the independent platform for the energy sector

EUROPEAN ENERGY REVIEW

Be part of the energy transition

7 - 9 February 2012

a special supplement for E-World by European Energy Review

Contents:

Dear visitors,

We don't have to guess what will be the main topic of discussion this year at the E-World 2012. It will be all about the "Energiewende" – and what this means for the future of European energy. The German government's decision to phase out nuclear power – in combination with the ambitious German and European climate and renewable energy targets for 2020 and beyond – will have a profound effect on all sectors of the energy market. To put it a bit crudely: it is good news for wind and solar power, for e-mobility and energy efficiency, for biomass and biogas – and for the gas sector in general. It also has important consequences for the electricity networks in North West Europe and for the power trading markets.

In a way it is also good news (if you want to put it like that) for European Energy Review (EER), since all these issues are close to our heart. EER is an independent online medium that reports on – and analyzes – developments in the energy market from a unique European perspective. We look at how EU and national policies impact on markets and vice versa: how markets and technologies influence policies. And I think we can say we offer some of the finest reporting in this field. Last year we even won the annual Award for Excellence in Written Journalism from the International Association for Energy Economics (IAEE).

We are very glad, therefore, that we are able now for the first time to present a special E-World issue of EER, through which we hope to present EER to those at E-World who have not heard of us yet. We can do this thanks to the support of the advertisers that you will find in this special supplement. They are not responsible of course for the content of this E-zine, but they did help to make it possible.

In this EER E-World Special Supplement we have decided to focus on three topics:

- We present an overview of the development of **smart grids and meters** in Europe.
- We look at trends in the European gas market from the perspective of the important **Central European Gas Hub** in Austria.
- We discuss the extremely ambitious **Danish plans for offshore wind power**.

All these developments are impacted of course by German energy policy and vice versa: they in turn will have a profound impact on the German energy situation.

We hope you will enjoy the stories and check out on our website what more we have to offer, as this is only a small selection. Thank you very much for your interest and good business at the E-World!

Karel Beckman, editor-in-chief
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E-world energy & water

The sector's most important forum

The energy sector is undergoing an extreme transformation. The three-day congress which will accompany E-world energy & water on February 7 - 9, 2012 will focus on the current developments in the sector. In 20 conferences, renowned experts will talk about subjects close to the market.

In this respect, the lectures and the workshops will relate, amongst other items, to the energy revolution, the gas market, statutory foundations, the extension of the networks, ecomobility and the position of regenerative energies in the energy mix of the future.

Thus, E-world energy & water will be the sector's most important forum which will provide the protagonists with comprehensive information and will invite them to transfer know-how.

In the "Ecomobility Conference" (February 8), Michael Siebert, Head of Communications Inside Electric Car at Siemens AG in Nuremberg, will speak about the implementation of a new infrastructure in the field of ecomobility. In this connection, the expert will also address the subject of the potential of new charging technologies in this sector. Dr. Gerhard Holtmeier, Chairman of the Supervisory Board of erdgas mobil e.V. and Member of the Board of Thüga AG in Munich, will talk about sustainability in ecomobility using natural-gas and electric vehicles. Manfred Ungethüm is the Managing Director of Trianel Kohlekraftwerk Lünen GmbH & Co. KG. He will examine the effects of the energy revolution on conventional energy generation. His lecture will take place within the framework of the congress entitled "Renewable Energies and Their Effects on the Network Against the Background of the Current Political Situation" (February 8). In the "Gas Conference" (February 7), Rune Bjørnson, Vice President of Statoil ASA in Norway, will speak about the energy source which is becomingever more important and about Statoil's prospects on the German gas market. Dr. Dieter Steinkamp, Chairman of the Board of RheinEnergie AG in Cologne, will report on the prospects for natural gas in Germany. Innovative and future-oriented: The congress called "What Market Design Does the Energy Revolution Need?" (date: February 8) will be dedicated to a particularly topical question. Matthias Kurth, President of Bundesnetzagentur ("Federal Network Agency"), will deliver a lecture on the structure of the future generation market. Andreas Mundt, President of Bundeskartellamt ("Federal Cartel Office"), will give possible answers to the challenge of "Market Design or Market Economy?"

Read the full congress programme here.

but serious obstacles still stand in the way of a real smart grid revolution

Smart grids move from research to early industrialisation phase

by **James Osborne**

Smart grids – everyone agrees they are needed to transform our energy system. And indeed, projects are multiplying across Europe. Still, long-term success is by no means guaranteed. New regulatory frameworks are needed to provide investment incentives. And new players need to be brought into the market: Google-type companies that can get consumers to start having fun with their energy consumption. Milan-based journalist James Osborne took a smart ride across Europe.

The good news …

Here is the good news: European industry has moved from the first, R&D phase of smart grids into a second stage that involves not just testing individual technologies but complete smart grid 'solutions'. Most of the experts we talked to are agreed on that. 'Compared with two or three years ago, **smart grids have moved from an academic phase to an early industrialisation phase**,' says Laurent Schmitt, vice president of smart grid solutions at Paris-based Alstom Grid.

The demonstration projects under way now are seeking to test a 'first phase of industrialisation', he says, involving larger numbers of end-users as a way to find a 'consumer context.'

All over Europe **an explosion of smart grid projects is taking place**. The European Commission's Joint Research Council (JRC) and industry association Eurelectric have published an inventory of all of the projects going on. They came to 300, which are all displayed on an interactive map on the website www.smartgridsprojects.eu. Some €5 billion is being invested in these projects, of which €3 billion is going into smart meters.

To give just **one example of a next-generation project**, in Isernia in central Italy, Enel is investing €10 million in building what it calls a true smart grid – an electricity network in which production and consumption are integrated in real time through information and communication technologies. Several thousand customers will be equipped with a Smart Info, a device that, among other



things, gives them real-time pricing information. The location was chosen because it is a centre of renewable energies, in particular solar power, hydroelectric power and biogas. The need to integrate intermittent renewable energy production and forms of decentralised power generation is of course one of the main drivers for the development of smart grids.

In addition, Enel is carrying out an €8.2 million project in Forlì-Cesena that also aims to maximise the integration of renewable energy. At the heart of this project is a control system that is able to connect via the internet the renewable generators with all the relevant facilities of the medium voltage network, including storage devices, to achieve maximum flexibility.

And the bad news

But there is bad news as well. All of this activity does not mean that the smart grid is here to stay. It still has **a number of structural challenges to overcome**. The four biggest ones are:

- The need for a proper regulatory framework that provides the right incentives for investments
- Standardisation
- Getting consumers to participate in the system
- Developing business models that will make it attractive for suppliers and consumers to be come part of the smart grid transformation.

We will take a look at each of those.

Challenge #1:

Regulation and investments

At this moment, utilities operating in the highly regulated market for electricity distribution have little incentive to invest in innovation, especially in researching and developing technologies with uncertain outcomes. The reason is simply that they don't get paid for it! Regulators set tariffs on the basis of costs, not with an eye to making large investments in technological innovation.

'Over the last 20 years, distribution system operators (DSO's) have faced little technological innovation in the way they plan, invest in and operate their networks,' explains Eurelectric, the industry body, in a report ("Regulation for Smart Grids") on how current regulation hampers investment in smart grids. 'Instead, innovation has been mainly about reducing operating expenditures or creating new, more efficient financial structures.' Eurelectric notes that, as new technologies will need to be developed, **'DSO's will need appropriate incentives to innovate.'**

'Europe is the region most exposed to renewable generation in the world and this puts us three to five years ahead of other countries, including China and the U.S.,' says Alstom's Schmitt. 'But we are behind in regulation and finding ways to move forward.'

Case study: UK poised to take the lead in smart grid action? (1)

Many observers in the energy sector are very positive about the efforts the UK is making to facilitate the development of smart grids. Energy regulator Ofgem has created a £500 million Low Carbon Network Fund (LCNF) to encourage distribution network operators and other players to try out smart grid solutions. The aim is to get utilities to test new technologies, operating practices and commercial arrangements.

Ofgem understands that the learning process is not just for individual utilities but for the whole energy industry. 'Lessons learnt from the projects will be shared with all network companies and other interested parties', says Rachel Fletcher, Ofgem's acting senior partner for smarter grids, governance and distribution. 'The aim here is to ensure that the networks do not hold up the decarbonisation of our energy use, and that the cost of this transition is kept as low as possible for customers.'

'Ofgems's Low Carbon Network Funding projects are a best practice that other European governments should look at very closely,' says Keith Redfearn, general manager for the Digital Energy business at GE. 'Research and education on what a smarter grid can deliver to us as a

From smart meters to smart grids

Energy gets smart

It is nighttime. The solar panels on the roof are taking a break. But down in the basement and in the carport, the washing machine and electric car are making use of the large stocks of readily available wind power, for both a colored wash and a battery charge. They were given the go-ahead by the smart meter in the meter cabinet. This central control unit connects the washing machine, charging station and the other electrical equipment in the household as well. It identifies all offers from energy suppliers and combines these with the customer's needs. The meter "knows" that the electric car is not going to be used the next day, so it will release part of the battery power in the morning and feed it back into the grid when there is a general increase in electricity demand. The power grid and its assistants "think" independently, recording and analyzing energy supply and demand and taking responsibility for management, storage and transport.

New Challenges for the Grid

There is an urgent need to modify the power grids which have been used up to now to transport electricity from the power plant to the consumer. The energy world is changing, with generation plants that utilize renewable energy sources gaining in importance, such as wind and solar farms. This means an increasing amount of power which is subject to strong fluctuations. Power generation is also becoming increasingly decentralized. Our customers can install solar panels on their roof or a mini-cogeneration power plant in the basement and thus become producers themselves, supplying power to the grid. The coming fleet of electric cars will also offer new capacity for storage. We also know that the average car stands idle for 23 hours a day. That leaves plenty of time to charge it during cheaper, off-peak periods. The task of harmonizing supply and demand gets that much more complex. In between the two comes the grid, which must be equipped to face these challenges.

Smart grids at E.ON

E.ON is tackling this challenge. The group is already researching many aspects of the use of smart grid technology in over 110 individual projects. These focus on findings regarding power flow and its dependence on wind, sun, consumer behavior, batteries (for example in electric cars); integration in the existing system landscape (network control systems) and the identification of suitable components for communications technology in transformer substations, electrical substations and network control stations. The future of the grid has already begun at E.ON.

Smart Metering at E.ON

The task of bundling experience in Smart Metering within the E.ON Group and further developing energy measurement as a new technology and driving forward standardisation in the technology has been in E.ON Metering's hands since the middle of last year. For more information please visit the Kompetenzcenter E.ON Metering.

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Brochure: Energy gets smart

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The European Union does provide various support schemes. The 300 smart grid projects counted by the JRC received a combined €184 million from the EU's so-called 6th and 7th Framework Programmes plus some €200 million from the European Recovery Fund, European Regional Development Fund and the European Energy Research Alliance.

And the European Commission is pushing for regulatory changes to encourage smart grid implementation. But it admits that progress is slow. 'There is a considerable gap between current and optimal investment in Europe, which can only partly be explained by the current economic downturn,' the Commission warns in its communication paper on smart grids of April 2011. **'Unless a fair cost-sharing model is developed and the right balance is struck between short-term investment costs and long-term profits, the willingness of grid operators to undertake any substantial investment might be limited.'**

Challenge #2:

Standardisation

Another major hurdle lies in the development of common standards for smart grid technologies, including smart meters. The Commission called on European standardisation organisations to provide standards for communication by March 2010 and complete harmonised solutions for additional services by December 2011. But the process is well behind schedule. **The reference architecture and first set of standards are now due to see the light of day at the end of 2012**, even though some say that the broad outlines of smart grid technologies are already becoming clear enough for industry players.
'Some utilities are taking a gamble and making wide deployment before standards are developed,' says Scott Petersen of Honeywell Building Solutions. 'But many are holding back.' To get around this barrier, Honeywell has abandoned its usual approach of using proprietary technology and embraced open standards. This reduces risk for clients such as utilities, which are wary of getting stuck with a system that becomes obsolete or else find themselves unable to change smart grid solution provider, explains Petersen.

Challenge #3:

Consumer behaviour

A key question is: how will people respond if they get the possibility to become smarter in their energy use? And will utilities be able to develop the more complex relationship with their customers which smart grids require?
While demonstration projects logically focus on 'enthusiasts' and early adopters, many users may not want to spend their days worrying about managing their 'smart' home. According to Christine Hertzog, a consultant based in Silicon Valley, author of the Smart Grid Dictionary and co-author of The Smart Grid Consumer Focus Strategy, **a commercial space is likely to be created not just by utilities themselves but also by other players that are more finely tuned into consumer technology trends**, such as cable TV providers, consumer electronics retailers, telephone companies and software developers.
These companies may be interested in proposing smart home offers alongside home security, home health and health-style applications, says Hertzog. 'Many consumers don't want to understand smart grids better,' she says, just as people don't need to understand how the Internet works in order to use it. We should not expect everyone else to think as much about it as anyone in the industry. If we are smart, it will be just the same service they enjoy now with the possibility of more active engagement.' A lot of the energy-efficiency work will be done instead by machine-to-machine applications.

Challenge #4:

Right business model

But the biggest challenge may be how to get all the players to do their part and put everything together so that the smart grid system can subsequently develop "spontaneously".

Case study: UK poised to take the lead in smart grid action? (2)

society is crucial.' The latest round of funding, announced in late November, saw Ofgem approving £57 million to six projects. They include installing electric storage batteries in homes, schools and an office to see if customers can be encouraged to use this stored electricity at times of peak demand. Other projects involve better use of existing network capacity to manage congestion on the grid and integrate new low-carbon generation without having to build new power lines. The biggest recipient – £22.8 million – is an automated demand response project for commercial and industrial energy users, led by Scottish & Southern Energy Power Distribution. The system will allow the utility to work with its business customers to temporarily reduce or shift energy use when overall demand spikes. Big energy users such as shopping centres, offices and factories will be alerted to expected peaks in energy use and grid congestion. They will have contracts that provide incentives for them to reduce their energy use at such moments. Scott Petersen, marketing and strategy director for energy solutions Europe & North Africa at Honeywell Building Solutions says the system should be able to reduce companies' energy demand by 10% with little or no impact on their operations.

The Joint Research Centre concluded in its report that most technologies are known, 'but **the new challenge that these projects are now confronting is their integration.**'

The Paris-based International Energy Agency (IEA) concluded more or less the same in a recent in-depth "Technology Roadmap on smart grids". 'The broadness and complexity of the electricity system – technologically and from a regulatory and market perspective – and its importance to society in general, increase the necessity to understand who should perform the actions outlined in this roadmap. Neither the government alone, nor the private sector alone, can accomplish the goal of modernising the electricity system', says the IEA. 'Collaboration is vital.'

Frits Bliek, of the Dutch energy consulting and certification company KEMA, compares the situation to that of the early phase of the internet. 'It's like getting the Internet into place,' he says. 'Once the basic components are in place, it's a question of moving into an area where all kinds of interactions come into place.'

Bliek is project leader of the Smart Energy Collective, a Dutch industry initiative that involves more than 30 companies from different sectors, including international ones like ABB, Philips and Siemens. They are doing what the IEA wants them to do: collaborating on developing intelligent energy concepts and innovative business models to take those concepts to the market. '**We are trying to create models that allow for the integration of technologies across different parts of the value chain**', says Bliek. 'Not just doing a demo for the sake of the demo.'

And that, of course, is where the smart grid needs to go. ■

Facts and figures

An often-cited study published by Pike Research in February 2011 estimates that cumulative investment in smart grids in Europe will total €56.5 billion between 2010 and 2020, with 37% of that sum being spent on transmission. The Pike report also forecasts that Europe will deploy 240 million smart meters by 2020. Today there at 45 million in use.

Do smart grids deliver results in terms of energy savings? The evidence indicates that they do. According to Enel's experience in Italy, consumers with smart meters have reduced their energy consumption by as much as 10%. In the UK, the AlertMe project allowed residents to turn off appliances by web interface or mobile, which led to savings of roughly 40%. In Spain, forecasts by the Active Demand Management (GAD) project, led by Iberdrola, show that an average consumer could save 15% of total energy consumption.

Smart grids are considered essential in helping to implement electric cars into the electricity system. The International Energy Agency (IEA) forecasts that electric vehicles and plug-in hybrid vehicles will make up 10% of global electricity consumption by 2050, potentially exacerbating peaks in demand. Smart grid technologies will therefore be necessary to make sure charging will take place when demand is low and/or supply is high.

PowerMatching City, a living lab smart grid

PowerMatching City is a living lab Smart Grid demonstration in the Netherlands consisting of 25 interconnected households. It focuses on the development of a market model for intelligent network operation under normal market conditions that allows simultaneous in-home optimization (prosumer), technical coordination (distribution system operator) and commercial coordination (balance responsible). The coordination mechanism, provided by the agent based PowerMatcher technology, is extended to allow these simultaneous optimizations.

For more information on PowerMatching City visit www.kema.com or www.powermatchingcity.nl.

KEMA

The ambitions of Gottfried Steiner, CEO of Austria's Central European Gas Hub

'This will be a heaven for traders'

by **Alexander Bakst**

Austria's Central European Gas Hub (CEGH), situated at the crossroads of gas routes between East and West, wants to become one of Europe's major trading hubs. In an interview with European Energy Review, CEO Gottfried Steiner reveals CEGH's strategy to expand the hub's spot-market trading, raise its liquidity and diversify the supply lines to the physical hub at Baumgarten, the most important trading point of CEGH. 'There will be a lot of gas from different sources all coming to Baumgarten. It will be like heaven for traders.'

The European gas market is, slowly but surely, undergoing a radical transformation. Traditionally it has been dominated by a few large, state-owned suppliers (notably from Russia and Norway) who had long-term contractual relationships with a limited number of large buyers, e.g. German utilities like Eon and RWE (who also used to be state-owned).

This Ancien Régime is now slowly falling apart. From the mid-1990s, the European Commission has begun a long process of liberalising European gas (and electricity) markets. The ultimate aim is to have a competitive, integrated European market in which a lot of different suppliers, traders and buyers are buying and selling gas on a day-to-day basis. In this scheme long-term contracts, such as Russia's Gazprom offers, still have a place, but a significant part of the action will take place on spot markets.

In fact, the Commission's dreamed-of gas market model already exists, namely in the United Kingdom. The UK's National Balancing Point (NBP) is by far the largest spot gas market in Europe. On the Continent, things are moving more slowly, but Continental spot markets are catching up, in particular the TTF in the Netherlands, Zeebrugge in Belgium and the Central European Gas Hub (CEGH) in Austria.

Liquidity

The CEGH is unique among trading hubs in that it is intimately connected to the physical gas junction at Baumgarten an der March

in Austria, which is the most important node for gas transit through Europe. A third of Russian gas supplies go through this distribution station operated by Austria's energy company OMV. Two major planned pipelines – Russian-backed South Stream and EU-backed Nabucco – will (if they get built) also go to Baumgarten.

In response to the dynamic developments on the European gas market, OMV established the CEGH in 2005. Its aim: to become a key player in the newly evolving liberalised market. Responsibility for carrying out this task lies in the hands of the CEGH's new management team with Gottfried Steiner as CEO and Bernhard Seiberl as Chief Operating Officer.

Gottfried Steiner, a young, charismatic professional who joined the company in May 2011 and now occupies an office on a high-up floor of the Floridotower, one of Vienna's tallest office buildings. In a conference room overlooking the city, he speaks in soft, measured tones of his plans to bring the Central European Gas Hub to the same level of liquidity as the Title Transfer Facility (TTF) in the Netherlands or NCG in Germany, Continental Europe's two largest gas hubs by liquidity. In the coming years, Steiner and Seiberl will oversee an expansion of the CEGH's spot-market and futures trading, the introduction of a within-day market and the consolidation of Austria's fragmented flange-based trading points into one single virtual trading point (VTP).

Steiner knows Austria has one very important asset: some 50 kilometres east of the Vienna headquarters is the physical gas junction at Baumgarten an der March, a sprawling facility adjacent to a tiny village with only a few hundred residents. The station took up operations in 1959, and since 1968 most of the gas that flows through its pipes has been traded via long-term contracts with Russia, the hub's main supplier. This friendship with Russia has enabled Baumgarten to become the largest physical gas junction for natural gas in Central Europe with an annual transport volume sold of 90 billion cubic meters (bcm). Steiner makes it clear that this relationship is not about to change. 'We are close friends', he says of his Russian colleagues at Gazprom. 'This is a historical connection that we value very much.'

Entry/exit system

At the same time, though, Steiner is well aware that the gas market is changing. The European Commission wants to reduce Europe's dependence on Russian gas. It wants to see spot markets appear and supplies to be diversified. Enter CEGH, a market-based trading platform jointly owned by OMV Gas & Power GmbH (80%) and the Vienna Stock Exchange (Wiener Börse AG, 20%).

CEGH has been taking steps to broaden market participation and increase the "liquidity" at the hub. (Liquidity is the degree to which an asset can be bought or sold without affecting its price, which is the case when there is a high level of trading activity.) But first it has to take one "internal" hurdle. Currently there are still a number of different "physical trading points" (i.e. OTC spot markets) in Austria, including Baumgarten, Oberkappel, Überackern, Weitendorf and Murfeld. CEGH is set to integrate all these locations together with its "Integrated Trading Area Baumgarten" into a single Virtual Trading Point Austria by 1 January 2013. 'We are quite confident that CEGH will be nominated to become the virtual trading point for Austria in 2013', Steiner says. 'We have all the provisions in place to fulfill this task accordingly.'

In line with this plan, the Austrian gas market will become organised as a single entry/exit

system as of 2013. This means that traders will pay an entry/exit fee for the transport of the gas between the entry and exit point regardless of the distance the gas travels. This allows traders to trade the gas in the system on the "virtual" market without physical limitations. Steiner says the new entry/exit system "is not only good for Austria and the gas markets, it is also good for CEGH."

Indeed, the CEGH has already seen improvements in several key indicators commonly used to measure liquidity. For one, the "churn rate" has increased steadily to almost 3.5 in August 2011 from just under 2.5 in 2006. This means that every unit of physical gas is traded an average of 3.5 times before leaving the hub. Membership has increased from some 20 registered members in mid-2006 to 130 in 2011, and hub nominations have risen to over 4,300 per day – up from roughly 300 in 2006.

The market has also become progressively less concentrated (more competitive) since it started in 2006.

In a final step, CEGH plans to introduce a cross-regional balancing platform. Steiner believes that with these steps and with new pipelines coming to Baumgarten, 'we will have reached at least the same liquidity parameters as for the TTF', currently the most liquid gas hub in Continental Europe.

Nabucco and South Stream

For the future, the Austrians are hoping to see new major sources of gas connected to Baumgarten, in the form of the by now famous (but yet to be built) pipelines Nabucco and South Stream. 'We have a big interest in the success of the Nabucco pipeline', Steiner says. Nabucco would transport gas from the Caspian Sea region (Azer-

'I truly hope that both of them will come, as this would bring a lot of opportunities for the markets.'

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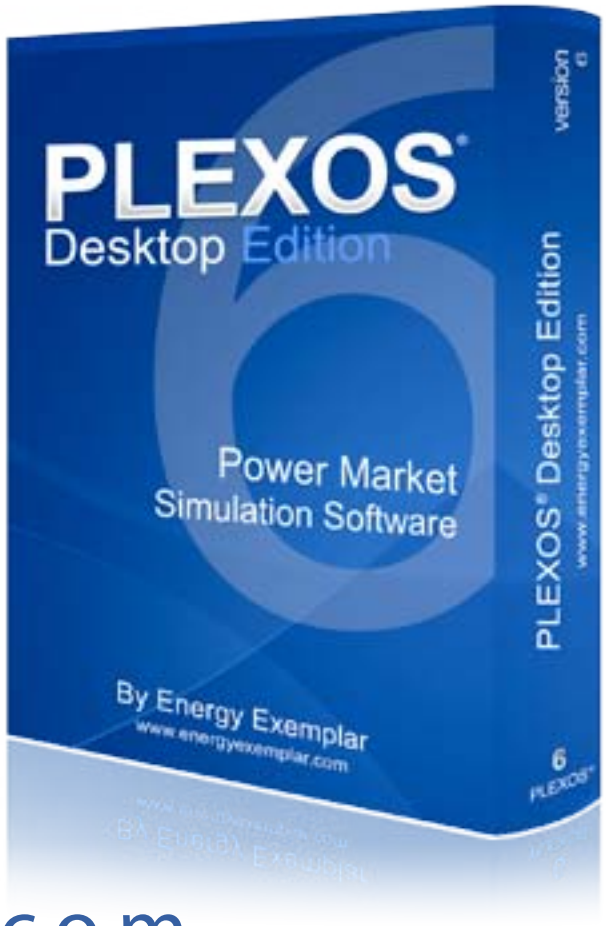

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baijan, Turkmenistan) and the Middle East (Iraq) through Turkey, Bulgaria, Romania and Hungary to Baumgarten. The 3,900-kilometer pipeline was conceived in 2002, and the first phase of construction is expected to be completed in 2017 – if, that is, sufficient gas is sourced to allow the partners to give the green light to the project. The pipeline, which is to have a transport capacity of 31 bcm per year, is a joint venture between RWE, OMV, BEH (Bulgaria), Botas (Turkey), FGSZ (Hungary) and Transgaz (Romania), who each own an equal share. 'The Nabucco pipeline will give the producers the possibility to monetize their gas, and we will provide the marketplace for them to make this happen', says Steiner.

At the same time, Russia launched its own project in 2007, South Stream, which is commonly viewed as a competing pipeline, as it will transport Russian gas along partly the same route: through the Black Sea and then through Romania, Serbia, Hungary on to Baumgarten. But Steiner believes the Nabucco and South Stream pipelines can coexist. 'I don't think South Stream is Russia's answer to Nabucco, South Stream is diversification of supply routes, not sources', he says. 'I truly hope that both of them will come, as this would bring a lot of opportunities for the markets.'

As Europe's own gas production dwindles amid growing demand, Steiner believes there will be enough appetite for natural gas to support both pipelines. 'You will have gas from a lot of different sources all ending in Baumgarten, and this is like heaven for the traders.'

Storage options

In addition to its central location, the CEGH and Baumgarten have yet another ace up their sleeve that increases their attractiveness to suppliers and traders: a lot of storage capacity. In 2010, OMV could make use of a storage capacity of 2.4 billion cubic meters (bcm), enough to cover Austria's winter-time demand for three months. The OMV storage reservoirs are located between 500 and 1,500 meters beneath the surface, and are spread across three stations in Austria: Schönkirchen and Tallesbrunn both close to Baumgarten, which is an additional advantage for trading at CEGH, and storage Thann in Upper Austria.

In addition, another Austrian energy firm, RAG (a joint-venture of Eon and EVN, among others) owns an equal amount of storage capacity in Puchkirchen and Haidach. The storage at Haidach is a joint-venture between RAG and Gazprom. OMV has plans to expand its overall capacity with the addition of new storage capacity near Baumgarten an der March. The reason is clear: 'Storage allows us to offer physical flexibility to our customers', says Steiner.

The market decides

So who will win the race to become the biggest Continental European gas trading hub? Or is it conceivable that the existing hubs will merge into one big trading hub, serving the entire European market? Steiner doesn't believe that will happen anytime soon. 'The evidence indicates that there will be no single gas hub in continental Europe. There are still too many physical obstacles within the pan-European pipeline infrastructure. So this has to be a long-term goal.'

Until then, he says, the European gas market will remain fragmented with 'regions defined by the regulators and by the markets'. And who will be the biggest? Steiner: 'This is something that, at the end of the day, the market will decide.' ■

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Anders Eldrup, CEO Dong Energy

How to make the world safe for offshore wind

by **Karel Beckman**

The relatively small Danish energy company Dong is world leader in offshore wind. With a large pipeline of projects, and institutional investors lining up to participate in them, the state-owned company is bound to remain so for some time to come. CEO Anders Eldrup explains the strategy behind Dong's offshore wind activities: 'We are working towards an industrialisation of the sector. With one goal: to bring costs down.' But with how much, he does not want to say. Karel Beckman reports from Copenhagen.

Visitors to the London Olympics next year, taking a cruise on the Thames Estuary, may see a pretty impressive sight. To wit, what will then be the biggest offshore wind park in the world: the London Array.

Here are some facts and figures. The park will consist of 175 turbines spaced between 650 and 1,000 metres apart over an area of 240 km2. They will each be 147 metres in height – half the Eiffel Tower (although just 87 metres will be towering above sea level). Total power capacity: 750 MW, equivalent to an average coal-fired power station, enough to power 450,000 homes. Initial investment: €2.2 billion. And this is just the first phase. Total investment will go to more than €3 billion if phase 2 – another 370 MW – gets built. That would make it the world's first 1GW wind farm.

Did we say impressive? Well, maybe. But the London Array with its 175 Towers of Power is just one of dozens of similar wind parks that are expected to be built in the coming decade in European waters. The European Wind Energy Association (EWEA) predicts that offshore wind power capacity will grow from 3,000 MW in 2010 to 40,000 MW in 2020. That is 40 London Arrays – about 4320 Eiffel Towers.

This phenomenal growth is mainly due to huge investments in offshore wind power planned by the EU's three largest economies – the UK, Germany and France. In EWEA's "baseline scenario", the UK government will expand its offshore wind power capacity from 1340 MW in 2010 to 13,000 MW in 2020, Germany will grow from 92 MW to 8,000 MW, France from zero to 4,000 MW.

This wind power revolution in North West Europe's seas will only happen, however, if all national plans are carried out – which is still something of an "if". Thus, for example, EWEA's figures include a strong growth of offshore wind power in the Netherlands (from 247 MW in 2010 to 4,500 MW in 2020), but the current right-wing Dutch government has stopped funding offshore wind projects, making achievement of the Dutch target next to impossible.

So far, though, the Netherlands appears to be only country that has had second thoughts. Germany and France show no signs of wavering. In the UK, which has by far the most ambitious plans, some doubts are emerging about the possible costs. The UK government has installed a panel that has been given the task to find ways of cutting the costs of offshore wind over the next decade. Still, there are no indications that the UK will not stick to its plans.

World leader

If there is one company that is ready to take advantage of the offshore wind revolution in Europe, it is Danish state-owned energy company Dong. Indeed, Dong – relatively small as it is with revenues of DK 54.6 billion (€7.3 billion) in 2010

– is word leader in offshore wind. At the end of 2010, it had 691 MW of offshore wind power capacity either in operation or under construction. It is 50% owner of the London Array. (The other owners are Eon and Abu Dhabi investment company Masdar. The European Investment Bank and the Danish Export Credit Fund have put up £250 million in financing.) But for Dong this is just a start. It expects to have 2,000 MW of offshore wind capacity online by the end of 2014. The target for 2020: at least 3,000 MW.

Dong was a pioneer in this sector. It built the world's first offshore demonstration farm in 1991 – 11 turbines with a total capacity of 5 MW near Vindeby in Denmark. Yet, the Danish company has two faces: a green one and a black one. Dong still relies on coal-fired power for 75% of its production. However, this is about to change. The Danes have set themselves a target of reaching 85% of its electricity production from renewables and 15% from fossil fuels. Already, Dong has shut down four of its coal-fired power stations. Two more are scheduled to be closed in the next two years.

The man behind this "green" transformation is Anders Eldrup, a former high-ranking civil servant at the Danish Ministry of Finance, who has been CEO of Dong Energy since 2001. Eldrup decided to change the company around in 2008 at a crucial moment: Dong was on the verge of building a (highly efficient) coal-fired power plant in Germany. It was also on the point of being privatized and ready to take part in the wave of acquisitions then sweeping over the European energy market. But – after the company had been unable to make acquisitions and the privatisation plan was dropped – Eldrup decided to make a radical break: to turn his back on coal and put his cards on wind power.

Climate activism

Strong public opposition in Germany to the coal plant project played a role in his decision. As did the fact that Copenhagen was then preparing for the "make-or-break" UN Climate Conference that was to take place in December 2009. Eldrup was one of the members of the Copenhagen Climate Council, founded in 2007 by a group of 30 "global leaders" of business and science. The Council's aim was to 'deliver a clear message' to the UN Summit in Copenhagen, to the effect that 'reducing climate change while allowing for continued economic growth' was the way to go.

Although the climate conference ended in disappointment, Eldrup continued his climate activism. He became one of the founders of Green Growth Leaders, set up in September 2010 in Copenhagen by the Scandinavian think tank Monday Morning, the City of Copenhagen, DONG Energy and the Danish Realdania Foundation. This group too consists of some 30 to 35 influential persons.

So how does Eldrup intend to turn the company around? For the prospects for offshore wind may be awesome, so are the challenges facing the sector. According to the EWEA just for the ten-year period 2011-2020 €66 billion should be invested in offshore wind in Europe. Other sources (including Eldrup himself) mention even higher numbers – over €100 billion. Can investors be found to put up this kind of money? And will the governments of the major countries continue to support offshore wind to enable this kind of investment?

An equally important question is: how can those costs be brought down? The EWEA estimates that capital costs for offshore wind are €3000/kW, which is 2.5 times as expensive as for onshore wind. On this last crucial question, however, Eldrup refuses to respond in detail. 'Costs will go down', he said, 'but I won't put numbers on this nor a timeline.'

How important is it for you to be the world leader in offshore wind?

It is nice, but what matters is that we are bringing the business model further. We are working towards an industrialization of the sector. We are the first to have made a framework agreement with a turbine supplier (Siemens), from whom we ordered 500 turbines, so that they can standardize the production process and bring costs down. We have done the same with a supplier of foundations and a supplier of cables. So we don't work project by project, but we are building up a portfolio of orders that will allow our suppliers to produce on an industrialized basis, as in a car factory. We also bought our own shipping company and we are having a special maintenance vessel made for us in China. In addition, we rent our own harbour in Belfast, which can handle the ever bigger turbines we are using. The Belfast harbour is very good for this purpose. We do all this with one goal: to become more efficient, to bring costs down. In this way we also develop some unique expertise of course.

So how high are the costs of offshore wind power now and how much do you expect to bring them down?

I won't go into specifics on that. In onshore wind we have seen great cost reductions. Offshore wind is only seven, eight years old. That means there still is a lot of potential. Obviously logistics – the supply chain – are crucial. With all the projects that are now starting to be developed, now is the time to make offshore wind more competitive.

But couldn't you put any numbers on this?

No, I don't want to do that. Not yet.

Good sites are increasingly difficult to find. That will drive up costs.

Yes, the first sites were close to shore. Round 2 and round 3 (bidding rounds for concessions, editor) in the UK are further from the coastline, in deeper water. That leads to new challenges.

'There are always discussions going on, that's normal in a democracy'

You need new types of foundations, longer cables. That may increase costs. But the round 3 wind farms will be much bigger, so there will be economies of scale. Turbines are getting bigger, they are now between 3 and 4 MW, they will be 6 to 8 MW, so the production from each turbine will grow significantly.

In the UK a discussion has started about the costs of offshore wind. There seems to be something of a backlash, especially among Conservatives. Does that worry you?

The UK government published a White Book in June, which said they will stick to the targets, on one condition: that prices will come down. The government has set up a panel, in which we are represented, to look into this. That is the official situation. For the rest, there are always discussions going on, that's normal in a democracy.

Aren't you very dependent on the UK market?

The UK market is very important for us, but Germany is coming up too, and France. Offshore wind used to be something only those peculiar Danes were doing. Now the UK, Germany and France, the three biggest countries in Western Europe, all have ambitious plans. France will be offering six sites this autumn. The expectation is that investments in offshore wind will increase with €100 to €120 billion up to 2020.

The investments needed are very large. How are you going to find the needed money?

Energy companies cannot finance all these projects with their own money. And governments and banks do not have much money at the moment. So there is only one group to turn to: institutional investors. We are working with them more and more. In September last year we divested 30% of the Nysted offshore wind farm to PensionDanmark. In December 2010 we sold a 24.8% interest of the Walney offshore wind farm to the Dutch Ampère Equity Fund and pension fund PGGM. And in September of this year the Japanese trading house Marubeni paid $324 million for a 49.9% share in our Gunfleet Sands wind park in the UK. We hope that these transactions will be followed by other, similar ones.

How did you manage to persuade them to come on board?

The first project was relatively easy, because it is an existing one. It has been operational for five or six years. We could show all the operational data. The second project was a bit more challenging, as it was still under construction. It will become fully operational in November and will then be the biggest offshore wind farm in the world. But there was a lot of interest from institutional investors to participate. We had no problem finding one. You have to take away some of the risks for these investors. But long-term, stable, predictable cash flows from infrastructural projects are attractive to them. We have the advantage that we can show a track record of operational data.

What do these data show?

That our equipment performed well. We had quite some problems with the first offshore parks in the first few years. But now availability is above target.

So you do see those €100 billion materializing?

Yes. It won't all come from us of course. But in 2020 it may well have been invested. Don't forget there is more than one reason to invest in offshore wind. It's not just climate, it is also security of supply. In the UK a lot of nuclear and coal-fired capacity will be shut down in the coming years. There are no alternatives for this yet. No decision has been made on any new nuclear projects. In France the Socialists have come out against nuclear power. And we all know about Germany.

'Since we have been active the longest, we can show a track record of operational data'

If all countries go for wind power, the balancing problems will grow worse. At this moment, Denmark exports a lot of its surplus wind power at certain moments. That will not be possible anymore if all the neighbouring countries expand their wind power capacity.

Certainly balancing is a challenge. The new Danish government wants 50% of electricity to be produced from wind in 2020. So we have to find a solution for this. In fact, we will need many different solutions. In Denmark we have developed an IT platform for large power users, called PowerHub, that helps us balance out energy consumption. For households there are two options: heat pumps and electric cars. Our first electric cars will be introduced within a month. With intelligent grids they can be used to increase flexibility in the system. And we will need more interconnections with our neighbouring countries. ■

'There is more than one reason to invest in offshore wind. It's not just climate. It is also security of supply'

Who is Anders Eldrup?

Anders Eldrup (born 1948) has been the Chief Executive Officer of Dong Energy Energy AS since 2001 and serves as President and Member of the Executive Board. Prior to joining Dong Energy, he served for ten years as Permanent Secretary of the Danish Ministry of Finance. His career at the Ministry included positions as personal secretary to the Minister of Finance, department head, and division chief. He also serves as Chairman of the Copenhagen Cleantech Cluster and Deputy Chairman of Fonden Lindoe Offshore Renewables Center, the Center for Formidling af Naturvidenskab og Moderne Teknologi and Rockwool Fonde.

He was one of the members of the Copenhagen Climate Council, founded in 2007 by a group of 30 "global leaders" of business and science. He is now a member of a similar platform, Green Growth Leaders, which was set up in September 2010 by Scandinavian think tank Monday Morning, the City of Copenhagen, DONG Energy and the Danish Realdania Foundation.

Eldrup was educated at the University of Aarhus where he received a master's degree in political science in 1972.

CEGH

CENTRAL EUROPEAN GAS HUB (CEGH) IS THE LEADING HUB FOR GAS TRADING AT THE GATEWAY FROM THE EAST TO THE WEST.

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CENTRAL EUROPEAN GAS HUB
GAS TRADING AT THE
GATEWAY TO THE EAST

The independent platform for the energy sector

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