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Information For Decision-making

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Wind **Power**

SETIS magazine

Wind **Power**

SETIS plays a central role in the successful implementation of the European Strategic Energy Technology (SET)-Plan by delivering timely information and critical analyses on energy technologies, research and innovation.

This Wind Energy magazine is the first issue in a new project that will focus on current and prospective developments in a different renewable energy sector on a quarterly basis.

Contents

Editorial

By Julian Scola,
Communication Director, EWEA

Wind energy is Europe's most developed and deployed renewable energy. By 2020, 34% of the EU's power needs should be met by renewables, and 14-16% of that by wind power alone. Today wind power meets around 7% of the EU electricity demand, halfway to the 2020 target.

Wind energy technology has come a long way since its modern form was released onto the commercial market in the 1980s. Back then the average power rating of a single turbine was measured in kilowatts, while today it is around 2-3 megawatts.

But, more can be done to improve wind energy technology and research has shown that turbines with power ratings of 10-20 MW are possible. And it's not just about increasing the power rating; today's turbines can be made more efficient and more reliable through R&D. Furthermore, turbines adapted to different terrains and extreme climatic conditions could be developed, floating structures for offshore wind power could come to the fore and mass manufacturing processes for offshore structures and large-scale turbines could be put in place.

Improvements made through R&D will also pave the way to a reduction in costs – today, in the best sites, onshore wind power is competitive with new coal and new gas – and is expected to be fully cost competitive in 2020. But offshore wind is still more expensive because working at sea adds costs, the sector is about 15 years younger than its onshore counterpart, and there is still much room for economies of scale. However, the industry expects to reach full competitiveness before 2030.

The 14-16% predicted level of wind power is one that the SET-Plan will be instrumental to achieving. The SET-Plan, through the European Wind Initiative, focusses EU, national and private research funds on the priorities identified by the sector, such as increasing wind turbine efficiency and reliability, bringing down the cost of wind energy, improving grid integration of wind power and reducing non-technological barriers to its development.

By 2020, with a concerted R&D effort, wind energy could meet up to 16% of the EU's electricity demand, saving 342 million tonnes of CO2 – the equivalent to around three-quarters of today's EU car emissions and up to one third of the EU's 20% carbon reduction effort for 2020. It could greatly enhance the continent's energy security by cutting dependency on imported fossil fuels, and stimulate green growth and at least 520,000 jobs.

JRC ANNUAL REPORT:

Wind energy in Europe and the world

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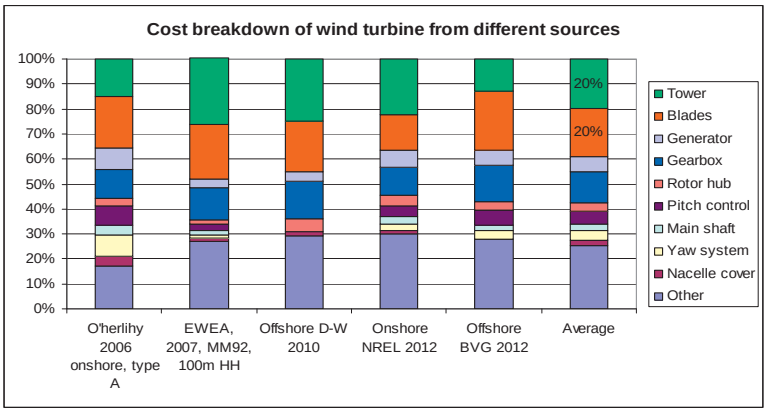
The Joint Research Centre has produced the first edition of an annual report on the technology, market and economic aspects of wind energy in Europe and the world. With this report, the JRC becomes an important contributor to the knowledge base for the wind energy sector, providing up-to-date information on the technology and economics with a focus on the European Union.

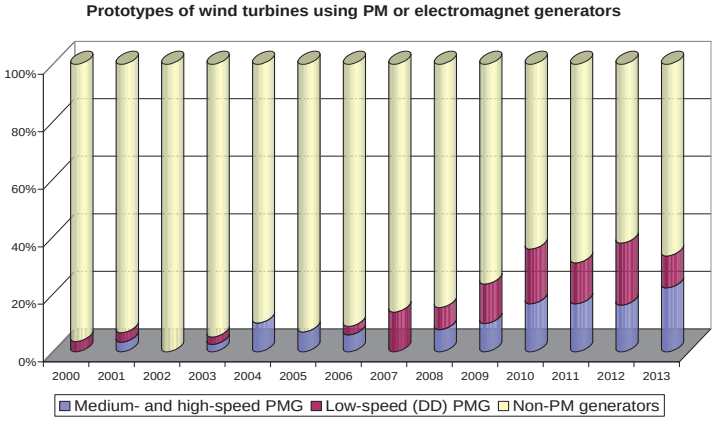
Wind power is the renewable energy which has seen the widest and most successful deployment over the last two decades, from 3 GW to above 280 GW of global cumulative capacity expected at the end of 2012. In Europe, the 100-GW mark was surpassed in September 2012, and already in 2011 four countries (DK, PT, IE, ES) obtained more than 10 % of their electricity from wind.

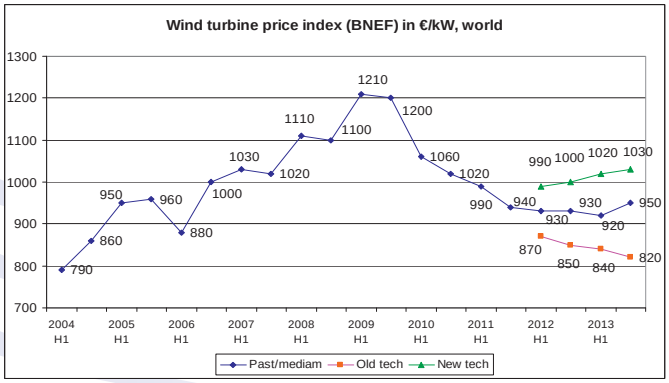
Wind energy will provide at least 12 % of European electricity by 2020, which is a very significant contribution to the 20/20/20 goals of the European energy and climate policy.

This report is centred on the technology, market and economic aspects of wind energy in Europe and, because the wind sector is a global industry, some sections have a global scope. The report is based on the core JRC research work on wind technology, on its own databases on wind turbines and installations and on models; on work performed in support of the European Wind Industrial Initiative; on research by key actors from industry and academia; and on exchanges with the industry. The report was also reviewed by reputed experts in the European wind energy field.

The report investigates the technological situation: state-of-the-art of wind turbines and of their main components, research, innovations, current challenges and possible bottlenecks, and its possible future evolution. Further sections focus on the wind market status, both globally and in Europe, they make proposals on some deployment scenarios and provide analyses on industrial strategies as made public by manufacturers and developers. A further section analyses the economic aspects and implications: cost aspects focus on turbine costs, capital costs (CapEx), the cost of operating the facility (OpEx), and the resulting cost of the energy produced (CoE). Finally, socio-economic aspects are considered upon including the amount of energy produced, the value of wind to the society and employment.







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MARCH 2013

SET-Plan Update

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As the technology pillar of the EU's energy and climate policy, SET-Plan has the objectives to accelerate technology development to achieve the 2020 Energy and Climate goals, to maintain EU industrial leadership on low-carbon energy technologies, and to contribute to the worldwide transition to a low-carbon economy by 2050. In 2007, the Strategic Energy Technologies Information System (SETIS) was established, which is an open-access information and knowledge-management system, that was set up to support the decision-making process in the SET-Plan, and to support the Steering Group in the strategic planning, monitoring and assessment of progress of the SET-Plan for meeting the EU energy policy objectives. This is achieved through the provision of regular, reliable information and data, addressing, amongst others, the energy technologies and innovation aspects of SET-Plan.

Recently, a number of significant SET-Plan related activities have taken or are taking place, including:

- The JRC has recently produced the first edition of an annual report on the technology, and the market and economic aspects of **wind energy in Europe** and the world, being very relevant to the theme of the issue of this SETIS magazine. With this report, the JRC becomes an important contributor to the knowledge base for the wind energy sector, providing up-to-date information on the technology and economics with a focus on the European Union.

- The review of **implementation of the SET-Plan** is currently ongoing, based on a process agreed with the Steering Group. The review focuses on the terms of reference of the Steering Group, the implementation of SETIS, and the SET-Plan implementation mechanisms, i.e. the EIIs and EERA. Furthermore, the review is addressing the appropriateness of implementation mechanisms, the effectiveness of implementation, and their delivery and impact. The findings and recommendations of the review will feed into the ongoing discussions for the definition of an enhanced SET-Plan for the period 2014-2020, which will be presented at the forthcoming SET-Plan Conference.

- New EII **implementation plans** for the period 2013-2015 are currently being developed by each EII Team. SETIS actively participates in this process by reviewing the achievements of the first implementation plans, flagging future priorities and revisiting the KPIs where needed.

- **ERA-NET+:** Two FP7 calls were published as part of the Work Programme 2012 and 2013 to support EIBI demonstration projects in line with the 7 value-chains defined in the Implementation Plan. The selected BESTF ERA-NET+ from WP2012 started

in January 2013 and includes 8 MS/AC (UK, DE, SE, FI, DK, ES, CH, PT) and contributes EUR 31 million of national funding in addition to the EUR 15 million of EC funding. For wind, an FP7 ERA-NET+ call (ENERGY.2013.10.1-2) was launched on 10th July 2012 for a European wind resources assessment which will include a new wind atlas, detailed wind models and measuring campaigns for validating the models. Led by Denmark, this project includes at least nine MS for an estimated budget of EUR 12 million plus an additional 30% of Commission contribution. The project will likely run for five years from 2014.

- The ongoing activity in the **Education and Training Initiative of the SET-Plan** is about to be completed. This work aims to identify the education and training needs for specialists involved in low-carbon energy technologies (researchers, engineers and technicians) in 2020 and 2030 in the EU.

- We would like to remind you that this year's **2013 SET-Plan Conference** will take place on 7-8 May. The Irish Presidency will host the conference at the Royal Hospital Kilmainham in Dublin. The two-day event will bring together a broad range of stakeholders including the research community, industry, financial community, policy-makers and a variety of international partners.

- SETIS has started work on an update of the **2013 Technology Map**, which is a concise overview of the status and prospects of energy technologies. The report is expected to be published in the second half of the year. It will be accompanied by a second report that will provide reference values for the operational and cost performance of current and future low-carbon technologies, for use in technology and energy system assessments.

- As part of the **Energy Research Knowledge Centre** (ERKC), a dedicated website, which will be accessible via a portal on the SETIS website, is now in a beta-testing phase and will be fully operational soon. In the meantime, ERKC has collected data and analysed over 450 projects. From these a number of country profiles have been developed, as well as European-wide analyses comparing budget spending per country, technology investment per country, etc.

- A symposium, co-organised by the JRC, was held in February in Brussels, on **"Benefits and limitations of nuclear fission for a low carbon economy"**. At the symposium different stakeholders voiced their opinion why European research is or is not needed in the nuclear fission domain. The outcome of the symposium will provide guidance to decision-makers on the Euratom part of Horizon 2020. A background study, an ethics opinion and the presentations can be found at *http://www.eesc.europa.eu/?i=portal.en.events-and-activities-symposium-on-nuclear-fission*

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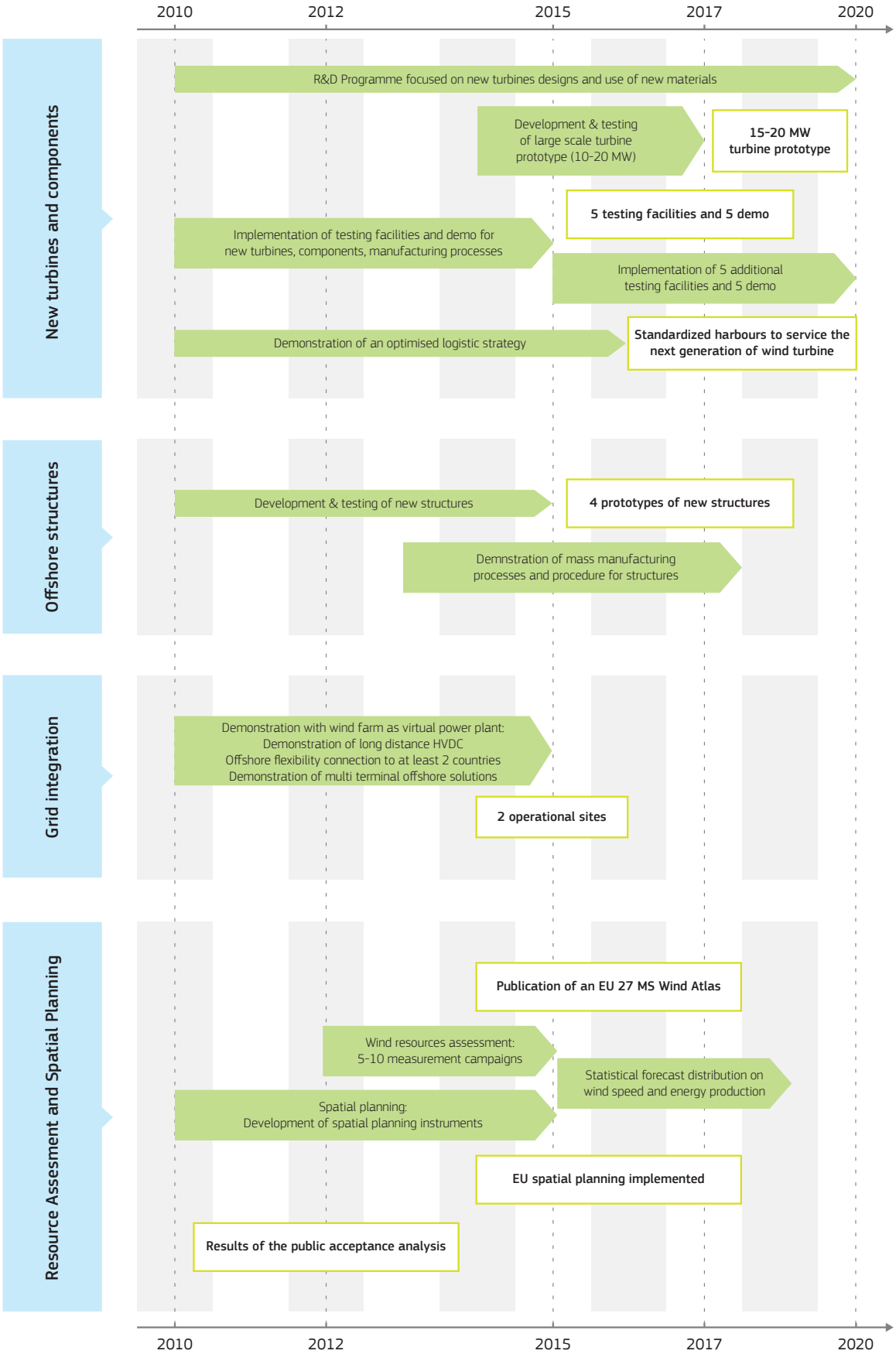
And finally, the SETIS website has recently undergone a major restructuring of its information architecture, including a slight redesign in order to align the website better with other EC websites. The restructuring better reflects priorities and new requests, such as dedicated project pages to support the operation of individual EIIs (e.g. EIBI), a clearer structure in the library, more emphasis on the implementation activities of the EIIs and EEPR projects, as well as an easier navigation structure. Moreover, SETIS will continue to address SET-Plan activities with a steady flow of short and long news articles, event announcements and regular interviews with the principal players in the low-carbon energy community, as well acting as a repository for the latest Scientific and Technical reports on all low-carbon technologies. This new-look quarterly SETIS magazine is also a major SETIS milestone.

WER implementation plan for 2010-2020



EEPR PROJECT IN FOCUS –

Nordsee Ost

Nordsee Ost is an EU - sponsored renewable energy project currently being implemented by German energy concern RWE Innogy to the north-east of the island of Heligoland in the German North Sea region. Once operational, the wind farm will be one of the largest commercial wind farms in Europe and will showcase state-of-the-art wind generating technology, making a significant contribution to the climate goals of the German government and the European Union.

Photo of Nordsee Ost project © RWE Innogy

The wind farm will have a total output of around 295 megawatts from its 48 multi-megawatt wind turbines, which is enough to supply approximately 300,000 households with electricity annually. When fully operational, the wind farm will produce 1,200 GWh of green electricity and will have a corresponding impact on CO2 emissions, mitigating an estimated 850,000 tonnes of carbon dioxide each year based on the equivalent production by a modern gas-fired power plant. The project will improve the security of energy supplies in Europe while at the same time providing a direct financial stimulus for the European economy and creating jobs. In addition, the project will strengthen the competitiveness of the European offshore wind industry and contribute to its innovative capacity, in line with the EU's SET-Plan mandate.

RWE Innogy is investing about €1 billion in the project, and EU involvement is capped at €50 million. EU funding is provided under the European Energy Programme for Recovery (EEPR), set up in 2009 to co-finance projects designed to make energy supplies more reliable and help reduce greenhouse emissions, while simultaneously boosting Europe's economic recovery. The EEPR is co-financing the supply of the first 30 innovative wind turbine generators to the wind farm.

Nordsee Ost, which covers an area of some 24 square kilometres, is located outside the main shipping lines, military training areas and sea bird protection zones, and so is an ideal site for the construction of a wind farm. As the wind farm is located 35 km out to sea, the turbines will not be visible from the shore. The sandy subsoil in the area is well-suited to the erection of wind turbines. Meteorological mast valuations have confirmed good and stable wind conditions at the site. This data was also used to reach decisions on the various design solutions for the wind farm, such as the type of turbine to use. In addition to the meteorological mast, data was also received from special buoys, which were used to analyse the behaviour of the sea at the site, including wave direction, average wave height and so on.

The foundations for Nordsee Ost are manufactured by Kvaerner and are to be placed at water depths of 22 to 25 metres. Each of these foundations is up to 50 metres high and weighs approximately 550 tonnes. The turbine towers will stretch almost 100 metres into the air, where they will be able to benefit from the strongest winds. The nacelle has a weight of around 350 tonnes

and the rotor consists of three blades of 61.5 metres in length. The wind farm's measuring tower is equipped with a laser-assisted measuring system which enables it to measure wind velocity and direction, both horizontally and vertically, up to a height of 200 metres. When the wind farm is operational, this data will be sent to an onshore control centre, which will ensure the optimal settings for the wind turbines.

All 48 wind turbines, which are being supplied by Germany's Repower Systems, are interconnected by inter-array cables and linked to a substation, requiring more than 60 kilometres of cable in total. An offshore substation will be built to convert the 33kV electricity produced by the wind turbines to a transmission voltage of 155kV. The stepped-up power will be transmitted to a grid connection point at Brunsbüttel using high-voltage subsea cables.

Construction on the project began in the summer of 2012 and the wind farm is set to be fully operational in 2014.

Project timeline:

2000 – Plans for the construction of a wind farm are originally developed by Winkra Offshore Nordsee Planungs und Betriebsgesellschaft

2002 – The project is acquired by Dutch energy company Essent

2004 – Germany's Federal Office for Shipping and Hydrography approves the project

2005 – A metering mast is installed at Amrumbank; the data received is used as a basis for the development of the Nordsee-Ost wind power station

2007 – The project receives the necessary approvals for the installation of offshore cables

2008 – RWE sets up renewable energy subsidiary RWE Innogy

2009 – RWE acquires Essent and Nordsee-Ost is transferred to RWE Innogy

2011 – RWE Innogy successfully completes the installation of a measuring tower at Nordsee Ost

2012 – RWE Innogy commissions the Victoria Mathias offshore installation vessel to build the Nordsee Ost wind farm

NOW – Components are being produced and delivered to Nordsee Ost's base harbour at Bremerhaven. Work is underway to install offshore turbine foundations.

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INTERVIEW WITH

Paul Coffey,
COO RWE Innogy

The Nordsee Ost project is scheduled to start operating in 2013 – is everything going to plan and will the wind farm start operating on schedule?

P. C.: "Due to the grid connection delay we unfortunately had to adjust and optimise our original construction schedule for our offshore wind project Nordsee Ost. However, since autumn last year we have been installing the so-called jacket foundations. And the turbine installation is planned to start next year."

What are the main challenges you have encountered during implementation of the project?

P. C.: "The delay of the grid connection belongs to the most important challenges for our project. That´s why we really welcomed the decision taken by the German Government at the end of last year to close some crucial legal loopholes in regards to a liability and a binding planning regime. These amendments within the German Energy Industry Act are necessary preconditions to enable further investments in the development of offshore wind farms in Germany. For example, it is a big step forward that from now on a realisation schedule has to be agreed early on with the grid operator and potential delays or deviations from this schedule have to be communicated immediately to the other party. This will certainly create more transparency and planning security for all parties involved."

Is the current level of technological research and development sufficient to ensure that technology keeps pace with the requirements of the industry, or have you encountered a lag between available technology and project requirements?

P. C.: "The offshore wind industry in Europe has made significant progress over the last few years. However, as an industry we are right in the middle of a very interesting process of leaving the pioneer phase and entering the industrial stage. R&D activities are still strongly needed and key to bring costs down, standardise processes on a European level like health and safety issues and to mitigate environmental risks during the construction of offshore wind farms. At RWE Innogy, we are committed to all these areas. For example, in 2012 we undertook a field trial together with partners in the German Baltic Sea, testing various innovative noise mitigation systems that are intended to limit the spread of piling noise during foundation installations. Furthermore our German offshore wind project "Innogy Nordsee 1" has been submitted into the EU New Entrants Reserve programme NER300. This financing instrument, managed jointly by the European Commission, the European Investment Bank and Member States provides us with a special R&D fund to improve the technical availability and performance of multi-megawatt turbines as well as to test innovative foundation structures and noise mitigation systems."

Has the Nordsee Ost project itself made any contribution to innovative advancements in the wind energy sector?

P. C.: "Back in 2009, we were one of the first companies that commissioned the construction of two special offshore installation vessels. Both vessels are now being used for our projects Nordsee Ost and Gwynt y Môr in the UK. It was not least due to our investments in the construction of these offshore installation vessels that many companies were encouraged to follow our example and build comparable vessels, so that today the amount of offshore special equipment and

services available on the market has improved significantly. Furthermore the European Union is providing up to € 50 million of funding for the realisation of Nordsee Ost as one of its lighthouse projects in the field of renewable energies. The financial support is granted under the European Energy Programme for Recovery. ”

The aims of the European Wind Initiative include improving the competitiveness of wind energy technologies and facilitating grid integration of wind power. Based on your experience has wind energy technology become more competitive, and how do you view the current level of grid integration?

P. C.: “Beside all other aspects mentioned like cost reduction throughout the supply chain, health and safety, new logistics and infrastructure concepts, grid connection and integration is by far the most urgent and challenging issue not only for the offshore wind industry but for the whole renewable sector. In Germany the grid connection situation is somehow special because the distance to the shore is wider than in most other European countries due to environmental restrictions. But with upcoming projects in the UK which are equally far offshore and even bigger than the German projects, the need for offshore substations, export cables and high voltage direct current transmission systems will increase significantly. The timely delivery of those components is essential, but I am sure that the supply chain is able to overcome this bottleneck which at the moment causes some delays in Germany and additional costs that hampers the extension of offshore wind. In the long run we have to have a grid system that is able to balance wind power fluctuations by using storable energy from hydropower plants for example or quick starting and highly efficient gas power stations from various North Sea littoral states. However, this pan-European approach certainly needs a lot of staying power. ”

What further steps can be taken to achieve these aims?

P. C.: “It is vital that the transformation of offshore wind towards a large scale industry succeeds over the next years. Only then we can realise the necessary cost reduction and become competitive with other sources of energy. All parties involved like regulators, certifiers, developers, utilities, grid operators, logistic companies, port operators, etc. need to work very closely together in order to achieve this goal. ”

Wind energy is set to be a leading power technology by 2050 – what do you see as the main obstacles to this scenario?

P. C.: “There are two main obstacles from my point of view. Firstly, the extension of the grid systems on- and offshore needs to keep pace with the extension of wind farms and other sorts of fluctuating energy generation. Secondly, onshore wind and even more importantly offshore wind must have a stable and reliable framework to become a cornerstone of Europe´s energy supply. Any significant change in the support mechanism on a short term basis can create uncertainty among potential investors followed by an unnecessary hiatus in the realisation of projects. That would jeopardise a lot of progress that the wind industry has achieved over recent years. ”

Paul Coffey

Chief Operating Officer (COO), RWE Innogy GmbH, Essen

Responsible for:

Wind Offshore • Wind Onshore • Biomass • Operational Safety • Commercial

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INTERVIEW WITH

Bent Christensen,

Senior Vice President at DONG Energy

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Wind energy generation is now a mature technology, but is evolving. In a few words, where are the biggest breakthroughs likely to be?

B. C.: "We have now taken the next step in terms of turbine capacity with next generation turbines over 5 MW. I think that this is where we have seen the greatest and most visible breakthrough. I'm certain that within the next 5-10 years we will see the next surge of even bigger turbines, probably in the range of 8-10 MW."

Capital expenditure for offshore is twice that of onshore. What will be needed to bring the costs down?

B. C.: "DONG Energy has set an ambitious target of less than EUR 100/MWh for the cost of energy for offshore wind projects that will be decided by 2020, which is equivalent to a cost reduction of approximately 40 per cent, compared to today's off-take prices in the UK. The cost reduction will require a well-known and stable environment for investments, as well as a market of a certain size that will allow us to utilize economies of scale across the value chain. Throughout the first 15 years of offshore development we proved the concept of developing, constructing and operating offshore wind farms. This was followed by five years of driving the developments in the offshore industry. New standardized solutions, framework agreements for key components such as turbines and foundations and an optimised logistic set-up and project execution have been some of the key elements. The next step for us is to utilise the competences we have built up throughout the last 20 years. These are competences that have made us the market leader in offshore wind. We will install the next generation of turbines, develop new cost-effective foundations, enter framework agreements and continue to improve our processes across the markets where we are active in developing, installing and operating offshore wind farms."

The use of permanent magnets in turbines has a number of advantages, but carries risks, such as the availability of rare earths, presently mostly concentrated in China. How do you think the risks and advantages can best be balanced out?

B. C.: "The use of permanent magnets has some advantages, but alternative solutions can be put in place if necessary."

The trend in the EU for offshore wind farms is "further and deeper" (though not in Germany). What are the advantages and the challenges? And is this trend likely to continue?

B. C.: "Going forward we can see that at least a large part of the UK's "Round 3" projects are to be built further from shore and in deeper water. I think that this is a trend we will continue to see, as the easiest projects closest to shore and in shallow water have been or are going to be built first. However, the potential further from shore is really big, as the wind resources are somewhat higher there."

How important is spatial planning in future offshore scenarios?

B. C.: "The entire process of planning has been and will continue to be a key part of the development of the project. The sooner you have your park running the sooner you'll see revenue from it. From that perspective a smooth planning process, where you have taken into account every part of the process, including risk mitigation, is key."

At present. thinking is based around the unit of the turbine. But there is talk of a shift towards "wind farm thinking". What difference would this make to future developments?

B. C.: "I think we have already seen this development. Today we don't think of either turbines or single projects as the centre of the planning work on our pipeline of projects. We look at the entire pipeline of projects and see how they fit into our scope of resources, budget, the supply chain etc."

Dong has recently installed a 6MW offshore turbine. 8 and 10 MW turbines are also being developed. Is there an upper limit? What are the main constraints?

B. C.: "I don't think we have seen the limit of capacity yet. We already know that several manufacturers are working on 8-10 MW turbines. But looking at the potential offshore, I can't really see arguments for not working beyond that capacity if it can be done in a cost efficient way that will drive down the cost, along with increasing power production."

The European Wind Industry Energy Association has set a target of 230 GW of installed capacity in Europe by 2020 and 400 GW by 2030. Are we on target?

B. C.: "I think you need to address that question to the European Wind Industry Association. In DONG Energy we have set a very ambitious target where we will install a total of 6.5 GW by 2020 compared to the 1.7 GW we have installed today. With that target we want to quadruple our offshore wind capacity within the next 7 years."

With fossil fuels like shale gas getting cheaper, is investment in wind technology threatened?

B. C.: "There's no doubt that the cost of energy for offshore wind needs to be reduced – for a lot of reasons. It needs to become competitive with other energy technologies if we are to utilize its full potential. And I'm certain that it will, as offshore wind is one of the key technologies in the fight against climate change and, to fill the gap, several EU member states are facing a lack of capacity in the years to come, as conventional power plants are taken off stream, while there will be increased demand for energy in general."

How important are feed-in tariffs to continue to help wind energy remain competitive?

B. C.: "The history of onshore wind shows that cost reduction will happen as the industry matures. And some of the best located onshore turbines are already competitive, compared to other energy technologies. We believe that offshore wind will follow the same cost development as onshore wind. But the sector needs to continue to build and to learn if we are to reduce the cost of energy. And for this, the sector will need a stable regime and long term targets to mitigate the risk of future investments."

Bent Christensen

Senior Vice President at DONG Energy

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Is European debt crisis undermining interest in low-carbon energy?

Recent government cutbacks in subsidies to low-carbon energies in some European Member States could slow investment, but the picture is complex.

According to a recent analysis by Bloomberg New Energy Finance (BNEF), new global investment in renewable energies fell 11 % in 2012, compared to a record year in 2011. And in some European countries, the drop was even greater, with Italy seeing a 51 % fall in new investment and Spain, 68 %. Bloomberg CEO, Michael Liebreich, in an online interview at the Massachusetts Institute for Technology last year, blamed Europe's debt crisis for at least part of the slowdown. But a closer look shows the picture to be more complex.

"The European crisis has crushed the sector's most important geographic market," said Liebreich. "How are you going to invest in European projects when there is a question mark over the survival of the Euro? The average commercial bank cannot fund a project in a high-risk country like Spain, Greece, or Portugal, the best countries in Europe for clean energy."

But while it is easy to blame the debt crisis in European countries and a slowing of growth in Asia for the apparent cooling of interest in renewable energies, this is far from the whole story. True, cuts of subsidies for renewable energies in Spain and Germany, a carbon price plummeting towards near zero in the European Trading Scheme, cheap coal and the abundance of shale gas in the USA, European solar energy component manufacturers going out of business and a revival of interest in nuclear energy, all seem to point towards a cooling of interest in renewable energies in Europe. But, in fact, renewable energies may be more robust than it seems in the current economic climate.

Overall, global investment in renewable energies has not stopped rising for the best part of a decade, increasing from around USD 50

billion (EUR 38 billion) in 2004 and peaking at just over USD 300 bn (EUR 230 bn) in 2011, according to BNEF. In Europe, according to the latest REN21 report (2012), renewable energies accounted for 31.1 % of the EU27 electricity capacity in 2011, representing 71.1 % of new electric capacity additions, far outstripping those based on fossil fuels. Nevertheless, several different factors have recently led to a slowing of growth, in Europe at least, and are, it is true, creating uneasiness among investors.

Some of these factors are economic. In the throes of both a debt crisis and the euro crisis, Spain last year stopped all new feed-in tariff (FIT) contracts for renewable energies. Feed-in tariffs are an increasingly common form of subsidy, where governments agree to pay renewable energy electricity producers (usually utilities, but also private individuals in the case of solar photovoltaic and wind, for example) above-market rates for the energy they generate. The aim is to encourage investment and growth in the sector until the technologies become competitive in their own right. According to REN21, globally, 65 countries and 27 states had introduced some form of feed-in tariff by 2012. But, in Spain, the cash-strapped government was footing the bill for keeping renewable electricity prices paid to suppliers artificially high. Reluctant to pass the true cost onto the consumer, it felt it had to pull the plug on the scheme. With Spain's economy in crisis, the estimated EUR 24 billion debt that the government had accrued through its FIT subsidy was an obvious target for cuts.

But with Spain a leader in terms of wind and solar photovoltaic energy installations, this volte-face has shaken some investors. And, according to a report on wind energy published at the end of 2012 by the EC Joint Research Centre (JRC), Spain's cuts in FIT "...damages investment confidence and that will probably seriously affect the future of the industry and wind generation deployment."

Germany also reduced feed-in tariffs for solar photovoltaic (PV) energy last year and intends to reduce them further. But it would be wrong to read into this a cooling off of national interest in renewable energies because of the debt crisis. Indeed, Germany has already set its target for the proportion of renewable energy in the mix above the 20 % figure under the EU's Energy Directive, aiming for 35 % by 2020, 65 % by 2040 and 80 % by 2050. And the cuts in feed-in tariff last year were in response to the very success of Germany's renewable energy policy – or "EEG" (Erneuerbare-Energien-Gesetz). Massive take-up of solar PV has brought the costs of components down dramatically, leading to a glut and several bankruptcies among European manufacturers. This meant that high feed-in tariffs were no longer needed to stimulate growth. France, Italy and Greece also decided either to cut or cap FITs for solar PV.

But the picture in Germany is very different to that in Spain. Under the EEG system, the cost of the feed-in tariffs is passed on to the consumer as a surcharge on their electricity bills. And when environment minister, Peter Altmaier, announced in February this year his proposal to cap the FIT surcharge until the end of 2014 and then limit it to a 2.5 % increase per year, part of his reasoning was to prevent unpopular further rises in consumer electricity bills in an election year. The proposed cuts were, though, presented as a necessary economic measure. According to Altmaier, unless the FIT subsidies are curbed, they would reach EUR 1 trillion by the 2030s.

Although onshore wind energy and solar PV are now mature technologies with a healthy share of the energy market, a challenge for European governments weathering a recession is to continue to find backing for them and other essential components of the EU's SET-Plan strategy to meet targets for reduced carbon emissions, such as carbon capture and storage, still in its infancy. And this is where cheap coal and abundant supplies of shale gas may raise the stakes, forcing a new round of advocacy measures to continue to make the full range of low-carbon energy strategies attractive to investors. As the JRC says in its report on wind energy, "the perception that renewable energies (RES) are expensive often triggers a great debate in the media when the cost of supporting RES is transferred to the final user, but the benefit of it is not perceived."

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Additional information:

- JRC Wind Status Report 2012
- REN21 Renewables 2012 Global Status Report
- Clean Energy Investment Fell 11% as Governments Cut Subsidies - Bloomberg report 2013 by Louise Downing
- Full Michael Liebreich interview, MIT Energy Initiative, 2012
- Peter Altmaier's proposals reported in the Frankfurter Algemeine Zeitung

RUSTEC – the DESERTEC of the north – to help EU reach 2020 targets

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With many green energy projects put under financial pressure by the debt crisis in Europe, EU Member States may have to look further afield for help in meeting their 2020 targets.

Russia has for decades been one of the main suppliers of fossil fuels to the European market. But now, an ambitious new project may see the portfolio of EU energy imports from Russia augmented by wind power produced in the north of Russia and supplied to the European grid through Scandinavia.

The plan, which has been named RUSTEC, may help European countries meet their renewable energy targets by supplying cheap clean energy from dozens of onshore wind farms built across Russia's Murmansk region and hooked up to a "power bridge" supplying electricity to the European grid through Norway or Finland. The project is the brainchild of the International Finance Corporation (IFC), which believes that renewables in northwest Russia will be even more attractive to investors than the multi-billion-dollar DESERTEC project that inspired it. The IFC has initiated an independent verification study on the RUSTEC project, and will "define further RUSTEC-related activities" based on the findings and recommendations of this study.

Like DESERTEC, the main driving force behind the RUSTEC project is the EU's target of achieving 20 percent renewables by 2020 and proposed goal of 80 percent by 2050. The EU directive establishing the 2020 target explicitly allows Member States to draw on outside resources if there is a large renewable energy resource base that can be easily interconnected to the EU.

Russia seems to fit the bill. The wind resource in Russia's northwest is large, and RUSTEC aims to tap this resource and capture the region's renewable energy resources, which, because they are abundant and concentrated, could be more cost-effective to harness than offshore wind resources in Western Europe.

According to an IFC paper, Russia's electricity systems are already "interconnected with the network supervised by the European Network of Transmission System Operators for Electricity." There is already transmission in place between northwest Russia and Norway, Finland, Estonia, Latvia, and Lithuania. RUSTEC would require new capability however, and there are some plans already in place to ensure that this is created.

When dealing with Russian-EU energy relations, concerns about the security of supplies are never far from the surface. Past disruptions to natural gas supplies from Russia to Europe may make some EU Member States wary about deepening European dependence on Russian energy. However, traditionally the greatest risk to fuel supplies from Russia has arisen from disputes between Russia and transit countries. The RUSTEC project plans to supply electricity from Russia directly to the EU, thereby mitigating the transit risk. The proposers of the RUSTEC plan acknowledge that developing resources outside the EU would prevent EU Member States from reaping all the social and economic benefits of developing domestic resources. Consequently, RUSTEC would need to balance EU economies' loss of domestic opportunities with improved opportunities to export intellectual property and high-tech equipment.

Doubts also have been expressed about the instability and unpredictability of the Russian investment climate, and that this may have a negative impact on the business aspects of the project. But the authors of the IFC report observe that RUSTEC could result in improved EU-Russian cooperation if strengthened contractual, regulatory and political agreements reinforce power purchase agreements (PPAs) and bilateral investment treaties. They see the building of pilot projects delivered through existing infrastructure as a feasible short-term way forward.

For the longer term, the analysts suggest an agreement between participating nations to take "appropriate steps" toward further development of interconnection capability. They also suggest the possibility of using proceeds from the EU's Emissions Trading Scheme (ETS) to fund intermediate steps.

The investment climate, however, is not the only hurdle that will have to be overcome in Russia itself. With fossil fuels playing such a significant role in Russia's economy, and fossil fuel producers wielding significant domestic economic and political clout, there has been a certain amount of ambivalence about renewable energy projects in Russian political circles in the past. Speaking at a party conference when he was serving as prime minister back in 2010, Russian President Vladimir Putin noted the threat to birds and other wildlife posed by wind turbines and generally sounded dismissive about the future of alternative energy. However, there have been some signs recently that the Russian authorities are softening their stance on renewables.

Russia's Energy Ministry, along with the Russian Regional Development Ministry, has finalized a draft set of measures to stimulate the development of electricity from renewable energy resources. This document has been submitted to the Russian federal executive for approval and subsequent submission to the Russian government. The set of measures includes suggestions for changes in federal legislation and regulatory acts to enhance the investment attractiveness of renewable energy.

Russian Deputy Energy Minister Anton Inyutsyn said back in November that draft decrees to clarify the legal status of renewables should be ready for publication by the end of 2012, and that these would address a long-standing complaint amongst would-be wind entrepreneurs that the law simply ignored their technology, and make it easier for them to hook up to the grid.
Anatoly Kopylov, vice president of the Russian Wind Energy Association, which represents both Russian and foreign wind energy firms, has been reported as saying that a preliminary agreement between government and business over the shape of the renewable market has already been agreed. He said that the law would not copy the European model of higher feed-in tariffs for renewable electricity to cover the higher costs of alternative energy generation. Instead the government will set a quota for renewable energy to be fed into the national grid each year. Alternative generators would then bid to supply a proportion of that quota and the government would sign contracts with the lowest bidders.

A recent EWEA report on emerging European wind power markets identifies Eastern Europe as one of Europe's new wind energy frontiers, and sees these markets as necessary to offset anticipated declines in the near future in some of the more mature Southern European markets. The report, however, also points out the lack of political appetite for renewables in Russia.

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That said, Russia's current electricity generation portfolio is estimated at more than 220 GW of installed capacity, of which 67 percent is thermal. Some forecasts predict that, without significant upstream investment, Russian gas supply could fall short of projected domestic and export demand within the next few years. Despite a four-fold increase in the domestic tariff for natural gas between 1999 and 2006, domestic gas consumption in Russia has continued to grow. In these conditions there may be increased political appetite to accelerate the development of alternative energy sources, and RUSTEC and other renewable energy projects stand to reap the benefit of this change in attitude.

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