dong's UK wind country manager Benj Sykes.

"The issue for the market is that there is little transparency on how big or small the (subsidy) pot is, how it will be divided up, if at all, between different technologies and how companies can win a share."

Cost reduction will become increasingly important if there is only a limited amount of funding available. "Obviously, more projects can be achieved for a given price if the costs are lower," Sykes said.

Ongoing design issues for

Levy Control Framework could slam the brakes on construction

EMR are resolvable, he added, and it is too early to start lobbying for a 2020 extension to the RO. "We would much prefer getting this sorted now rather than kicking the can down the road," he told reNews.

RWE and SSE have already started lobbying for an RO extension, motivated in part by their large onshore portfolios but also the timing of Round 3.

"Early Round 3 projects should be in construction around 2017 at the time EMR is

currently planned to be phased in," said RWE chief operating officer Paul Coffey.

"Introducing EMR right when these projects could come to fruition is a very risky situation."

Policy debates are being held against a background of increasing anti-wind posturing by elements of the Conservative Party.

"The inevitable outcome is that RWE will quite rightly ask whether we should be

continuing with UK renewables investment. Next time we ask (the German company's board) for an investment it will be clear that confidence has been dented and we will have to work long and hard to rebuild that confidence," Coffey said.

"We also have to remember that within RWE, the UK is competing for international capital that could go to other countries if they have more attractive renewable environments."

Supply chain wants the UK to play longer game

Offshore wind players are calling for a fourth round of Crown Estate leases to sustain the industry to 2030 and beyond. Supply chain and other participants fear that the pre-2020 boom could otherwise turn to bust in the next decade.

"We would wish for a Round 4 to be in the planning," said Vestas Offshore senior vice-president Uffe Vinther-Schou.

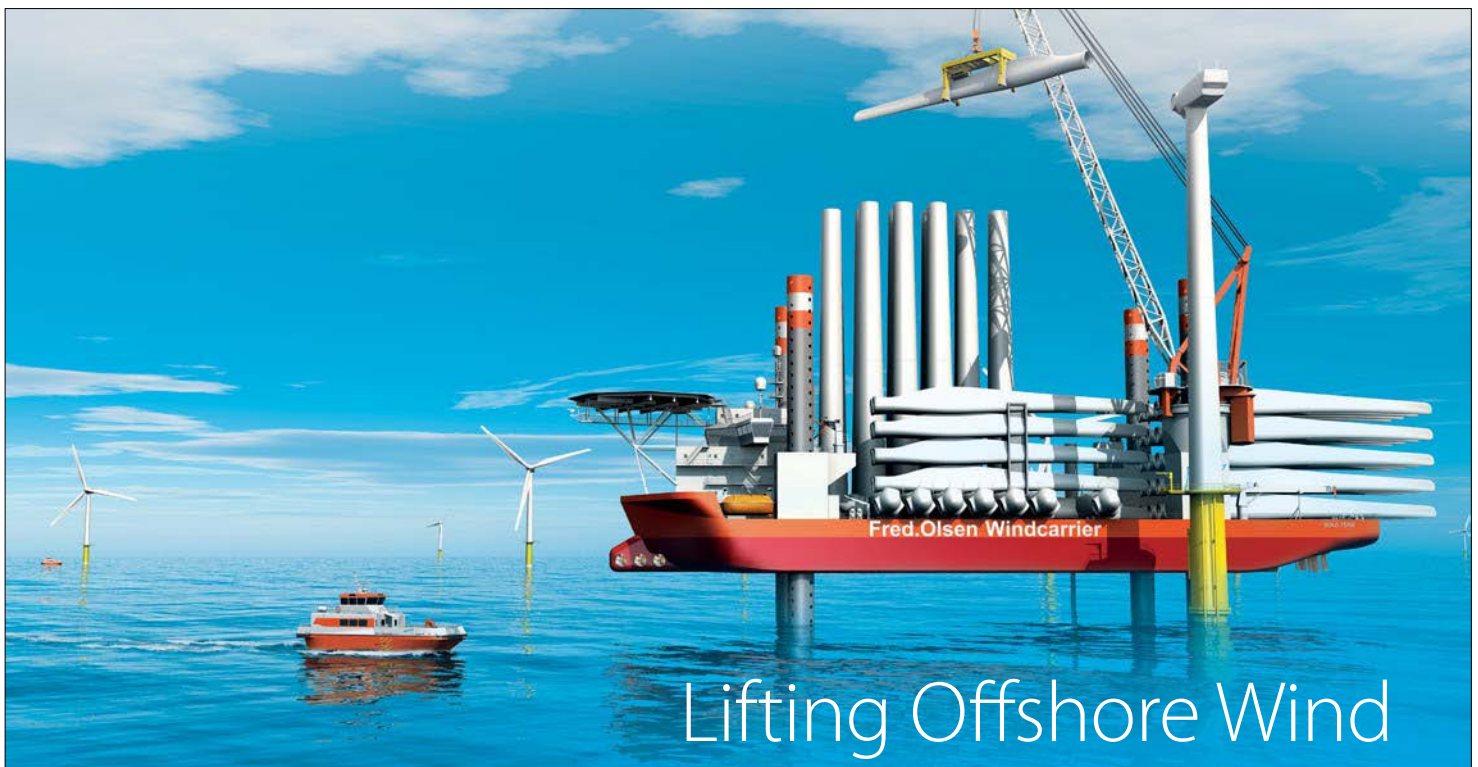
"When you consider what investors are looking for, one of the issues is that nothing is certain after 2025. Offshore wind needs long-term certainty to get the right environment to invest."

The outlook for the sector is key in Vestas Offshore's ongoing talks with Mitsubishi about setting up an alliance in part to introduce the next-generation V164 8MW turbine, he said.

Securing a partner with deep pockets would allow the Danish manufacturer to realise its ambition of becoming a top-two supplier to the industry.

The Vestas man sees take-off for the next-generation turbine market happening a number of years after 2015, which is one reason the company backed away from a planned manufacturing facility in

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Developers fear bill for shared grid

Shared offshore grid infrastructure promises massive savings for the national network but wind developers increasingly worry they will have to foot the bill.

National Grid is already making co-ordinated grid offers while regulator Ofgem is pledging to provide certainty for developers asked to make extra transmission investments.

The offshore wind community, meanwhile, is trying to make sure the additional costs can be recouped in the OFTO process.

"The basic problem is we don't want Ofgem to punish us for doing something National

Grid is getting us to do. There are clear clashes of interest between the three parties," a developer source said.

As it stands, there is no mechanism to treat so-called anticipatory investment in the OFTO process. This occurs when a developer, as part of an agreement with National Grid, builds more transmission assets than necessary for a particular offshore wind farm.

Such scenarios save costs by providing shared transmission kit for future developments and contribute towards a more efficient national network.

The problem is that there is as yet no certainty for

developers about how that the extra investment will be repaid when the assets are cost-assessed by Ofgem as part of the OFTO process.

The regulator said it would consult on its proposals for the treatment of anticipatory investment, which it calls "investment to support more efficient connections for later phases of offshore generation", before the end of the year.

Ofgem commercial managing director Bob Hull said the main role for the watchdog is to ensure developers have certainty to make anticipatory investment in co-ordinated infrastructure in cases where

there is an overall cost benefit to grid users.

Second, Ofgem is working to ensure there are no barriers between developers and National Grid when it comes to working out plans for shared transmission initiatives.

"Undoubtedly there are significant potential savings," Hull said, pointing to studies that suggest totals between £500m and £3.5bn depending mainly on the amount of offshore wind that is actually built. "But future scenarios are extremely dependent on technology where there is a lot of work still to be done, so it's a case of wait and see."



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Long game call

11 Kent. "The Sheerness decision was taken after applying a good dose of realism," said Vinther-Schou. "We don't think the customers will be there for the V164 in early 2015, which had been part of our original planning."

He said he still believes the introduction of larger turbines by established players such as Vestas, even if it is in the second half of the decade, will be crucial to the sector's cost-reduction ambitions.

The call for the longer horizons that might be sparked by a Round 4 was echoed across the balance of plant supply chain. "We are too focused on 2020. We need to look at 2030 and beyond," said Alex Dawson, chief executive of fabricator TAG and chairman of regional supply chain group Energi Coast.

"Institutional investors in the supply chain want to see a pipeline of projects stretching well into the next decade. We've already seen delays on projects that we thought were going to happen by now and we're in a situation where some institutional investors are asking will it ever happen?"

Crown Estate head of offshore wind energy Huub den Rooijen said: "We are constantly monitoring requirements and we have an open mind but we are not actively working on creating Round 4."

Road opens for a cavalcade of Scottish farms

Most advanced projects heading for the water in 2015, writes **Todd Westbrook**

Applications for Scottish offshore wind farms totalling more than 4GW were filed in 2012, making the question for the country's new industry "when" rather than "if".

The reality of planning and construction, however, has led to schedule revisions at both Scottish Territorial Waters and Round 3 developments.

Mainstream and SSE/Repsol are poised to move the quickest with, respectively, their STW projects at Neart na Gaoithe in the outer Firth of Forth and

Beatrice in the Moray Firth. Mainstream filed its consent application at NnG in the summer and holds a grid connection offer for the end of 2014.

However, early-stage estimates of construction starting in 2014 have been tempered with the company now officially targeting 2015.

Industry sources said they expect movement on a range of contracts in the next 18 months with turbines of at least 3.6MW and up to 7MW in the frame.

Discussions have also been instigated with onshore facilities around the Forth and Tay with an eye to staging,

NORTH OF THE BORDER TIMETABLE			
Project	MW	Developer	Build start
Argyll Array	1800	SPR	2018
Beatrice	1000	SSE/Repsol	2015
EOWDC	77	Vattenfall/ Technip	2014-15
Inch Cape	905	Repsol/EDP	2016
Islay	690	SSE	2017
Neart na Gaoithe	450	Mainstream	2015
R3 Moray Telford	500	EDP/Repsol	2015
R3 Moray Stevenson	500	EDP/Repsol	2016
R3 Moray MacColl	500	EDP/Repsol	2017
R3 Seagreen Alpha	525	Fluor/SSE	2016
R3 Seagreen Bravo	525	Fluor/SSE	2016

logistics and other support activity.

Foundations will be either steel jackets or gravity base. Power will be exported via one or two offshore substations to an onshore substation at the Crystal Rig 2 wind farm in East Lothian.

The Beatrice partners, which filed applications in support of their wind farm in April, are facing delays related to planning that make a decision unlikely in the shorter term.

A number of statutory consultees have yet to supply

feedback on the up to 277-turbine project while aviation objections have been filed by NATS and the Ministry of Defence.

SSE and Repsol have a contracting head-start, however, thanks to an alliance approach to offshore wind that includes Subsea7, Siemens T&D, Atkins, Bifab and Siemens Wind. Work on the water is scheduled to begin in 2015 at the earliest. Grid connections are in hand for spring 2016, 2017 and 2018.

SSE said when filing its application with Marine **14**



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Bell rings for new territorial round

The Scottish government is intent on securing further investment in offshore wind through the early identification of development opportunities in both traditional and deep-water technologies.

Planning is already well advanced for a second round of licences in Scottish territorial waters, a so-called STW2, as well as for an initial series of floating demonstrators in selected waters. A plan for

overall sector development will be produced by Holyrood in summer 2013 following ongoing consultation on identified areas.

Up to 15 zones are being considered for STW2, including four off the east coast, four off the Northern Isles, one off the north-west coast, five off the west coast and one in the Solway.

The latter is already the subject of an out-of-round exclusivity agreement between

Dong and the Crown Estate, which runs until three months after the final offshore plan is published by the Scottish government next year. An agreement for an up to 280MW project lease may then be pursued.

Crown officials have otherwise shied away from engaging with the details of a second round off Scotland, saying only that the seabed landlord is "committed" to

offshore renewables in the country.

Sources suggested that Holyrood's desire for devolution and reform at the Crown Estate, as well as the upcoming independence referendum, is muddying the waters.

On the floating front, the Scottish government is expected to launch a consultation before the end of the year on promised specific Renewables Obligation support for the technology, as well as other "experimental" wind elements such as novel foundations.

The RO banding is not expected to support a large amount of capacity but will "help secure the progress and deployment of small demonstration projects" ahead of 2017.

Norwegian company Statoil lobbied for just such a measure in its response to the RO consultation process. The company is eyeing plans to install an around 20MW Hywind 2 demo off Aberdeenshire (see *Norway*, p34).

Six deep-water sites were identified in the government's plan for next-generation offshore wind.

Each nominated 30-square-kilometre area is in waters between 80 and 120 metres deep with a wind resource greater than 9m/s and proximity to onshore grid infrastructure.

The zones off the coasts of Caithness, Moray, Aberdeenshire (two), the Western Isles and Shetland are expected to host up to 100MW each.

Road opens for a Scottish cavalcade

13 Scotland that a final investment decision "is unlikely to be taken before 2014 at the earliest".

The utility is also involved alongside Fluor in the Round 3 Firth of Forth zone, for which initial applications were filed in October.

Seagreen Alpha and Bravo are located around 27km off the Angus coast on "relatively flat, uniform seabed" in waters up to 55 metres deep. The projects will feature up to 75 turbines of 7MW each. Power from the Seagreen duo will come ashore at Carnoustie and connect to a substation at Tealing.

Work on the water is due to begin in 2016 and wrap up in the fourth quarter of 2019. A met mast was due to go in this year but work on the suction bucket unit has yet to kick off, it is understood, raising doubts about installation before next spring.

A met mast was also due to go up this year at EDP and Repsol's 1500MW Round 3 zone

in the Moray Firth. Original schedules for "steel in the sea" came unstuck earlier this year and the developer has yet to identify a new plan. An onshore met mast was erected in Caithness this year.

Applications for the Moray projects, known as Telford, Stevenson and MacColl, have been filed with Marine Scotland. Up to 339 turbines will be required in total with sizes ranging from 3.6MW to 8MW. Foundations will be gravity bases or jackets.

Moray will connect to shore near Fraserburgh in Aberdeenshire. Infrastructure will include between five and eight offshore platforms, including up to two AC/DC converter stations.

The developer holds a series of grid connections starting with 120MW in October 2016 and jumping yearly to a total of 1500MW by 2020.

Planned Scottish applications that have yet to be filed include SPR's proposal for the Argyll

Array wind farm, which has been set back by the need to carry out extra environmental work in connection with basking sharks and great northern divers. The footprint was reduced as a result.

Paperwork for the project off Tiree on the west coast will not be filed until 2014. Onshore works are set for 2018 with first power by 2020.

SSE's 690MW plans off Islay, to the south of Argyll, are due to land with Marine Scotland at the end of 2013.

A fisheries meeting was held this month as part of ongoing consultation on the wind farm, for which a larger footprint was granted by the Crown Estate earlier this year.

Repsol and EDP are targeting an application before the end of this year for the 905MW Inch Cape in the outer Firth of Tay off the east coast.

The project holds a trio of grid connection offers for 2017 and will connect at Cockenzie in East Lothian.



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Drive to dot land and sea with sites for demonstrators

Private and public sector interests are hoping to fill a European-wide requirement for both onshore and offshore demonstration sites for evolving turbine technology.

Scottish Enterprise and Highlands and Islands Enterprise are working to secure onshore and near-shore opportunities while Vattenfall, Technip and AREG are gearing up at the European Offshore Wind Demonstration Centre off Aberdeen.

The latter is anticipating sanction for a 77MW array before the end of the year, which would clear construction to kick off in 2014 ahead of a late 2015 grid connection.

Six potential suppliers have signed memoranda of understanding for the seven-turbine site, including most of the market's big-name participants.

Agreement has been reached on radar mitigation solutions with civilian and military officials, although details and timelines will only be established once consent for the demo has been granted.

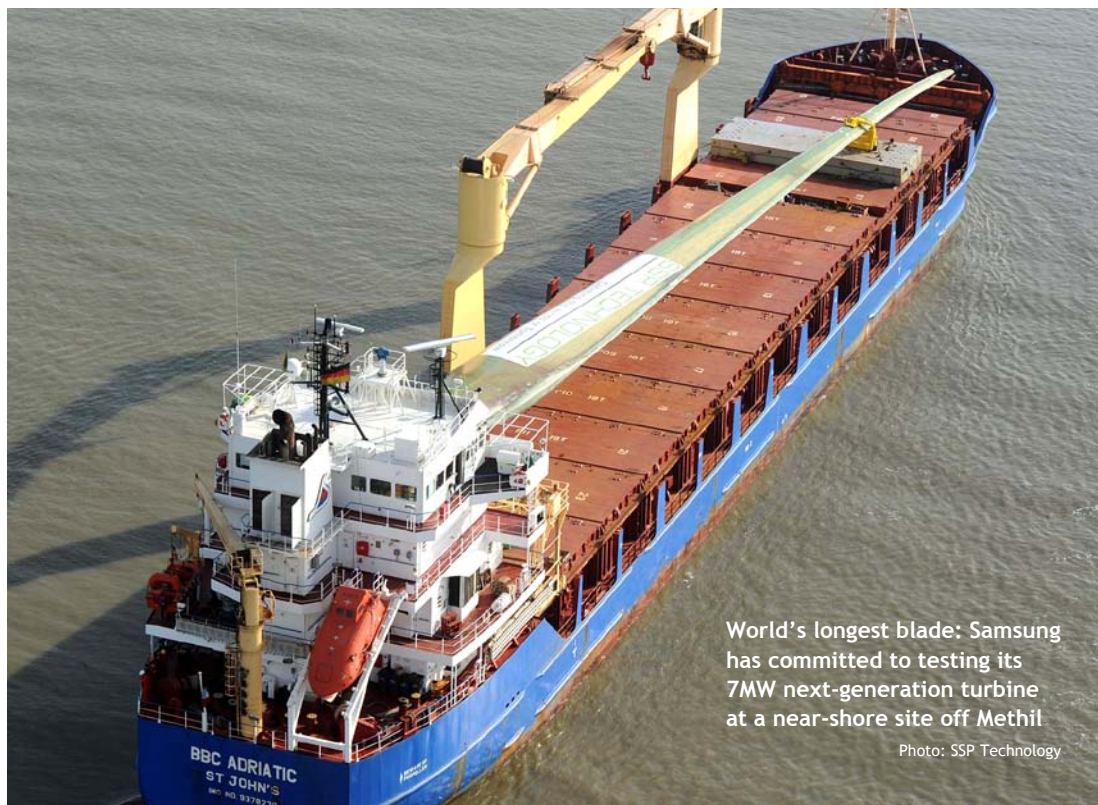
Scottish Enterprise is leading the charge in Fife on behalf of South Korean giant Samsung, which has committed to testing its 7MW next-generation turbine at a near-shore site off Methil.

If successful the machine could spark manufacturing investment such as a gearbox plant for David Brown.

The Hartlepool company is due to produce an initial unit for inclusion in the Samsung turbine by early next year. An 83.5-metre blade for the unit produced by SSP in Denmark is being tested in Germany.

The national enterprise agency has also secured a test berth at SSE's three-turbine Hunterston demo on the west coast of Scotland.

A bidding process for the slot will kick off early next year. There has been "lots of positive early interest" in the site, for



World's longest blade: Samsung has committed to testing its 7MW next-generation turbine at a near-shore site off Methil

Photo: SSP Technology

which Scottish Enterprise is providing £4.3m in funding.

SSE is expected to fill the other two berths with machines from Siemens and Mitsubishi, with the initial unit going in next year.

The agency is meanwhile narrowing a list of other potential onshore test sites with the aim of securing between five and 10 in the short term.

An initial cull is being followed up by more detailed feasibility studies, carried out by Arcus, that also takes into account issues such as access and grid.

Dutch turbine developer 2-B Energy, which gave up a slot off Methil to accommodate Samsung, is in active discussions about using one of the onshore test sites.

Successful deployment could spark Scottish manufacturing of the two-bladed downwind machine, it is understood, although a similar test and commercial roll-out combination is being explored in the Netherlands.

Highlands and Islands Enterprise has also been screening potential onshore test sites in its area, this time with Atmos carrying out the work. Two locations remain of interest.

"Discussions are ongoing with the relevant local authorities,

landowners and industry," said HIE.

Andy McDonald, director of renewable energy at Scottish Enterprise, said the test sites are in part about creating the right conditions for wider

supply chain investment to take hold. "There is huge potential for engineering and manufacture. We are also working with indigenous supply chain about accessing the rest of the world," he said.

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A tale of two markets in Ireland

Offshore wind in Ireland is experiencing a major gulf in fortunes on either side of the border.

The stage is set in Northern Ireland for work to begin on the province's maiden project after the Crown Estate awarded development rights for a 600MW offshore wind zone in October.

Winning consortium First Flight Wind, a joint venture of Dong and RES/B9 Energy, is already getting its teeth into the lengthy process of data collection, surveys and zone characterisation.

Most of the marine bird surveys are set to be completed before community engagement and consultation kicks off in a meaningful way next spring.

In 2014, another round of consultation and analysis will be undertaken as the results of the environmental assessment emerge.

The development group must

600MW development cooking in North while developers in Republic left to fight for distant export opportunities, writes **Jack Horgan-Jones**

also tackle the problem of a weak onshore grid that currently would struggle to accommodate an extra 600MW.

Sources in the North said First Flight is engaged in preliminary analysis with grid operators NIE and SONI to identify a shortlist of landfall and connection points. This process is expected to take around eight months to complete.

The developer is meanwhile engaging with various

stakeholders as it goes on a public relations blitz designed to ease the passage of the project from conceptualisation through to construction and operation.

The full benefit of the much-vaunted supply chain is unlikely to be enjoyed exclusively by domestic players in the six counties.

However, there is an opportunity for indigenous companies to offer their local knowledge and buddy up with

international contractors, said sources.

A good example is Michael F Ewings Shipping, which has entered into a joint venture with logistics player Blue Water Shipping.

South of the border, a major re-organisation is underway as the industry adjusts to life without the prospect of a government subsidy.

Brian Britton, chairman of offshore wind industry body NOW Ireland, said: **17**

Harbours are jousting for Irish Sea support role

Dong's £50m offshore wind support facility at Belfast harbour is on course for completion by the end of the year.

The first job to be tackled by the 50-acre complex will be Dong's 389MW joint venture with ScottishPower Renewables at West of Duddon sands.

Belfast harbour officials said

they will be targeting a market for 11,000 turbines in UK and Irish waters in the Irish Sea by 2020.

Meanwhile, south of the border, a recent study by the Irish Maritime Development Office stated that seven Irish ports are in a good position to serve offshore marine renewables.

Of the seven, preliminary

development plans are in place in Cork Harbour, where Burke Shipping is hoping to land distribution contracts with turbine manufacturers active in the Irish Sea.

The company is in talks with the Port of Cork for dredging work and has lined up Danish consultancy Ramboll to refine its plans.



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16 “In times to come I hope (the government) are not coming back with their tails between their legs if they don’t meet the targets from onshore and biomass.”

Major projects are looking to direct connection to the UK market as a lifeline including Fred Olsen and Hazel Shore’s 1100MW Codling wind farm, as revealed exclusively in *reNews* earlier this month.

Central to the success of these plans is a memorandum of understanding between the British and Irish governments on energy export, which is expected before the end of the year. Without the pact exports are a non-starter.

Irish energy minister Pat Rabbitte’s plans for a royalty on export projects may also queer the pitch. Britton said there is “no use in imposing an onerous charge on the Irish offshore developer” that would make export impossible. “The Irish government would look very stupid if they did that.”

Britton called on Dublin to ensure that export for all sizes of offshore development is made possible by allowing a combination of statistical transfer, direct connection and further interconnection.

In the meantime, southern developers are looking with frustration north of the border, according to Britton.

“Five years ago Northern Ireland wasn’t at the races. You have a clear example in NI of what can be achieved when the government department up there works with the minister, works with the development agencies... and works with the industry.”



Painful progress: costs are estimated to have reached €2.5bn at the German developer’s 400MW Bard Offshore 1

Photo: Bard

German uncertainty spooks investment

The German offshore sector is struggling to raise finance, threatening government plans to build more than 10GW by 2020.

The industry expects no more than 7GW of installed capacity by the end of the decade, according to a survey

by wind lobby group WAB.

Over the past year, several projects have either been put on hold or are anxiously seeking finance against a background of delayed grid connections. Dong Energy, for example, recently put the 346MW Borkum Riffgrund 2 proposal “back in the development pipeline”.

Bard has spent the best part of 2012 looking for investors to buy the company, although its

Industry is hoping grid compensation law will break logjam, writes Dan Billingham

problems are complicated by the painfully slow construction of the 400MW Bard Offshore 1 wind farm where costs have soared from €1.5bn to an eye-watering €2.5bn.

The developer was hoping to wrap up a sale in the spring. Movement is needed before construction can start at the company’s 400MW Veja Mate project, which currently faces a three-year delay until 2017.

WPD is another developer that has spent the year trying to tie up financial backing for an imminent project, this time the €1bn Butendiek site. The company is hoping to maintain a minority stake.

EnergieKontor is also keen to attract investors to its 108MW

Nordergründe wind farm, which will cost more than €300m, and is willing to offer a complete sale. Construction is scheduled for the third quarter of 2013, leaving little time for further delay on the financing front.

Germany’s offshore woes go beyond fundraising. Trianel is close to completing foundation installation at its 200MW Borkum West 2 first phase. At the same time it is trying to claw back losses of at least €50m that will arise from grid connection delays.

The consequences of this uncertainty are having a direct impact on the supply chain. The Nordseewerke shipyard, a tripod foundation fabricator, was forced to



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Blame game for grid chaos

Developers have struggled to complete wind farms in 2012 against a background of near complete uncertainty over the connection regime.

Transmission operator TenneT said a year ago that it was unable to finance any new grid infrastructure after 2015 while also warning that a number of offshore hub projects currently under construction would be delayed.

The company informed clients about expected hold-ups on one of its hubs, DolWin1, on no less than three occasions this year, pushing the estimated completion date back a total of eight months from February to October 2013.

The 576MW HelWin1 and 800MW BorWin2 hubs are also subject to major delays totalling up to 24 months from the original connection dates in 2012 even though initial work started more than a year ago.

RWE has yet to gain a final connection date from TenneT

GERMAN NORTH SEA CONNECTIONS			
Grid hub	MW	Online	Projects due to connect
BorWin1	400	2009	Bard Offshore 1
BorWin2	800	2015	Global Tech 1, Veja Mate
BorWin3	900	tbc	Albatros 1, Hohe See
DolWin1	800	2013	Borkum West 2, MEG 1, Borkum Riffgrund
DolWin2	900	2015	Delta Nordsee 1&2, Gode Wind 1&2
DolWin3	900	tbc	Borkum Riffgrund 2, Borkum Riffgrund West
HelWin1	576	2014	Meerwind Sud/Ost, Nordsee Ost
HelWin2	690	2015	Amrumbank West
SylWin1	864	2014	Butendiek, DanTysk, Sandbank

for HelWin 1 after the latest delay notice was issued in June. The developer is working on the assumption its 295MW Nordsee Ost site can be connected in 2014. Paul Coffey, RWE chief operating officer, called the grid situation "a mess".

The delays have been blamed on the scale of the technical challenge. HelWin1 and BorWin2 contractor Siemens said the problems have partially been overcome as it gains

experience. The company hopes to reduce issues in the future by building standardised 900MW facilities.

A contributing factor is a lack of clarity in the approval process, as are rigid environmental laws that demand the use of noise reduction technology on the platforms.

Unfavourable North Sea weather currently only allows offshore work between May and September, providing a knock-on effect if installation misses this window.

Newer connection projects have proved less problematic so far. SylWin1 is running just a few months late and is set for completion in spring 2014. It will connect the Butendiek and DanTysk wind farms.

HelWin2, which will connect Eon's 288MW Amrumbank West to the German grid and offers 690MW of capacity, is currently on time and set for an early 2015 finish.

While progress has been made on construction delays, problems in the tendering process for connections further down the line, caused by a lack of finance at TenneT, pose a new threat.

EnBW has postponed taking a final investment decision on its planned 400MW Hohe See wind farm, due to come online in 2017, because the BorWin3 connection project is behind schedule in the tendering phase.

Strabag is unable to put a start and finish date on its 345MW Albatros farm,

file for insolvency last month when it was unable to confirm an order provisionally planned for 2013 with one of the wind farms that is awaiting financial closure.

Plans to attract private finance for a new offshore wind base at Bremerhaven fell through in September with local public funding likely to be used instead.

The financial crisis should be eased by a proposed law on compensating developers for connection delays. Once passed, a number of wind farms could come off the shelf such as WindMW's proposed 320MW Nördlicher Grund.

WAB chief executive Ronny Meyer said he expects the legislation to spark investment that has been withheld due to uncertainty over grid links. However, further trouble is lurking over the horizon in the shape of feed-in tariffs.

Current supports call for consumers to pay a minimum of 15 cents per kWh for power for the first 20 years of an offshore wind farm's operation. Vice Chancellor Philip Rösler has spoken of a desire to abolish the tariffs and environment minister Peter Altmaier has proposed lowering them.

"These messages create critical uncertainties for international investors," said Meyer. "We don't expect much investment to come in the next year until the federal election in autumn 2013, which will hopefully bring clarity on the future of feed-in tariffs."

The government's failure to get the policy framework right, given the country's ambitious goals for offshore wind, is something of a puzzle.

Politicians representing constituencies in northern Germany, where ports servicing the offshore sector are located, said colleagues from the south of failing to provide enough support.

Erwin Sellering, the prime minister of Mecklenburg-Vorpommern, has accused the federal consumer minister Ilse Aigner, who hails from Bavaria, of drawing on anti-northern bias to limit the amount consumers will pay to compensate developers for grid delays.



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18 which is set to share the same connection.

Developers have reacted with anger to the continued connection delays. Trianel declared last month that it would launch a legal claim against TenneT to recover losses incurred on its first-phase Borkum West 2 wind farm.

Windreich filed a lawsuit over the offshore connection due for its 210MW Deutsche Bucht wind farm, which is also suffering tendering delays.

This was subsequently dropped, however, after TenneT agreed to link the farm temporarily to BorWin2, which is scheduled for completion in 2014.

The German parliament is set to enact a new law on compensating developers for grid connection delays in the New Year. A fierce debate is raging about how the burden should be shared and developers are unsatisfied with a promise of only 90% of the electricity price they would have realised from a connected wind farm via feed-in tariffs.

The law proposes that



Waiting for a date: work is continuing on the much delayed HelWin1 offshore transformer platform, including provision of corrosion protection from Cathelco

Photo: Cathelco

concerned it will be unable to find insurance cover for its offshore compensation commitments without this change.

TenneT would also like its maximum compensation bill reduced and a greater share of costs to be passed on to consumers. Only then will it be able to attract the outside investment needed to avoid further havoc to the connection schedule, it argues.

RWE's Coffey warned that as the legislation stands, projects that have qualified for "unconditional grid connections" before a 31 August 2012 deadline will be entitled to new connection arrangements, including the added comfort of compensation in the event of delays.

Later projects, however, will have less certainty and avenues for recourse, he added.

compensation starts after the 11th day that a wind farm is fully operational without a grid connection.

Keeping a constructed project 'live' before a grid connection is made will require the use of back-up generators to power turbines and the internal hub station, an idea that Trianel has called "neither economically nor ecologically

useful". TenneT opposes a plan that will force it to provide up to €100m in compensation to each wind farm in cases where only minor negligence can be proved.

It has called for equality with the onshore delay law, where major negligence must be committed by a transmission operator for compensation to be payable. The company is

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Developers take on the challenge

More than 4GW of capacity is heading for commissioning in the North Sea by 2016

Construction is on the up in the German North Sea although teething problems and grid delays continue to push schedules towards the end of the decade at many sites.

A total of 4100MW of capacity is currently set to be built by 2016, including Bard's long-delayed Offshore 1 wind farm. More than 40 of 80 turbines are likely to be in at the project before the year-end with the developer indicating that weather conditions and high waves have hampered installation work some 101km from shore.

The wind farm is now due to be completed at the end of 2013 or beginning of 2014, a full two years behind the initial schedule.

Construction of Trianel's Borkum West 2 first phase has progressed with the first 19 Weserwind tripod foundations

installed on schedule by the middle of October. The full set of 40 foundations is on course to be in by the end of 2012 with the help of the SHL heavylift vessels Stanislav Yudin and Oleg Strashnov.

The first Areva 5MW turbine will be installed at the beginning of 2013 with Trianel expecting to wrap up work in the second quarter. A wait for the DolWin1 connection to be completed is then likely before the 200MW wind farm can go online in October 2013 at the earliest.

Coming online around the same time should be Windreich's 400MW Global Tech 1, despite starting foundations work later. The first tripod, produced by a WeserWind and EEW joint venture, was installed in August with the help of Hochtief and GeoSea vessel Innovation.

Windreich is confident that even the threatened insolvency



2013 start-up: the last of 30 monopile foundations was installed at EWE's 108MW Riffgat wind farm in September

Photo: EWE

of Nordseewerke, which has been contracted to fabricate half the 80 foundations, will not upset its schedule. The first of the farm's Areva 5MW turbines will be installed by Innovation next February with export

cabling completed in the autumn.

Global Tech 1 was to have connected to BorWin2 but at least 200MW is now expected to link temporarily through the BorWin1 platform,

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20 although maritime regulator BSH has yet to approve the plan. Global Tech will revert to BorWin2 once the grid hub is completed.

EWE will bring 108MW online in 2013 at its Riffgat wind farm after the last of 30 monopile foundations was planted during September. Export cabling is scheduled for spring 2013 after a transformer platform is delivered in February.

Siemens 3.6MW turbines will arrive in spring with the aim of commissioning in the third quarter of 2013.

WindMW's 288MW Meerwind is also due online in 2013 should a grid connection arrive in time. Work on the water started last month with the first three

Ambau foundations piled in with the help of the Seajacks vessel Zaratan. Siemens is providing 80 of its 3.6MW turbines.

RWE Innogy's 295MW Nordsee Ost will share a grid connection with Meerwind. The developer installed the first foundation in September using its in-house vessel Victoria Mathias. A set of 6MW Repower turbines will go up to coincide with the eventual grid connection at the project.

Vattenfall will try to bring the 288MW Dan Tysk online in early 2014 with Siemens 3.6MW turbines. Foundation work is scheduled to start in December 2012.

Windreich's 400MW MEG 1, again using the developer's

preferred 5MW Areva machines, is also due for a 2014 finish with foundation work starting in April 2013.

EnergieKontor's 110.7MW Nordergründe is pencilled in for completion in 2014. The project needs to tie up financing before construction can proceed, which is currently planned to start in the third quarter of 2013. Repower 6.15MW turbines have been lined up.

WPD is seeking financial close on Butendiek, where 288MW of Siemens 3.6MW turbines are tabled to go online in 2015.

A start to foundation installation in 2013 should see Eon's 288MW Amrumbank West and Dong's 277MW Borkum

Riffgrund 1 go live in the same year. Both farms will again feature Siemens 3.6MW hardware.

Windreich will wait until January 2014 to kick off foundation work for its 210MW Deutsche Bucht project but plans to have its usual Areva 5MW turbines set up and delivering power by 2015.

RWE has promised to make a decision in early 2013 on whether its 332MW Innogy Nordsee 1 will be built. Completion with 6.15MW Repower turbines is planned for 2016.

The second phase of 200MW at Trianel's Borkum West 2 project is also scheduled for a 2016 finish.

Smoother sailing in the Baltic Sea

Proponents of 19 offshore wind projects totalling more than 5000MW have applied for grid connections with Baltic Sea system operator 50Hertz, writes our Baltic correspondent.

Installed capacity could reach up to 3000MW in the next 10 years and, given TenneT's difficulties in the North Sea, there is a growing belief the region is a more favourable development option.

50Hertz completed its initial connection for EnBW's 50MW Baltic 1 wind farm in 2011. The second will be at the same company's 288MW Baltic 2, which will connect to the Baltic 1 offshore transformer platform via two 60km cables and then to shore at Bentwisch.

The transmission system operator is due to install the wires by next February.

Initial foundations at Baltic 2, a mix of monopiles and jackets, are due in this year. First power from 80 Siemens 3.6MW turbines is scheduled in 2013.

KNK Wind's 384MW Arcadis Ost 1 is due for start-up by the end of 2016. The output will be exported to shore via a 32km export wire.

Also on the 50Hertz radar are Iberdrola's 400MW Wikinger wind farm, Eon's 150MW Beta Baltic, and BEC Energie Consult's 155MW Adlergrund GAP.



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Rich subsidy comes with risks

First-round licence winners have a year to survey their sites, writes Lisa Louis

Generous feed-in tariffs designed to secure France's offshore wind revolution could spark resistance against the sector on the home front, it is feared.

Paris has a target of 6000MW of installed capacity by 2020

 with four licences totalling 2000MW already awarded and a further 1.4GW moving towards the tender stage.

However, megawatt-hour payments that could run to €200m put the country near the top of the European league in terms of state supports.

"French consumers are (currently) paying a renewable energy tax that is still relatively low," said Arnaud Prugnat, who is in charge of French offshore wind at Siemens. "But with a

feed-in tariff well above the international average, that subsidy will increase drastically once the first offshore wind farms are commissioned.

"This could cause a real acceptability problem for renewables," he warned.

Siemens joined forces with a GDF-led consortium to bid for the first round of French offshore for the up to 750MW Le Treport project but the government said their offer was too expensive and dropped the zone from the initial tender.

The German giant plans to be involved in the upcoming Round 1.5, which is due to be tendered later this year and includes a rerun at Le Treport and the 600MW Noirmoutier site. "We do believe in the future of the French offshore wind energy market but its development will fall short of government expectations," said

FRENCH OFFSHORE LINE-UP

Round 1

Project	MW	Developer	Capex
Courseulles, Normandy	450	EMF	€1.8bn
Fecamp, Normandy	498	EMF	€2bn
Saint-Brieuc, Brittany	500	Ailes Marines	€2bn
Saint-Nazaire, Brittany	500	EMF	€2bn

Round 1.5

Le Treport, Normandy	705	To be tendered
Noirmoutier, Vendee	600	To be tendered

Eolien Maritime France (EMF) comprises EDF, Dong, WPD and Alstom. Ailes Marines comprises Iberdrola, Areva, Eole-RES and Technip

Prugnat, who said there is now widespread market consensus that France will fail to reach its 6000MW goal.

Meanwhile, successful bidders from Round 1 have started taking to Atlantic and English Channel waters as they prepare pre-construction works.

Consortia led by EDF and Iberdrola have 12 months to complete geotechnical, geophysical and environmental studies. Two months later they will submit complete lists of

suppliers for their four projects to the government.

The Spanish company, working as Ailes Marines alongside partners Areva, Eole-RES and Technip, started seismic investigations at the site of the 500MW Saint-Brieuc wind farm off Brittany earlier this year.

Belgian company GeoSea completed geophysical work in September and geotechnical studies this month. Cone penetration tests were carried out at 11 planned

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22 locations. The contractor has been using survey vessel *Explorer* and self-elevating DP2 jack-up platform *Goliath*. Results from the investigations will inform foundation design at the 100-turbine project.

Consortium member Areva will supply 5MW turbines to Saint-Brieuc. The manufacturer has lined up Longvic-based Ceole to provide the towers. Jacket foundations will be produced by French companies STX or Eiffage, which hold preliminary contracts with Ailes Marines.

Contractor In Vivo is conducting environmental impact studies. The consultant will put together a list of fish species, mammals and birds present at the project site in co-operation with French research institute IFREMER. The survey will take up to two years.

The consortium has also erected a lidar met device at the Grand Lejon lighthouse near the project site. French contractor MeteOcean Consulting has been hired to carry out wave and tidal studies, which will kick off in the coming weeks.

The €2bn Saint-Brieuc wind farm is located 10km offshore. Construction work is due to kick off in 2017 and be finished by 2020. Waters at the site are up to 35 metres deep.

EDF-led consortium Eolien Maritime France, which includes Dong and WPD, is building three projects. The 480MW Saint-Nazaire wind farm off Brittany will cost €2bn and comprise 80 Alstom 6MW turbines, which will be erected in up to 32 metres of water.

EMF's two other developments, the 450MW Courseulles-sur-Mer and 498MW Fecamp, are situated in the English Channel. They will cost €1.8bn and €2bn, respectively, and include 75 and 83 Alstom 6MW turbines.

The wind farms are located between 10km and 14km off the coast. Waters are up to 20 metres deep. Installation works at all three offshore projects will start in 2017 and are due to be completed by 2019.

EMF is currently tendering geotechnical and geophysical

studies across the portfolio. The geophysical studies include hydrographic, geomagnetic and seismic surveys.

The successful bidder will carry out shallow penetration tests and samplings, deep penetration boreholes, and pre-investigation UXO clearance surveys. The studies will complete data being collected since 2007. The consortium has also been contracting out environmental studies to up to 20 different companies.

EMF is currently tendering for business and management consulting services. The consortium is looking for specialists in design, environmental, commercial and electronics.

Seismic investigations: Geosea vessel Goliath on site at Saint-Brieuc

Photo: Symorg



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Offshore Wind Projects



Grid operator RTE laying out connection strategy

French transmission system operator RTE has submitted technical and financial offers to EMF and Ailes Marines for the connection of their offshore wind farms. The developers have until next month to accept the bids.

The grid provider has also made initial contact with possible subsea cable suppliers. Half a dozen manufacturers have been invited to participate in a qualification process.

Interested players will provide a cable prototype for RTE to test. "We are hoping this will make it easier for us to pick the right candidate during the tender later on," said Eric Fournier, head of RTE's offshore division.

The company will start the bidding process by the end of

this year. Subsea cable production and the offshore installation works could be assigned either separately or to a single contractor. The tenders for onshore cables and transformer stations will be launched in 2014 or 2015.

A consultation period on the cable routes will open early next year. RTE will define corridors up to 500 metres wide for each power line and submit its plans to market participants, local fishermen, associations and politicians. Planning for each wind farm will be supervised by the relevant prefects.

RTE is hoping to get approval for the cable corridors by October 2013 and a go-ahead for the definitive routes in the first quarter of 2014. The utility

will then carry out environmental impact studies.

The company expects to obtain all the necessary construction permits and begin installation works by early 2016. The grid connections are scheduled to be up and running with half their capacity by 2018. The remainder will be completed one year later.

Connections will use 225kV AC cables between 40km and 60km long. The wind farm developers will have to foot the bill, which will amount to up to €200m per line.

RTE has a 15-strong offshore team that includes engineers and commercial personnel. The last subsea connection the French provider installed was a power line between France and England in the 1980s.

Timing mists shroud future tender rounds

The French government refuses to be drawn on a precise timeline for the country's promised future offshore wind licensing rounds.

"It is too early to give any additional information. We will do so in the coming months," said a spokesperson at the Ministry of Ecology.

Two months have elapsed since a second tender, dubbed Round 1.5 by industry players, was announced and bidding criteria have yet to be published. A third tender with a maximum capacity of 3000MW is planned for the second half of 2013.

Market participants are becoming increasingly impatient and openly question whether France will be able to stick to its target of 6000MW of installed offshore capacity by 2020.

"It takes us several years to go through the administrative process before we can even begin constructing our offshore wind farms," one developer said. "The government really needs to get on with it."

Round 1.5 includes the 600MW Noirmoutier project situated about 15km off the Atlantic coast where waters are up to 35 metres deep. The tender also includes the 705MW Le Tréport wind farm 15km off the coast in the English Channel with water depths of up to 25 metres.

Developers such as French energy giant GDF, which missed out on Round 1, as well as established players including Vattenfall and Mainstream are expected to participate in future rounds.

Possible alliances have yet to emerge with one developer suggesting formal arrangements will wait for the official bidding criteria to be published.

However, at least one, the EDF-led EMF consortium, appears content to stick with its current line-up. "Never change a winning team," said Frederic Hendrick of group member Alstom.

Photo: Alstom



6MW Haliade turbine earning its spurs

Alstom, which is supplying turbines for EMF's three projects, is currently putting its new 6MW Haliade turbine through its paces at the Carnet onshore test site in Loire-Atlantique (pictured).

"So far reality has been in line with our simulations. We have only encountered some minor problems and were able to iron them out by changing a couple of technical parameters," said Alstom

offshore wind vice president Frederic Hendrick.

"Our turbine has already produced 5MW of energy and we are now hoping for some bad weather in order to reach the maximum power of 6MW," he added. Once the maximum capacity is reached, certification of the turbine will take another year.

Offshore trials of the Haliade 150 in Belgian waters have been delayed by several months and

are now expected to begin early next year.

Alstom is still waiting for the foundation to be delivered by lemant, which took on the order after parent company Smulders went into administration, and faced delays as a result.

The turbine constructor plans to kick off pre-serial production of Haliade by the end of 2013 or early 2014. Serial production is expected in 2014.

Industrial revolution on French coastline

Turbine manufacturers planning supply chain hubs to service coming build phase

French harbours and suppliers are gearing up to serve the country's nascent offshore wind market. The ports of Le Havre, Saint-Nazaire and Cherbourg will host parts of the supply chain with others competing to get a slice of the action.

Turbine manufacturer Areva has opened an offshore wind office in Le Havre with a team of four people. It has already found French suppliers for three quarters of its components and continues to meet with companies in the pursuit of 100% local content.

Areva will lease 60 hectares in Le Havre and build blade and nacelle factories. At least 700 direct jobs will be created.

The harbour authorities are currently testing the soil and will start upgrading the land and quay by 2014. The factories will be built from 2015 on with serial production kicking off in 2016.

Areva plans to produce 100 of its 5MW turbines per year at the complex. The units will be trialled at a test bench for 2.5 days each.

"Testing of our production turbines provides not only full quality to our customers, it saves time during installation at sea because some commissioning is already done at the plant," said Philipp Kavafyan, director of Areva Wind in France.

The company intends to supply turbines with a total capacity of 12GW from its new factories. In addition to the

French market, Areva is eyeing projects in the south of England and Belgium.

EDF has reserved 30 hectares for a turbine foundation factory in Le Havre although a supplier remains to be appointed. The harbour will start preparing the site in the second half of next year when the energy company will apply for a building permit.

STX will supply jacket foundations for Areva from its factory in Saint-Nazaire. The French fabricator is also considering entering the market for monopile and gravity foundations. STX could supply transition pieces, transformer stations and installation vessels.

Alstom has applied for a construction permit for nacelle and generator factories in Montoir-de-Bretagne next to Saint-Nazaire. Construction works will kick off in the coming weeks and be finished in 12 months. Up to 300 direct jobs will be created.

The harbour town has put together the bidding criteria for a new 350-metre quay next to the nacelle factory. The €40m tender will be launched in January and the planned facility will be suitable for loads of up to 400 tonnes.

Saint-Nazaire has closed a €15m deal with two companies to relocate an existing floating pontoon to free up space for the new quay. Work commences in January.

The harbour has cleared 14 hectares to accommodate Alstom's factories in a €20m operation. Two other sites of 20



Permit request: the Montoir-de-Bretagne site close to Saint-Nazaire, where Alstom will be building turbine plants to serve the French offshore wind sector

Photo: Andre Bocquel

and 12 hectares are available for the offshore wind industry. The city has invested €10m in the latter, which could host an offshore hub.

Longvic-based CEOLE is lined up to provide the Areva towers. The company is likely to construct a new plant somewhere on the French coast.

The port of Cherbourg will host two Alstom suppliers. LM Wind will produce blades and another company, still to be designated, will assemble turbine towers. The plants will

be finished by 2015. GE Power Conversion is lined up to provide the generators and converters for the turbines.

Cherbourg's 220-metre Quay des Flamands will be extended to 580 metres. Vinci subsidiary Soletanche Bachy will make the quay suitable to tackle loads of up to 15 tonnes per square metre. Work kicks off early next year.

French metal constructor Eiffage and Dutch group Smulders are talking about constructing tower and foundation plants in Cherbourg or Brest. "But

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FRENCH PORTS OF CALL

Port	Tenant	Activity
Brest	Seeking tenants for 40 hectares of port facilities	
Cherbourg	Alstom	Towers
	LM Wind	Blades for Alstom
Dunkirk	Seeking tenants for 15 hectares of port facilities	
Le Havre	Areva	Blades and nacelles
	EDF contractor	Foundations
Saint-Nazaire	Alstom	Nacelles and generators
	STX	Foundations

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25 we will only do so if we receive orders for at least 250 jacket foundations and 350 towers over the next five years," said Eiffage's Arnaud Devillepin. He added that the companies are in negotiations with both French licence winners.

Dunkirk harbour is also gearing up for the French offshore sector, in addition to positioning itself for projects on the UK east coast. Facilities include a 300-metre quay and an adjacent 15-hectare area.

Other home-team companies eyeing the offshore wind market include Louis Dreyfus Armateurs, which could provide transport, cable installation and maintenance services with one of its vessels.

The logistics outfit is also offering to help design and operate a jack-up vessel suitable for the offshore wind sector.

Cable supplier Nexans is positioned to supply and install inter-array and export cables. The company is in touch with EDF, Iberdrola, Dong, GDF and RTE about possible future tenders.

InControl lives up to its name off Belgium

Belgian offshore pioneer InControl is aiming to start full-blown development work on the 165MW Belwind 2 next January.

The second-phase project has been waiting in the wings for several years. Its emerging schedule is partly driven by the opportunity to stagger construction with the developer's 216MW Northwind, which is due for completion in the summer of 2014.

InControl director Frank Coenen said: "Giving timelines is always risky since these are huge investments but we are provisionally aiming for financial close on Belwind 2 around January or February of 2014."

This would allow construction to begin towards the end of

Developer is taking a hybrid contracting approach at Northwind as it starts clock on Belwind 2, writes **Will Wachtmeister**

that year. The project has an added economic challenge. Under Belgium's current support system, transmission system operator Elia has to purchase green power certificates at €107 per MWh from an offshore wind farm's first 216MW but beyond that it falls to €90.

This means 114MW of Belwind 2, which will join the operational 165MW Belwind 1 in the same permitting zone, will fall in the lower support price category.

The Northwind site, which is expected to enter construction next April, will eventually feature a cable tie-in with Belwind 2 to create added export redundancy, Coenen said.

InControl put together its

team for Northwind this summer using what it called the "contract novation" approach, a hybrid of pure multi-contracting and engineering, procurement, commissioning and installation models.

The company selected and negotiated the project's sub-contractor structure, which is typically handled by the EPCI contractor.

InControl negotiated 16 supply, installation and construction packages with suppliers and then brought together and reformatted, or "novated", the contracts into six bankable packages.

Coenen said: "Our approach is to be in control of a project through the



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26 entire lifecycle on behalf of investors and banks. We have experts in development, engineering, contracting, financing, construction and operation, and our greatest quality is to be able to manage all these phases in a consolidated, and therefore risk-controlled, manner.”

The outcome was a €900m project, €750m of which is for hardware and installation. The remaining costs are development, insurance, construction financing as well as bank and advisor fees.

Vestas will supply and install 72 V112 3MW turbines. GeoSea is handling supply and installation of foundations and inter-array cables. Jan De Nul will dredge and install the Nexans-supplied export cable while a Bladt-Semco-CG partnership will supply and install the offshore substation.

Coenen said he believes that technological innovation being developed in the current generation of projects will drive future cost reductions. “Just look at the V112 compared with the V90. That’s a 15% output improvement,” he said.

Northwind will use GeoSea and Hochtief next-generation installation vessel Innovation. Coenen warned, however, that supply chain constraints and lack of competition in the cable and offshore transmission sector remain a worry for developers.

“There have been huge improvements in the engineering of wind turbines and in the availability and capabilities of wind installation vessels but there has been far less progress in grid and cabling,” he said.

Parkwind, the Colruyt-backed offshore wind investment holding company, recently took a stake in InControl, which means the developer now has direct access to equity financing.

InControl’s approach is clearly tailored to Belgium, a market typified by project finance and limited involvement by utilities, but the company could soon be broadening its horizons. Coenen said several proponents from around the world have contacted the company looking for support.

Giant strides at Thorntonbank 2

Installation progress at the Thorntonbank 2 wind farm off Belgium surpassed even the project team’s raised expectations this year.

A total of 30 Repower 6M turbines went in from March to August, six more than originally planned. The 6.15MW machines, currently the largest in the world, are expected to be fully commissioned by mid-November.

“In terms of construction this was our most important year because a lot of things had to come together,” said developer C-Power chief executive Jaak Rutten (pictured).

Thorntonbank’s second phase also consisted of the installation of 48 jacket foundations, a second export cable and the offshore substation.

The export wire from the project’s 30MW first phase, which had run straight to landfall, was also re-installed in a delicate operation to connect it into the transformer station.

“We’ve completed this year’s work well ahead of time and have also done very well in terms of safety,” Rutten said.

The third phase comprises 18 Repower 6Ms with installation starting early next March with an expected finish before the summer.

The project will again use DEME’s newbuild installation vessel Neptune, which performed well on its debut at phase two this year. “In good weather the Neptune could load up a turbine in Oostende, sail out, install and come back in two and a half days,” said Rutten.

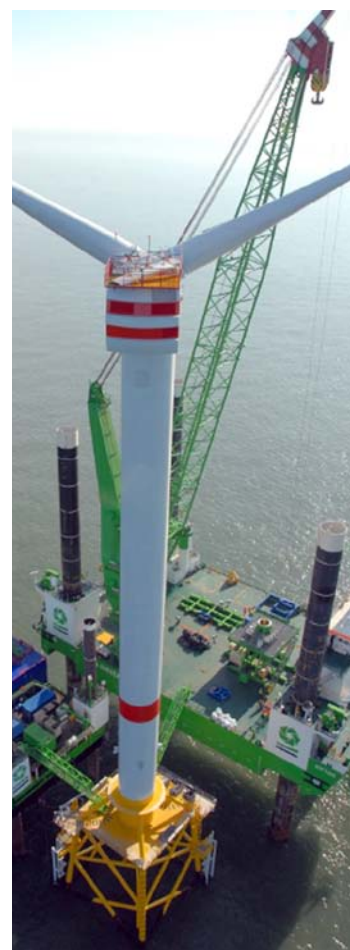
He defended the significant contingency buffer between phase two, where the last turbine was installed in early August, and next-year’s phase three. There could be a gap of six months before the next

round of installation starts. “Although we’ve finished early we deliberately decided not to build between October and March because of weather downtime risks and we also wanted a spare period for unexpected problems.”

Another reason is the financing set-up, which foresees revenues from phase two before construction spending on phase three starts.

“We saw that we could go quicker (by adding six turbines) but it was also a matter of aligning the tempo of component supply. We also had to be sure that all sub-contractors were OK with it.”

Thorntonbank has three main contractors. DEME is responsible for the production of the jacket foundations and all offshore installation, Repower is supplying the turbines and ABB manufactured the cables and transformer station.



Fast-mover: the 184.5MW Thorntonbank 2 Photos: C-Power



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Shared Belgian grid to cap costs

The next generation of Belgian offshore wind will come to fruition under a new subsidy system and will be built with shared offshore transmission infrastructure.

The timing of the up to 450MW Norther and the Otary consortium's Rentel, Seastar and Mermaid projects depends heavily on the offshore and onshore reinforcement initiatives being pursued by grid operator Elia.

The company last year gained the legal competence to develop an offshore network and the next wave of wind farms are expected to stagger construction from 2015 or 2016 onwards.

At the same time, a compromise worked out with Belgium's large industrial power consumers, which complained that the current system was eroding national competitiveness, will see support payments adjusted for projects after Belwind 2, C-Power and Northwind.

The new values will reflect the savings to be realised by

using more innovative technology and those generated by Elia's planned offshore network, which could include one or two shared offshore substations.

Frank Coenen, who is on the executive committee of the Federation of Belgian Offshore Electricity Producers, said he is feeling relaxed about the new regime.

"The Belgian support system does allow stable and profitable business but there isn't a massive amount of money to be made here," he said.

"One of the key drivers for Belgium is the need to create new production capacity in the national electricity system as well as environmental concerns. That these investments and the technology to be developed create important employment is not in the forefront of the Belgian agenda.

"Other countries, like France, have enough electricity production capacity (and) in these countries employment and environmental concerns are the main drivers," he said.

Financing slog to concertina Gemini build

Developer Typhoon Capital mulls faster construction pace at 600MW Netherlands wind farm, writes Will Wachtmeister

Typhoon Capital has drawn up a contingency plan that could push back and intensify the construction schedule at its 600MW Gemini wind farm.

The Netherlands project, which will feature 150 Siemens turbines at the new configuration of 4MW, is heading for financial close early next year, well beyond the previous target of summer 2012.

Instead of three six-month installation periods in 2013,

2014 and 2015, the developer is now mulling two more intensive six-month phases in 2014 and 2015. The staged timetable is required due to environmental restrictions prohibiting underwater installation noise in the first half of the year.

Typhoon is trying to secure €2.6bn in financing for the wind farm and continues to talk with potential investors and credit agencies. The exercise could be eased by a €500m loan from the European Investment Bank.

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28 Van Oord has narrowed tendering to around two bidders per package, sources said. Some of the potential participants are understood to be from South Korea, where Typhoon has actively sought out better lead times and bigger capacity from potential export-oriented suppliers.

Typhoon is meanwhile looking to build on its Dutch experience with participation in the UK and German sectors. The company said it plans to take stakes next year in consented North Sea projects to bring them to financial close, followed by full or substantial exit.

Talks with developers in both jurisdictions have already begun. "We have looked at the new (Dutch) government programme and our conclusion is that there won't be any new offshore wind projects in the near future, certainly not next year," a Typhoon spokesman said.

The incoming government has raised renewable energy targets to 16%, he noted, but an imminent offshore rollout has not been secured.

RWE lays table for 300MW demo

RWE is poised to play a leading role in Dutch government plans to develop a 300MW demonstrator to boost cost-reduction efforts. The German utility is offering up its Tromp offshore wind concession for the initiative.

Dutch industry representatives and RWE are working with officials at the economic affairs ministry to create a "plan of approach". The new government, which took office last month, could approve the plans next year, although other potential sites remain in the hunt.

RWE, Van Oord and research institute ECN have already installed a met mast and carried out seabed investigations with promising results at Tromp.

RWE Benelux offshore wind development manager Laut van Seventer said the utility wants to help kick-start the Dutch sector and contribute to ambitions to reduce costs by 40%.

The demo should serve as a starting point for government to support other projects in the Dutch North Sea, he said,

although what technologies will be on show remains to be seen.

"We want to define a process in which we can encourage as many supply chain players (as we can) to participate."

The Dutch government is likely to back further roll-out of commercial offshore wind once significant cuts in costs have been secured. A major policy review is scheduled for 2015.

Current costs are around €170 per MWh, mainly because the export cable infrastructure is not socialised and therefore falls within a typical project's budget, van Seventer said. "It seems that the tone in the new government programme is much more positive towards the offshore wind industry.

"I don't think we'll see a large roll-out but it says that the government is serious about reaching cost reductions so I believe there will be room for investment that combines innovation and new offshore wind farms," he added.

Aside from Gemini and the demonstrator, the only other

active project in the Netherlands is Eneco's 129MW Luchterduinen. The need for additional permitting delayed progress earlier this year. The farm is currently scheduled to enter construction in July 2014 and go live in the summer of 2015.

The chances of achieving 6000MW by 2020, still an official government target, are widely doubted. Transmission operator TenneT has publicly warned that the goal is beyond reach due to grid technology constraints and procurement lead times.

National wind energy association NWEA blamed the previous government for decision-making delays, which led to higher costs and "insurmountable" problems.

"Politicians have to finally take their responsibility and do it now," said NWEA director Ton Hirdes. "An acceleration in decision-making is possible and that makes a quick restart to offshore wind possible. It's a question of political will."



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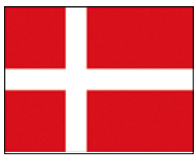
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Denmark's orderly march towards increasing offshore wind capacity has been disrupted by new government timetables that delay parts of a planned 1500MW build in the years to 2020.

Political parties agreed this week to put off initial connection at the 600MW



Kriegers Flak project in the Baltic Sea by a year to 2018 while

near-shore schemes will also be delayed by 12 months to no sooner than January 2017. The 400MW Horns Rev 3 remains on the menu for 2017.

The national wind industry association has welcomed the certainty but believes the delays come at the wrong time, particularly given the difficulties of larger markets such as the UK and Germany and the opportunity to capitalise on subsequent looseness in the supply chain.

Transmission operator Energinet.dk is carrying out

Danes dragging their feet near and far...

Government delays offshore timetables in years to 2020, writes Todd Westbrook

environmental work in preparation for the wind farms as per the original schedule dictated by government in March.

The company is responsible under the Danish system for overall environmental impact assessment of the projects as well as the grid connection out to and including the substations.

Tenders for the wind farms were originally due to be issued next year for award no later than 2015 with Horns Rev 3 emerging first from the process.

Construction was to have kicked off in 2017 with full power required ahead of 2020 as part of Danish efforts to produce 50% of electricity from

wind by that date. Exact rules for the offshore tenders remain uncertain.

Government officials are working to bring down the costs of future projects compared with the under-construction 400MW Anholt site where Dong was the only bidder and supports are 105.1 ore per megawatt-hour.

Energinet.dk completed initial geophysical surveys on the next generation of projects this year. UK company Gems Survey carried out the work using specialist vessel MV Aquarius.

Initial results at the roughly 250-square-kilometre Kriegers Flak site in the Baltic and the smaller Horns Rev 3 in the North Sea identified no immediate show-stoppers. A tender will be launched over

the winter for geotechnical work at both sites, which will be conducted next year.

The third round of development at Horns Rev, off the west coast of Jutland close to Esbjerg, will feature a simple radial connection to shore.

Kriegers Flak's grid link, on the other hand, is being planned as part of a European-funded interconnection effort that is expected to stitch together the Danish and German networks through what amounts to a Baltic-based forerunner of an offshore supergrid.

The joint Energinet.dk and 50Hertz HVDC network will feature an offshore converter substation taking AC power from Kriegers Flak and EnBW's 288MW Baltic 2 wind farm with additional links to the German company's operational Baltic 1.

DC transmission wires will then run both to Germany and Denmark. Sweden could also join at a later date.



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Plenty of takers for near-shore projects

The Danish government is in talks with local authorities around the coastline about hosting near-shore wind farms totalling 500MW.

Copenhagen officials are speaking with eight different localities that have expressed an interest in having projects of no more than 200MW each built in waters within 20km of shore.

The appetite is very high, sources indicated, even in areas where tourism is a key element of the summer economy. "Yes, some of these are popular beach areas but the municipalities feel they must do something for year-round residents as well," said one.

Zones in the running include three off the west coast of Jutland, one off north-east Jutland, three to the west of

Zealand and one off Bornholm in the Baltic Sea; 16 areas were originally identified.

The government's energy plan calls for the near-shore wind farms to be up and running by 2020. A funding mechanism is expected to be detailed shortly, along with a refined shortlist.

Dong's long-planned demonstrator at a near-shore site off Frederikshavn featuring Vestas hardware remains on the menu, although it is unlikely this will take place as planned next year.

A spokesperson said the two companies "are working closely together to demonstrate the V164 at Frederikshavn" but would not be drawn on exact timing for deployment of the 8MW turbine.

Dong delivers the goods at 400MW Anholt

Dong Energy is on track to complete the 400MW Anholt wind farm off north-east Jutland in autumn 2013.

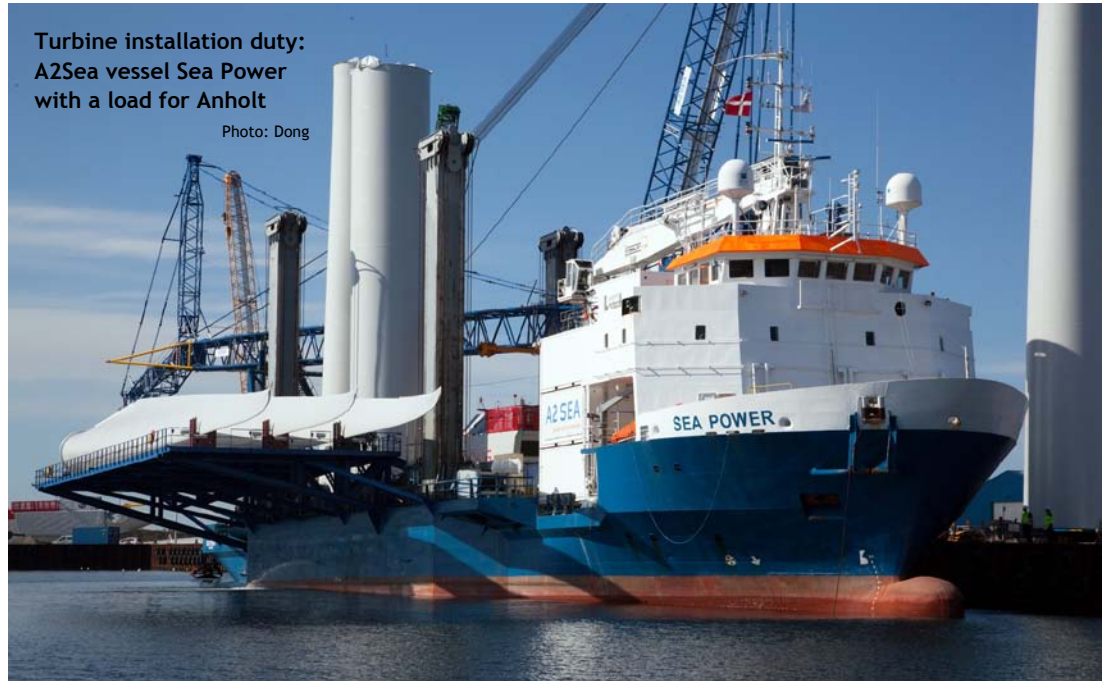
The company had installed 10 complete Siemens 3.6MW turbines at last count with five already connected to the grid and producing power.

A total of 111 machines will eventually be installed at the wind farm with 30 scheduled to go up before the end of this year and all turbines due in place by May 2013.

Commissioning will run through summer ahead of full operation next autumn.

“The... weather has been tough and forced us to intensify the work onshore rather than offshore but we are still within schedule as we are with budget,” said Dong.

Anholt’s capex is expected to be just shy of Dkr10bn. PKA and PensionDanmark are understood to have paid roughly Dkr6bn for



Turbine installation duty: A2Sea vessel Sea Power with a load for Anholt

Photo: Dong

their 50% share in the project with the cost to Dong of its 50% stake depending directly on the bill for its construction programme.

A2Sea vessel Sea Power has been tackling turbine installation at Anholt and will be joined by Sea Worker at the beginning of December. A third A2Sea vessel, Sea Jack, is

expected to report for duty early in the New Year.

Ballast Nedam vessel Svanen installed Blatt-built monopiles with Jumbo Offshore handling the transition pieces, again built by the Danish supplier under its framework agreement with Dong. Nexans supplied 160km of 34kV infield wires, which were installed by VSMC.

Energinet.dk was responsible for the substation as well as the 28km export cable to shore at the Djursland port of Grenaa.

The 245kV wire was fabricated by NKT while Blatt built the substation topsides and a joint venture of Pihl & Sons and Zublin supplied an innovative steel jacket featuring a concrete caisson.



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Milestone: Karehamn's gravity base foundations head out Photo: Eon

Eon puts Sweden back in the game

Foundations all in at new project after long hiatus, writes Will Wachtmeister

Eon Sverige has completed foundation installation at the 48MW Karehamn wind farm, a milestone in the country's tentative return to the offshore sector following a four-year absence.

The project is entering a construction lull lasting to next March when contractor Baltic Offshore will start work on a 20km offshore export cable.

Installation of 16 Vestas 3MW V112 turbines is scheduled to begin in May using MPI jack-up Discovery.

Karehamn proves that profitable projects can be built under the Swedish subsidy regime, said a spokesman for the developer, but he cautioned against concluding that others could follow.

"Karehamn shows that if you find the right location with the right conditions you can move ahead with your project. But let me underline Karehamn... can be regarded as an exception," he said.

"In a very general way, we don't see the absolute need for any specific policy changes. But to support the Swedish offshore business and drive projects forward we would like to discuss a joint political will and common political framework."

Eon has started investigating conditions at its Sodra Midsjobanken site, which could accommodate 300 turbines towards the end of the decade.

The surveying is being carried out by an innovative tripile jack-up 'mobile met mast' based on a design by Marcon Wind Power that can be moved around the site. Eon's up to 90MW Utgrundet II project remains parked, the spokesman added.

Elsewhere, Vattenfall could take a final investment decision next year on a unique repowering project at Sweden's Yttre Stengrund offshore wind farm.

The utility said it is actively investigating ways to swap out the five existing NEG Micon 2MW turbines and replace them with modern machines.

"Assuming the project gets the all clear to move forward with procurement and it is shown to be profitable, Vattenfall's management will be able to take an investment decision in 2013 at the earliest," a spokesperson said.

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Powering the future

Innovation 'worth helping hand from Swedish grid'

Developers including WPD argue that the deployment of new cost-saving techniques and a change to Sweden's grid regime would allow them to build their projects.

The German company is moving up a gear at the fully consented 265MW Storgrundet site in the northern Baltic, which it has been developing since 2005.

Soil sampling and cone penetration tests were carried out this summer in the hope central government would offer specific support for offshore wind in the near future.

The tests showed, among other things, that gravity-base foundations are feasible but the project holds the promise of innovation and cost-cutting across the board if and when it reaches construction.

WPD director Charlotte Bergqvist said: "We can see ourselves realising our project within the (Swedish) electricity

certificate framework as long as the grid connection is kept outside the project's budget and is instead considered part of the main network."

This is a reasonable approach, she said, considering what neighbouring countries Denmark and Germany are doing. "Nor is it unreasonable when you consider the development of other networks in Sweden.

"For example the Gotland Cable, which will move onshore wind power from Gotland to the mainland, is financed collectively through (transmission system operator) Svenska Kraftnat."

WPD's hopes of building Storgrundet were boosted this autumn when the government said it expects the project to be included in Svenska Kraftnat's planning for network investments.

As matters stand, however, the wind farm will not reach the construction stage. Sweden's electricity certificate

FUTURE PROJECT PIPELINE

Project	MW	Developer
Finngrundan	1110	WPD
Kattegatt Offshore	282	Favonius
Kriegers Flak	640	Vattenfall
Sodra Midsjobanken	700	Eon
Stora Middelgrundan	864	Universal Wind
Storgrundet	265	WPD
Taggen	300	Vattenfall/Hanobukten
Trolleboda	150	Vattenfall
Utgrundan 2	90	Eon

system, which is technology neutral, ensures that the cheapest projects are built first. "It's a healthy system but doesn't drive the development of environmental technology," Bergqvist said.

"The system does not give Swedish players the potential to establish themselves in offshore wind energy with concepts developed on the home market for later export."

Sweden has the potential to achieve something big by developing offshore wind technologies designed specifically for projects like Storgrundet in the calmer

waters of inland seas like the Baltic, Bergqvist said.

The approach offers savings of around 30% compared to North Sea technology and can also be exported to other relatively calm European waters, she said.

However, the Swedish government's September budget lacked any support measures for the offshore wind industry.

Bergqvist said the innovation message will eventually hit home. "We believe that we will find ways both to influence the politicians or make the projects fly in other ways."



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Norway's domestic offshore wind market has been holed by low energy prices and the country's technology-neutral green certificate scheme.

That has left local players largely focused on exporting expertise, particularly in the floating wind sector.

Statoil is leading that charge and remains on a twin-track



path towards deployment of a second-generation Hywind system off

either Scotland or the US state of Maine.

The company is targeting a final investment decision on a four or five-unit array around 2014, which would put deployment on track for 2016.

An original timeline to decide on a specific location for the project this year has

Technology exports keep hopes afloat for Norwegian wind

drifted. Scotland, where Statoil is eyeing a site off the coast of Aberdeenshire, is offering specific incentives to experimental wind through a new Renewables Obligation band. Consultation on the proposal kicks off later this year.

The Norwegian company lobbied for just such support, touting "substantial opportunities and benefits" and calling for RO certificates at "the same level that will be offered to marine technologies".

Maine is making a state-level push to attract Hywind and other floating developers

through a broad-based initiative that includes a power purchase agreement offer from the state's public utilities commission.

The federal government is also on the move and has already progressed Statoil's unsolicited application for Hywind 2. A comment period that just ended attracted no competing requests for the project site 19 kilometres off Booth Bay in around 100 metres of water.

Feedback from the public was largely centred on potential impacts on fishing and wildlife.

The next-generation Hywind

platforms will feature turbines larger than the original Siemens 2.3MW unit with blades of up to 60 metres. The floating spar foundation is also evolving and will extend just 80 metres beneath the surface rather than 100 metres. Unit costs are expected to come down significantly.

Norwegian company Sway, meanwhile, relaunched its floating one-sixth-scale demonstration device in May off the west coast following damage to the unit during storms in late 2011. The company is working towards a 2.6MW full-scale deployment.

Officials from the US National Renewable Energy Laboratory in Colorado installed scientific wind, wave and motion measurement equipment on the prototype in June as part of ongoing testing of the device.

Separate company

35

Project trial run to fill in picture for Finns

The Finnish government is preparing to subsidise a single project in 2015 in order to demonstrate the feasibility of the technology at scale.

Offshore wind in the country has to date been confined to a



single Siemens 2.3MW turbine off Pori and the

30MW Kemi Ajos near-shore project. The government wants to explore bigger installations with an eye to setting appropriate feed-in tariffs for the sector, it is understood.

A bidding process for an

around €20m pot is expected next year following government deliberation through the winter.

Finland currently offers a fixed tariff for wind of all stripes, which according to the national wind energy association, "is not high enough for offshore projects".

Some 16 developments totalling roughly 3000MW are nevertheless making their way through the environmental assessment process.

Development companies involved include home-town players PVO Innopower, Suomen Hyotytuuli and Suomen

Meritullis as well as Germany's WPD.

The Finnish Baltic was identified in a study earlier this year as having a resource of up to 84GW, although much of that raw potential will be restricted by onshore concerns including tourism and amenity.


"The Turku archipelago is included as a potential area for offshore wind (in the study)," said wind association managing director Anni Mikkonen.

"The area is so precious to Finns that at least at the moment I would think it is highly unlikely that one could get permits for huge capacity of

offshore wind there. Some projects could fit in nicely, at least in my opinion, but probably not the amount of capacity that was estimated in the report."


Finnish turbine manufacturer WinWind meanwhile had a difficult 2012 with the company's Swedish arm going into bankruptcy in large part due to difficulties with 3MW units at the 10-turbine Vanern freshwater wind farm.

The parent company, which is itself owned by Indian player Siva Group, experienced working capital issues due to a lack of orders.



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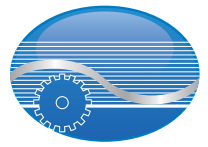
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Sway floating demonstrator: prototype first step towards a 2.6MW full-scale deployment

Photo: Sway

34 Sway Turbine has meanwhile taken the wraps off plans for a 10MW offshore turbine. The ST10 will feature a large diameter permanent magnet ring

generator with each blade mounted on an A-frame support straddling the spoke-style generator. "The outer rim of the generator is connected to the blade support structure,

providing the means of transferring torque between the turbine rotor and the generator," said Sway.

Work appears to have stalled completely at the seabed-

mounted 350MW Havsul project off the west coast, where Vestavind holds the country's only commercial-scale wind farm permit.

An all-in-one foundation and turbine installation methodology was developed to help cut costs but contracts expected in the second half of this year have not materialised.

Vestavind has been courting the oil and gas industry in search of a partner for the wind farm, which was originally due to go live around 2017-18 but has now been put off until the end of the decade.

The developer was also recently awarded a licence for its Lutelandet project in Sogn and Fjordane, again on the west coast. The island development includes a 45MW onshore wind farm and space for a trio of offshore test units totalling up to 10MW.

Statoil is a 50% silent partner in the project, which also features a proposed industrial facility with a deep-water quay and large drydock that can serve the oil and gas and renewables markets.

Worth the wait in Poland

A Polish offshore wind sector loaded with promise is likely to remain in limbo until the end of the decade due to grid

constraints and regulatory issues. A

2020 target of 500MW appears achievable, however.

Sources active in the country's Baltic waters said a licensing mechanism is advancing for blocks already identified near the maritime border with Germany, along the maritime border with Sweden, and off Ustka and Leba along the north-central coast.

Polish utility PGE has been awarded exclusive rights on a trio of blocks while other European players, including Iberdrola, have also been tempted by Poland's relatively shallow and resource-rich Baltic acreage.

Those holding or seeking blocks must still acquire environmental and construction

permits before moving ahead with projects, according to a government source. Support mechanisms for the sector remain a work in progress.

PGE has reportedly already secured grid access for a pair of its wind farms around 2019, which sources said is indicative of timelines across the sector. AOS, Energoprojekt and Eltel are working towards establishment of an offshore grid to accommodate future projects.

Polish industry is keen for the offshore sector to progress, according to EU-funded initiative South Baltic Offshore. "Development of offshore wind energy constitutes an attractive alternative to the traditional specialisation of the Polish shipyard industry," it said.

"Improvement of the conditions for offshore wind investments may become a catalyst both for the sector itself as well as for the shipyard industry and co-operating industries."

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Large-scale development hits the buffers in Iberia

Fiscal austerity has choked off utility-scale offshore ambitions in Spain and Portugal, limiting activity in the sector to the realm of technological innovation.

The region's entire



renewables sector has been crippled by deficit



reduction measures that have caused a once-

buoyant onshore industry to screech to a halt.

Set against this backdrop, the several gigawatts of commercial projects once mooted in Spain's few shallow waters now appear little more than a pipedream.

Portugal, for its part, never truly began a formal process for commercial development and

Only test sites and demonstrator projects are left standing, writes Seb Kennedy

this does not appear likely to change for the foreseeable future.

Amid the ensuing industrial decline, Spanish and Portuguese offshore R&D projects are looking to tap the European Commission for funding, with mixed fortunes.

Portugal has fared better than its neighbour thanks to successful at-sea trials of a floating Vestas V80 turbine on board a demonstration unit of the WindFloat structure. The system will be assessed for another six or 12 months at the Aguçadoura test site.

Principle Power and partner EDP are now looking towards a phased 27MW array of floating machines some 14km off Portugal's Atlantic coast. The project was ranked among the

leading bids in the EC's NER300 funding competition.

The application envisages a first phase of two 3MW offshore turbines each atop a WindFloat triangular support structure, followed later by a further three 7MW turbines on the novel foundations. The turbines will be connected in an array through 'dynamic cables' and to an onshore substation through a 30km-long medium voltage main cable.

The WindFloat array is one of three top-rated Portuguese NER300 schemes supported by Lisbon. A final decision from the EC is due in late November and contract awards will follow in 2013. Projects will have four years to get up and running.

Spain's leading offshore project is the Zefir test station



Leading bidder in the NER300 funding competition: the Windfloat demo off Portugal

Photo: Principle Power

off the coast of Tarragona, which passed the first phase of technical due diligence in March in its hunt for €30m of support but did not feature on the NER300 shortlist.

This may not be a deal breaker, however, as NER300 funds were intended only for the scheme's 30MW deep-water floating second phase.

The latest schedule

37



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36 could see construction begin in April for a seabed-anchored first phase of 20MW in shallower waters, powering up in September 2013.

Project sponsors include Alstom, Gamesa, Acciona, EDP, Elecnor, Siemens and Prysmian, and backers are said to have "earmarked" €230m to cover both stages of Zefir.

Gamesa, for its part, remains committed to the offshore sector but timeframes are slipping for the maiden appearance of its 5.5MW G128 turbine prototype.

A mooted 2013 installation at Arinaga Quay in Gran Canaria looks likely to fall into early 2014 while commercial roll-out of the machine before the end of that year is considered by some to be optimistic.

Gamesa said it is "adjusting investment to market trends" and will pursue 7MW and 8MW platforms "in the medium to long term".

The company is yet to commit to a planned offshore manufacturing supply chain in Scotland to service the UK market.

WPD adding to Italian stable despite terrain

German developer WPD is planning to move forward with a pair of new wind farms off Italy even though market conditions make construction of any project unlikely before 2016.



Details will be unveiled in the New Year but the projects will join a WPD portfolio that already includes the 324MW Margherita wind farm off Manfredonia, which is currently being assessed by government ministries.

Other developers are active off Italy including Seva, which applied earlier this year for a pair of wind farms off Bari totalling 402MW and 126MW.

Rome introduced a feed-in tariff this year for offshore wind that ranges between €165 and €175 per megawatt-hour. As only fully consented projects can apply, however, no one is expected to qualify before the 2015 deadline.

Projects in Italy must be assessed by as many as 40

different bodies including the Ministry of Cultural Heritage, which according to Italian sources has been critical of offshore wind to date.

Transmission is also an issue with the priority currently given to renewable energy projects expected to be reversed by government in the near future.

The country included an offshore wind target in its national renewable action plan of 680MW and to date a total of more than 1GW of projects have started development.

"It's important to get that first wind farm up and running to show everybody that this sector can work," said one developer source. "The second project will then come much more quickly."

Elsewhere in the Mediterranean, Greek developer RF Energy was given approval in the summer to build a 498MW wind farm off the island of Lemnos in the Aegean Sea.

The €2bn project will comprise 81 Repower 6M turbines and is planned for waters outside Natura 2000

areas, archaeological sites and at a "great distance" from the coast to minimise visual impacts.

Greece has nearly 2000MW of projects in the early stages of planning in national waters, according to the country's system operator.

Accommodating future offshore power is dependent both on upgrading the transmission system and the growth of onshore wind.

Swedish company Hexicon is marching on with plans to build a floating, six-sided 54MW wind installation off Malta despite failing to secure NER300 funding from the European Union.

The developer said interest shown by investors and financial institutions will allow the project to progress.

Environmental work for the more traditional wind farm planned off Sikka l-Bajda has been completed and is currently being reviewed by stakeholders.

The Maltese government plans to launch a tender process for the roughly 20-turbine project.



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Tipping point within reach for US players

The US is inching ever closer to deployment of its first offshore wind turbines via development of commercial arrays both large and small and single-machine demonstrators.

American offshore wind



flag-bearer Cape Wind is targeting first power in 2015 and

full commissioning of its project on Horseshoe Shoal in 2016.

Final size of the project, however, remains up in the air.

Cape holds power purchase agreements with National Grid and NStar for a combined 363MW of output and if no other buyer for electricity can be found the wind farm will be financed and built as a 101-turbine site.

The developer remains hopeful of securing the backing

2015 shaping up to be year for delivery of first power, writes Todd Westbrook

necessary to build the full 130-turbine farm, for which Siemens will supply 3.6MW machines, a spokesperson said.

Time is tight, however, with financial close on Cape Wind expected by the end of the second quarter next year. "If and when we contract for more power we will seek financing for that added component," said the spokesperson.

Cape completed initial seismic work at the site this year and is planning further pre-construction campaigns in 2013, although exact details have yet to be revealed.

CalDive, Flatiron and Cashman will lead on construction with other suppliers yet to fall into place. It is widely anticipated that Siemens will tackle the

project's transmission works and electricity supply platform. Cape Wind connects to shore at Barnstable.

Deepwater Wind is on course to be first in the water off the US with a target of financial close on its 30MW Block Island demo in the second half of next year and construction starting on transmission elements in 2014.

Siemens is supplying 6MW direct drive turbines, which are due up in summer 2015. A US yard in the Gulf of Mexico is expected to fabricate jacket foundations and all contracts will be in place ahead of a final investment decision.

Permits must still be secured from the US Army Corps of Engineers and the Rhode Island Coastal Resources Management Council. The former is likely to be the more time consuming but even so Deepwater expects paperwork to be sorted by the end of the first quarter of 2013.

Block Island features an unusual transmission element alongside the more straightforward wind farm and export cable. A secondary wire will supply power to and from the previously off-grid island to the Rhode Island mainland.

Deepwater has yet to decide whether it will finance, build and then sell the transmission element to National Grid or whether that company will take over the transmission project sooner and carry out the work itself. "Those discussions are ongoing," said the developer.

Fishermen's Energy had a difficult 2012 with its plans to build a 24MW demonstrator off Atlantic City, New Jersey, caught up first in a state-level debate over the costs and benefits of the project and then in ongoing delays to approval for proposed offshore renewable energy credits.

Sources said both those

DoE to open up its coffers for demonstrators

The US Department of Energy is expected to award funding imminently for up to five demonstration projects. Total spending of \$180m was originally due to be awarded earlier this year but was caught up in the presidential elections.

Recipients will include both traditional and floating wind. Winners are likely to come from both the east and west coasts, from the Great Lakes and from the Gulf of Mexico, said sources familiar with the process.

Projects mentioned in connection with the DoE cash include a floating demonstrator off Maine, a second floater off Oregon, LEEDCo's Icebreaker demo off Cleveland, University of Delaware's proposed test site and a project off Texas.

Consultancy company ODE, which is involved in a number of the sites, said the value of the awards will go well beyond the individual winners.

"If they can get deployment going in a number of different areas it can only be good for offshore development in general," said managing director Peter Godfrey, who added that in 10 to 12 years the North American market would undoubtedly be "moving forward vigorously".

issues could now be solved in time for deployment of 5MW turbines in 2014. Contractors already lined up include XEMC for headline hardware and Kerite and Durocher for cable supply and installation.

The developer holds a US Army Corps of Engineers permit for construction, including three-legged jacket foundations and a 35kV export wire running beneath the beach to connect at Atlantic City Electric's existing Huron substation.

One source said Superstorm Sandy, which came ashore at Atlantic City, provided valuable data for the project rather than ruling out development altogether as some feared.

"We now have data on the loads involved and it appears the turbines can match those conditions," he said.



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Federal lease process builds head of steam off east coast

The federal leasing process for wind energy areas identified off the east coast has failed to meet Interior Secretary Ken Salazar's bold 2011 prediction that as many as six deals would be signed by the end of this year.

However, the Smart from the Start initiative, run by the Bureau for Ocean Energy Management, did lay the groundwork this year for what is expected to be a series of auctions in the mid-Atlantic outer continental shelf in the early part of 2013.

Coastline states including Massachusetts, Rhode Island, New Jersey, Delaware and Virginia could be included. The mechanism for the auctions has already been identified and preliminary environmental work largely completed.

Bidders off Rhode Island will be asked to chase two lots, those off Virginia will fight for a

SMART FROM THE START	
Developers registering interest at most recent milestone	
Maryland	Arcadia, EDF, Energy Management Inc, Fishermen's Energy, Orisol, RES Americas
Massachusetts	Arcadia, Condor Wind Energy, Deepwater Wind, EDF, Energy Management Inc, Fishermen's Energy, Iberdrola, Mainstream, Neptune, OffshoreMW
New Jersey	EDF, Fishermen's Energy, Garden State Offshore (Deepwater and PSEG), Iberdrola, Mainstream, Neptune, New Jersey Offshore, OffshoreMW, TCI Renewables, US Wind
Rhode Island	Deepwater, EDF, Energy Management Inc, Fishermen's Energy, Iberdrola, Mainstream, Neptune, US Wind
Virginia	Apex Offshore, Arcadia, Cirrus Wind Energy, Dominion Resources, EDF, Fishermen's Energy, Iberdrola and Orisol

single project. Plans for auctioning the rights to other zones are still being finalised.

The one licence that was awarded in 2012 was to a company with no immediate plans to progress development. NRG secured a lease for the zone off Delaware based on long-gestating plans originally drawn up by Bluewater Wind.

An NRG spokesman said signing a deal for the roughly 450MW zone, despite pulling the plug on Bluewater in December 2011, was an "important step in preserving our valuable offshore wind assets". In the near term, the

company has to make a lease payment of about \$300,000.

Future wind energy areas off the east coast are still being fine-tuned. Plans for three zones off North Carolina are due to emerge towards the end of this year while a single zone is taking shape off New York.

Proposed areas off South Carolina and Georgia remain in development and BOEM is also active off Maine, Florida, Hawaii and the west coast.

The federal agency has in addition granted exclusivity to Atlantic Wind Connection, which is planning an offshore transmission network.



SeaRoc has successfully deployed a floating lidar at the site of Garden State Offshore Energy's proposed 1000MW wind farm around 20 miles east of Avalon, New Jersey.

The platform will monitor wind speeds at up to 200 metres above sea level while the spar buoy foundation measures motion and wave height.

Garden State partners Deepwater Wind and PSEG are hoping to secure a Smart from the Start lease for the wind farm.

Photo: SeaRoc



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Mega-farm finds way through Brazil's bureaucratic jungle

Brazil's mammoth 11.2GW Asa Branca offshore wind farm continues to gun for an initial deployment in two years despite becoming embroiled in red tape.

Developer Eolica Brasil has struggled to secure crucial paperwork to guarantee



exclusive access to federal waters off the state of Ceara but

insisted a 30MW first phase remains on track for 2014.

Company founder Marcello Storrer told *reNews* the elusive land lease agreement for Asa Branca may no longer be needed to secure remaining environmental permits.

It has become apparent there are "hundreds" of coastal enterprises, including several wind farms, established on federal acreage "without any

Developer wastes years chasing permit officials just ignore, writes Seb Kennedy

kind of land lease agreement", he said.

Eolica Brasil could have avoided "years" of inertia arising from a Catch-22 situation with two regulatory agencies if it had simply not applied for the document to begin with, he added.

"I realise years later it is my fault for requesting it. This country is kind of crazy but that is how it works," Storrer said.

The company has received assurance from regulators that the permitting process can continue in the meantime and the land lease issue can be resolved "if and when it is needed".

Eolica Brasil has also gained access to a decade of valuable met mast data from three onshore wind farms in Ceara

that will fast-forward the offshore development process.

The company can proceed with environmental studies at three 240MW modules that fall within a 10km radius of the onshore masts without the need for further field studies.

These sites will be installed between 2014 and 2016 if financial and supply partners can be brought together.

Talks continue with Siemens over a framework deal for 6MW turbines, although it is understood one-time frontrunner Alstom remains in the frame. Various potential financial partners, including Eletrobras and private investors, are waiting in the wings.

Project finance terms have been steadily improving in Brazil in recent years and Storrer said he believes Asa Branca may leverage as much as 90% senior debt from development bank BNDES.

This would have to be underpinned by a power purchase agreement priced at R\$120 or R\$125 per MWh in either Brazil's free market or federal auctions. Capital expenditure of R\$5.5m per megawatt in phase one is projected to drop to R\$4m by phase three.

Eolica Brasil set up joint venture company Servemar with Offshore Wind Power Systems of Texas in June to provide the latter's Titan floating foundations and installation and maintenance services at Asa Branca.

Servemar's scope will include any future offshore Eolica Brasil developments in South and Central America and the Caribbean, excluding Mexico.

Elsewhere on the continent, Venezuela is commissioning the first handful of onshore turbines in the Guajira province, which are being touted as forerunners to an eventual gigawatt-scale offshore Caribbean initiative.

Political class across Canada turns a blind eye to sector

Canada's once-promising offshore sector is now sitting on its hands due to political inaction. The most advanced projects are awaiting policy and support mechanisms that will allow wind farms to progress both off the west coast



and in the Great Lakes.

On the latter, Windstream appears to have given up hope of working within the confines of the Ontario government's moratorium on freshwater wind development.

The company had been looking to move ahead with its 300MW Wolfe Island project as a sort of reference for scientific and other studies but has been unable to find common ground with provincial authorities.

"The government has chosen not to engage with us on this matter," said a spokesperson.

Windstream had reached agreement with Siemens on turbine supply and lined up support from a number of supply chain, industrial and local government organisations.

A second developer, Trillium Power, was unsuccessful earlier this year with a C\$2.25bn lawsuit claiming damages from the moratorium and impacts on its 414MW Trillium Power Wind 1 project in Lake Ontario. The company is appealing.

On the west coast, NaiKun once had ambitions to build its 396MW project in the Hecate Strait off British Columbia as soon as 2011 but in recent years has gone into the corporate equivalent of standby mode, cutting spending to an absolute minimum and paying its directors and its chief executive partly in shares.

The project itself holds environmental approvals from the provincial and federal governments, as well as agreements with key suppliers and First Nations. However, market conditions in BC appear to rule out a power purchase agreement in the short term.

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Hong Kong awaits starting orders

But progress stalls in mainland China due to clashes with other marine interests

Wind Prospect and local utility partner CLP Holdings are on course to submit a budget for a 200MW wind farm off Hong Kong to government officials before the end of this year.



Under Hong Kong rules, capex has to be approved before being passed on to ratepayers.

A decision is promised within 12 months.

The partners are sifting replies received earlier this year from major contractors following the issue of a formal request for expressions of interest, which will form the basis of the budget.

A \$9m lidar met mast for the wind farm was erected last

May. It was fabricated in China by CNOOC and COOEC and features a caisson foundation.

Wind speeds at the site in Clearwater Bay have proved better than expected so far. Up to 67 turbines will be installed around 9km offshore although commissioning is not expected before 2016.

Hong Kong Electric is on a similar development path in the Lamma Channel and reached the met mast milestone this year with SgurrEnergy supplying an ORQA platform complete with Galion lidar unit. The utility is planning to build 35 turbines of at least 2.3MW and is expected to enter construction following its Hong Kong rival.

Proponents off China, meanwhile, have gone quiet as the result of planning issues and conflicts with marine interests. The country had set its sights on 5GW by 2015 but that has



Siemens goes east: the 50MW Jiangsu Rudong tidal zone wind farm in the East China Sea

Photo: Siemens

largely been forgotten as licences issued in 2010 to local heavy hitters ground to a halt. A second round of awards appears to have been delayed until at least next year.

According to one source, awards for offshore acreage neglected the needs and input of fishermen, the navy and transport officials, to name but a few. Costs for the sector are also higher than originally

anticipated. Longyuan Power did complete the 50MW Jiangsu Rudong tidal zone wind farm in the East China Sea in spring this year. Siemens supplied 2.3MW-101 turbines for its first offshore effort outside Europe.

Components for the machines were produced at the company's plant in Shanghai. Water depths at the site are up to five metres during high tides but dry during low tides.

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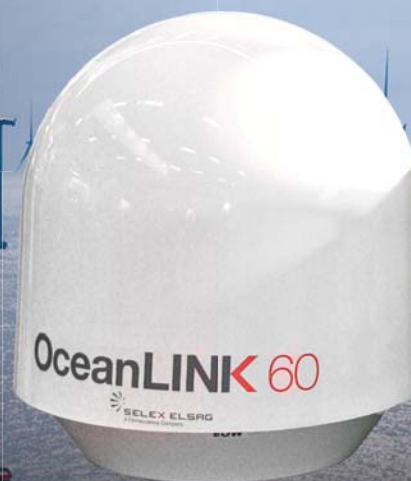
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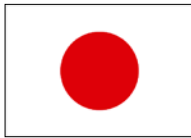


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Post-Fukushima Japan joins new wave in Asia

Japan dipped a toe into the offshore wind sector this year as part of a national effort to boost renewables and cut back on the use of nuclear power in the post-Fukushima era.

The New Energy and Industrial Technology Development Organisation



installed a 2.4MW Mitsubishi turbine in around 12

metres of water some 3km off Choshi in October.

Tests will be carried out for two years following expected commissioning early next year.

Government also sponsored installation of a floating 100kW turbine off Nagasaki, which is scheduled to be upgraded to a 2MW machine following initial operations and data collection.

In the private sector, heavy hitters Toshiba, Hitachi,

Tokyo moves away from nuclear power as Vietnam gets on project scoreboard and Taiwan and India eye development

Sumitomo and others have teamed up in a ¥120bn initiative to build wind farms off Kyushu and elsewhere over the next 10 years. A pilot installation of 7.5MW is planned for 2016, to be followed by a 300MW commercial project.

Vietnam installed its first offshore turbines this year. A total of 10 GE 1.6MW units went

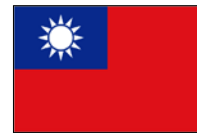


in at a tidal near-shore site off Bac Lieu. Cong Ly, the

company behind the project, also has plans to build a second phase of up to 120MW and is seeking permission for another wind farm at Can Thanh.

Taiwan is hoping to translate

long-held ambitions to build an offshore wind sector into reality with an \$8.3m government award due in January for a demonstration project expected



online by the end of 2015.

The Ministry of Economic

Affairs is widely expected to select local companies for the project, although experienced international developers are lined up to play a supporting role. A series of commercial wind farms will follow in a bid to hit government targets of 3000MW by 2030.

GL Garrad Hassan has signed a memorandum of understanding with the country's Industrial Technology Research Institute to help push offshore development.

Taiwan has roughly 1200MW of capacity in water depths from five to 20 metres and 5000MW in waters between 20 and 50 metres.

A number of initiatives are in the earliest stages off India's west coast. Oil and gas player



ONGC is reportedly looking at a 10MW demo in order to

assess the potential for future commercial deployment.

Resource studies have also been carried out at a number of locations as part of government attempts to build as much as 4500MW in the longer term. Further assessment campaigns are planned.

One source that has carried out work for would-be Indian players said the potential is not nearly as great as often discussed. He cited low wind speeds, constraints due to oil and gas activity, deep water close to shore, "lots of fishermen" and other permitting issues.

Samsung brings scale to South Korea's wind sector hot-spot

South Korean industrial giant Samsung is preparing to roll out its under-development 7MW offshore turbine at an 84MW project off Jeju Island.

The company formed the Daejeong Offshore Wind Power joint venture last month with



Korea Southern Power and is planning to kick off

construction in 2014 for operations in 2015.

A 14-turbine first phase off the Yellow Sea island near Gwangju could eventually be boosted to 200MW, depending on the success of the initial deployment.

The Korean government is chasing up to 2.5GW of offshore wind around Jeju by the end of the decade in co-operation with utility Kepco and heavy industrials including Samsung, Doosan, Daewoo, Hyundai and others.

Phased ambitions unveiled a year ago include 100MW by 2014 and 400MW by 2016. It is unclear if the most recent Samsung plans are integral or supplemental to the government path.

Europeans are being drafted in to assist Korea's progress. German utility developer EWE's offshore services and solutions business has been signed on as an advisor to the 2.5GW government proposal.

Technology and experience will be shared with Jeonnam Technopark, an institute set up by the South Korean government to oversee development off Jeju.

EWE will also join forces with a trio of local manufacturers to test new foundation materials and advise on design.

Trade body RenewableUK meanwhile signed a memorandum of understanding with the Korean Wind Energy Association focused on co-operation between companies active in the two markets.

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Investment in new transport and installation vessels is booming with a larger, faster and stronger fleet coming online to meet the demands of wind farms farther from shore and in deeper waters.

"We're seeing a lot of new vessels entering the market and when they start operating there will definitely be enough vessels for the next four to five years," said A2Sea senior advisor Kaj Lindvig.

The Dane predicted a fresh wave of vessel investment will be needed in four or five years if German grid issues are resolved and the UK opts for long-term support for offshore wind. Development of new areas such as Ireland, Northern Ireland, Poland, Finland and Sweden, but especially France, would give a useful boost to the long-term health of the sector.

"The UK and Germany will be the main markets but it's not great to rely on just one or two large markets," he said.

A2Sea took delivery this month of its own contribution to the new fleet, the Sea Installer. The vessel was specifically designed for turbine installation and can carry seven units in one go.

It will be used to install the two Siemens 6MW turbines at the Gunfleet Sands 3 demo. Lindvig said the primary goal at Gunfleet is to show the vessel can install the next-generation of offshore turbines quickly.

Sea Installer will then install a number of machines at Anholt before heading to West of Duddon Sands, where it will transport and install 108 Siemens 3.6MW turbines starting in April 2013 and finishing in summer 2014.

Lindvig said he believes vessels such as the Sea Installer can increase operational capacity by 65% to 80% by handling deeper waters and more challenging weather.

A2Sea is also looking at more radical concepts for the future of offshore wind installation through its partnership with Teekay. Lindvig said modelling of a converted oil tanker shows the platform makes sense technically and economically.

The partners will go ahead with converting a Teekay-owned tanker if a first order is

Bigger, better installation fleet now sailing into view

Operational efficiency soars thanks to investment rush but jury is out on best technology, writes Will Wachtmeister

secured. It could be ready for a first project in 2015, given the lead times for purchasing a crane.

How vessels are used and contracted is also important, according to one market player. MPI chairman Paul Gibson said long-term vessel charters, as well as basic changes to

installation plans, can help cost-reduction efforts for offshore wind.

He said day rates for offshore wind jack-ups are currently in the region of €135,000 to €200,000 but multi-year charters can reduce client's costs by around 20%.

Gibson argued that savings

can also be made by installing some turbines earlier in a project cycle, as opposed to following installation of all foundations, in order to generate substantial per-unit revenues earlier in the construction process.

Designing offshore platforms so they can be installed by jack-ups as opposed to more expensive heavy-lift vessels is another immediate way to save costs, he added.

Jumbo Shipping, by contrast, is pinning its

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Welcome to Denmark: the legs of Swire Blue Ocean's Pacific Orca tower over the dockside buildings

Photo: Swire Blue Ocean

New vessels pack a punch

DEME subsidiary Scaldis is building heavylift vessel Rambiz 4000 for delivery in spring 2014. The ship will be capable of lifting a massive 4000 tonnes and joins a company fleet that already includes next-generation vessel Innovation and seven other jack-ups in GeoSea colours.

DEME chief executive Alain Bernard said it is important that the company retains flexibility to operate across different sectors. "We have invested in vessels and there are many others coming into the market because the authorities have committed to 2020 targets and we need to have the capacity to get there.

"Our jack-ups can (also) be used for civil works, wreck removal and oil and gas. We are flexible with our equipment to

change between different types of projects if one market slows down," he said,

Swire Blue Ocean, meanwhile, will introduce two of what are possibly the most powerful transport and installation vessels early next year. Pacific Orca

recently arrived in Denmark and is undergoing a final fit-out while sister-ship Pacific Osprey will tie up on 31 December.

The vessels can jack up in significant wave heights of 2.5 metres and the crane can work in 20m/s winds, opening up

"enormous weather windows", said Swire general manager and director Lars Blicher.

The units' ability to work in up to 60-metre water depths means all UK Round 3 projects are within reach, he added.

Pacific Orca was recently booked to install foundations at Dong's 320MW Borkum Riffgrund 1 project in the German North Sea following on directly from its first assignment at West of Duddon Sands.

The Danish developer has a long-term agreement on the Pacific Orca, with options to extend to 2015, and is free to keep the timing of the vessel's move to Borkum flexible.

Pacific Osprey, meanwhile, is heading for DanTysk where it will install 80 Siemens 3.6MW turbines next summer after an oil and gas decommissioning job.

Bigger, better installation fleet

43 hopes on floating installation vessels rather than jack-ups. Managing director Michael Kahn said the company is challenging the turbine industry to change designs so turbines can be erected from floating vessels to shorten lead times.

"Jumbo strongly believes in the floating option and in pre-piling and mounting transition pieces in an industrialised, serial way," he

said. "We dare to offer a fixed price per jacket-type-foundation as we are able to work much more efficiently than jack-ups."

Utility player RWE has taken a different tack from its developer peers by operating its own offshore wind installation vessels.

Seabreeze units are on the job at the under-construction Nordsee Ost and Gwynt y Mor projects.

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