

Coalition & wind: can the UK be a net exporter of Renewable Electricity?

Smart Grids & Cleanpower Conference, 24/25 June 2010
<http://bit.ly/cleanpower>
Matthew Delany, Director Government Relations, Offshore

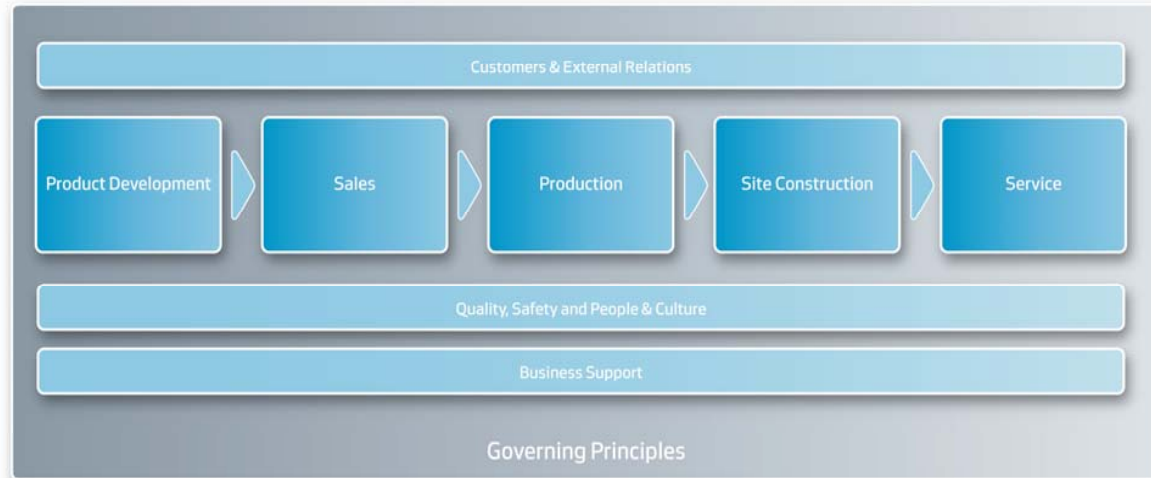
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Vestas

- World's leading wind turbine manufacturer
- Global
- 20,693 employees / 2009 Revenue: EURO 6.6 Billion
- Pioneering expertise on and offshore



In the UK

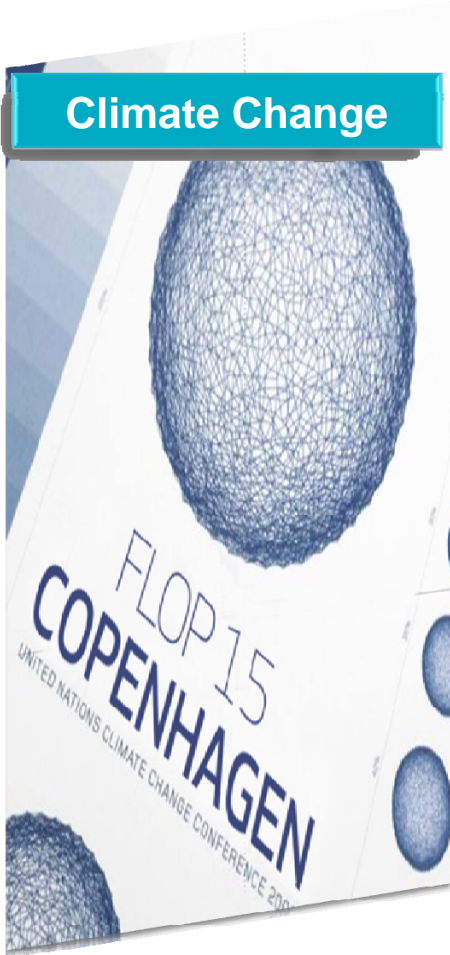
- Warrington, IoW, Leatherhead, Bristol, O&M sites..>500 staff and growing
- New Technology centre on Isle of Wight
 - £50m on building and land (picture)
 - next generation offshore blade technology
 - Prototype facility will make pilot series in UK before full manufacturing facility is ready



Challenges in 2009:



Financial Crisis



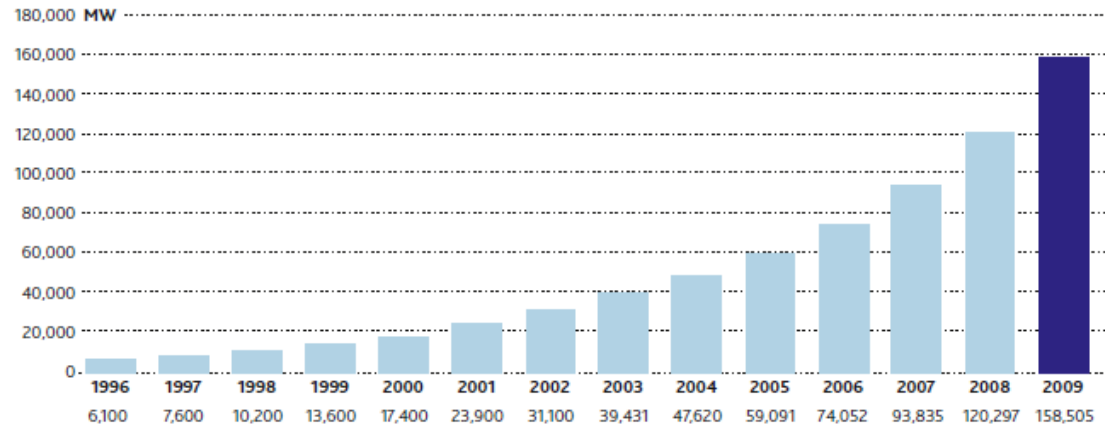
Climate Change



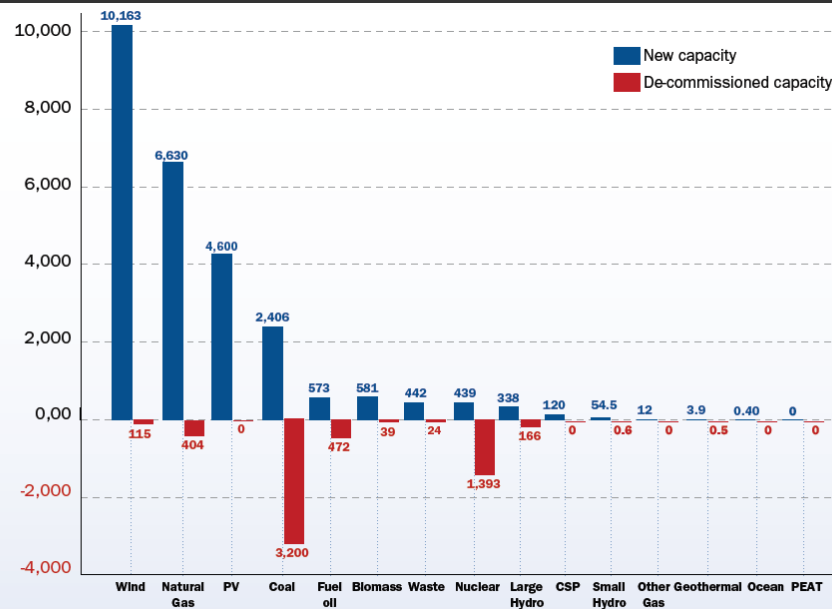
Cheap Oil & Gas

...despite economic woes, global wind power boom continues ...

Global Cumulative Installed Wind Capacity (Source: GWEC)



New installed Capacity in EU in 2009 (Source: EWEA)



..... illustrating that wind power is a mature, efficient and proven technology - no longer a niche business

Competitive

Predictable

Independent

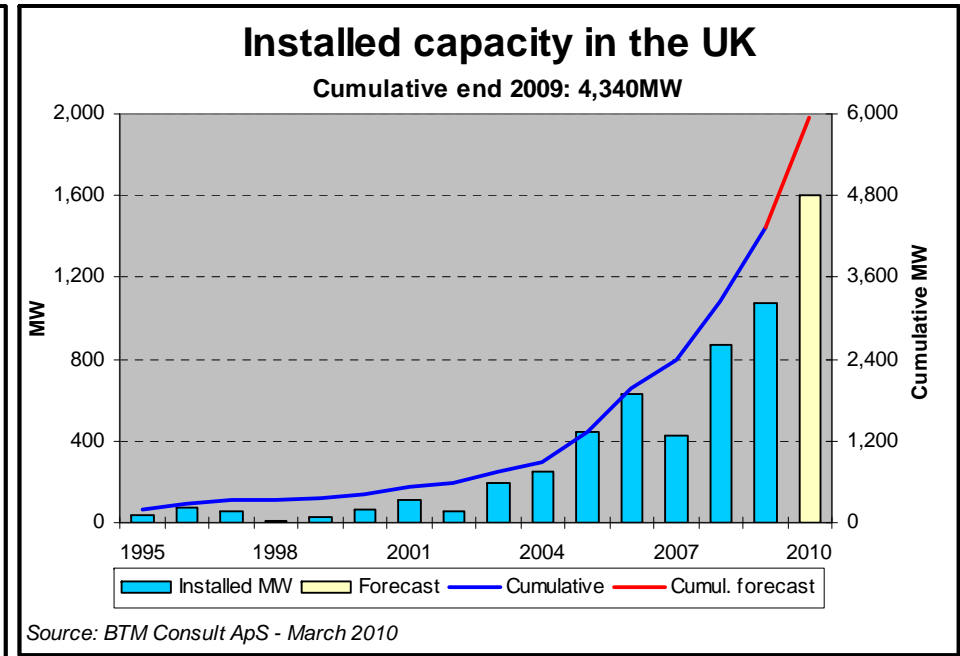
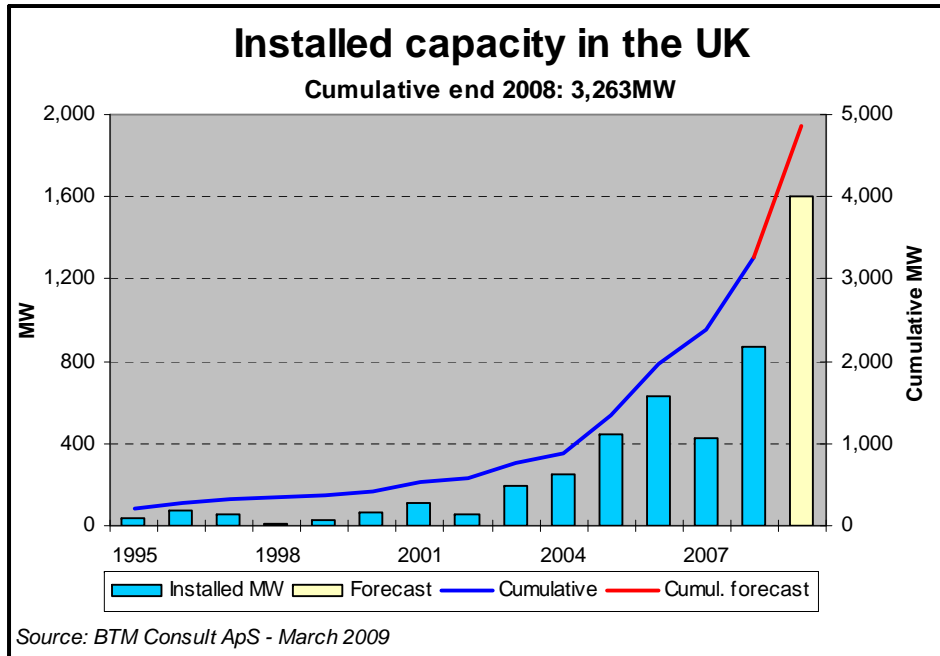
Fast

Clean



Turbine pre-assembly, IJmuiden, Q7, The Netherlands

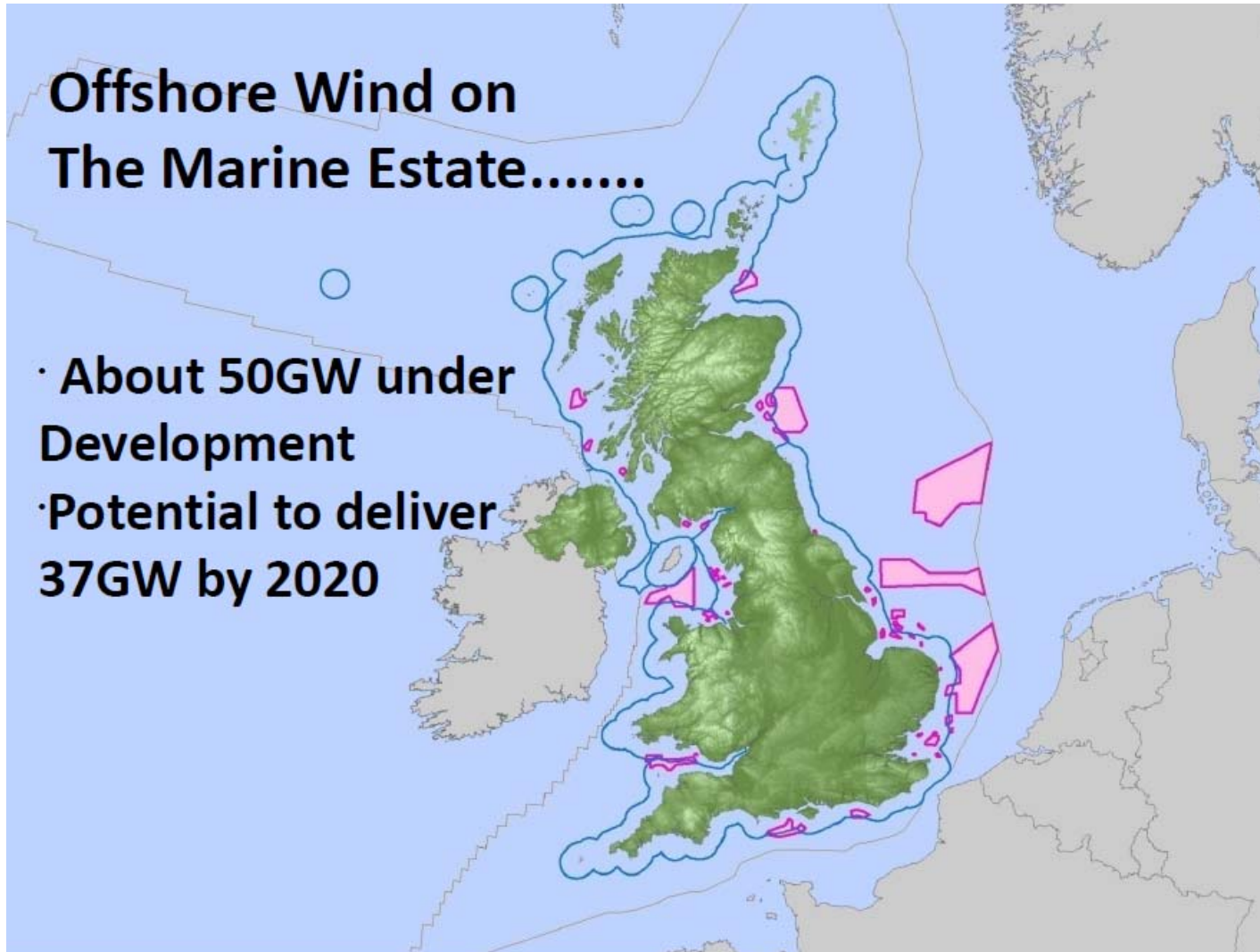
...How is the UK fairing?



Development in 2009 below forecasted levels but significantly ambitious development plans Offshore!

Offshore Wind on The Marine Estate.....

- About 50GW under Development
- Potential to deliver 37GW by 2020



Key Drivers

- Energy Security
- Climate Change obligations
- Green Economy



and perhaps now.....

....prospects of becoming a net electricity exporter – UK Plc ££££££

	Installed capacity	Resource utilisation	Capital expenditure	Annual Revenue in 2050	
Scenario 1	78 GW	13%	£170B	£28B	50% UK demand
Scenario 2	169 GW	29%	£443B	£62B	Net electricity exporter
Scenario 3	406 GW	76%	£993B	£164B	Net energy producer

the electricity equivalent of 1 billion barrels of oil could be generated annually, matching North Sea oil and gas production

www.OffshoreValuation.org

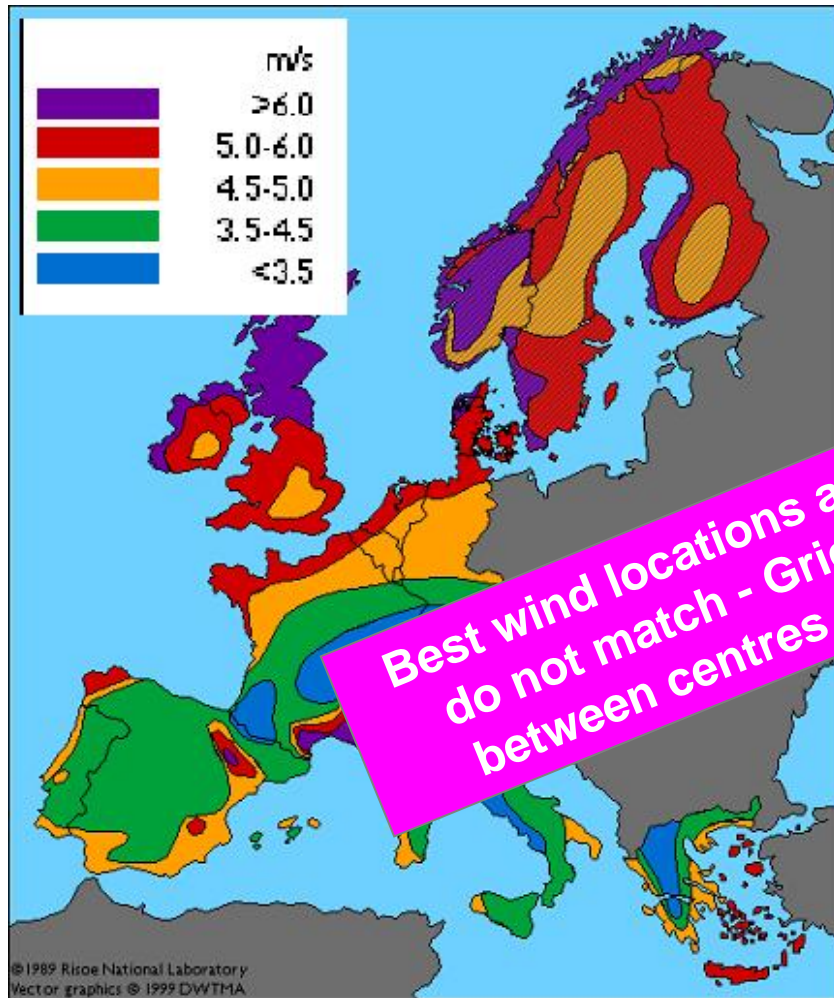
Some key challenges

1. **Grid** connections
2. Provision of low cost **financing**
3. Managing **variability** of power
4. The **cost** of offshore
5. Booming **public deficits** and debt

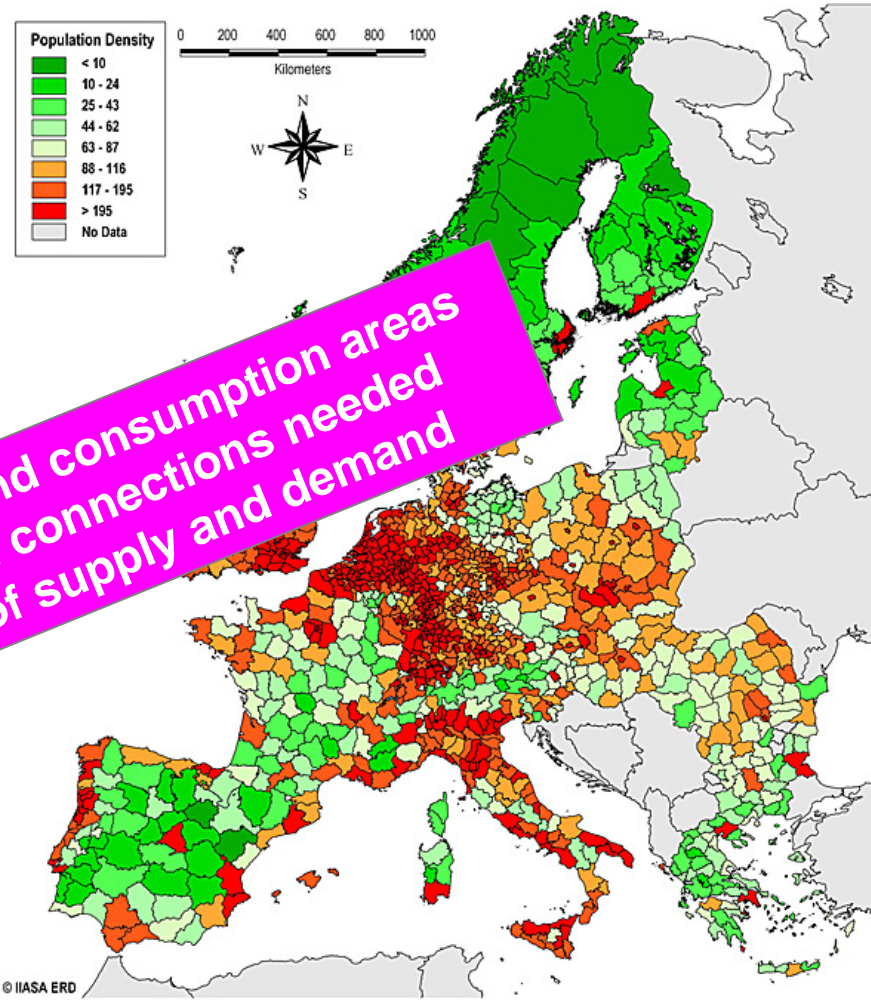


The UK – the “Saudi Arabia of Wind”?

Wind potential



Population density



Best wind locations and consumption areas do not match - Grid connections needed between centres of supply and demand

Financing

Call On Capital

If construction and operating assets are carried on balance sheet then balance sheets exhausted by 2015

If operating assets can be refinanced to dilute equity to 40% then balance sheets can carry to 2017.

By 2020 Current players balance sheets expire at more than 25% equity

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The Balance Sheets

- There are 17 “Operators” in UK offshore wind at present
- By our assessment they have £35bn of balance sheet capacity to invest in offshore wind (including gearing)
- Possibility of at least one Operator exiting & 2-3 Operator entering before 2020
- Expected net balance sheet capacity is therefore £40bn

Program Shortfall of £80bn

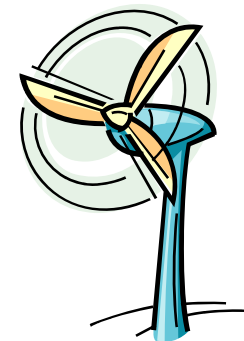
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Institutional investors, pension funds? Right framework required!

Managing variability

Clever ways to use surplus electricity needed!

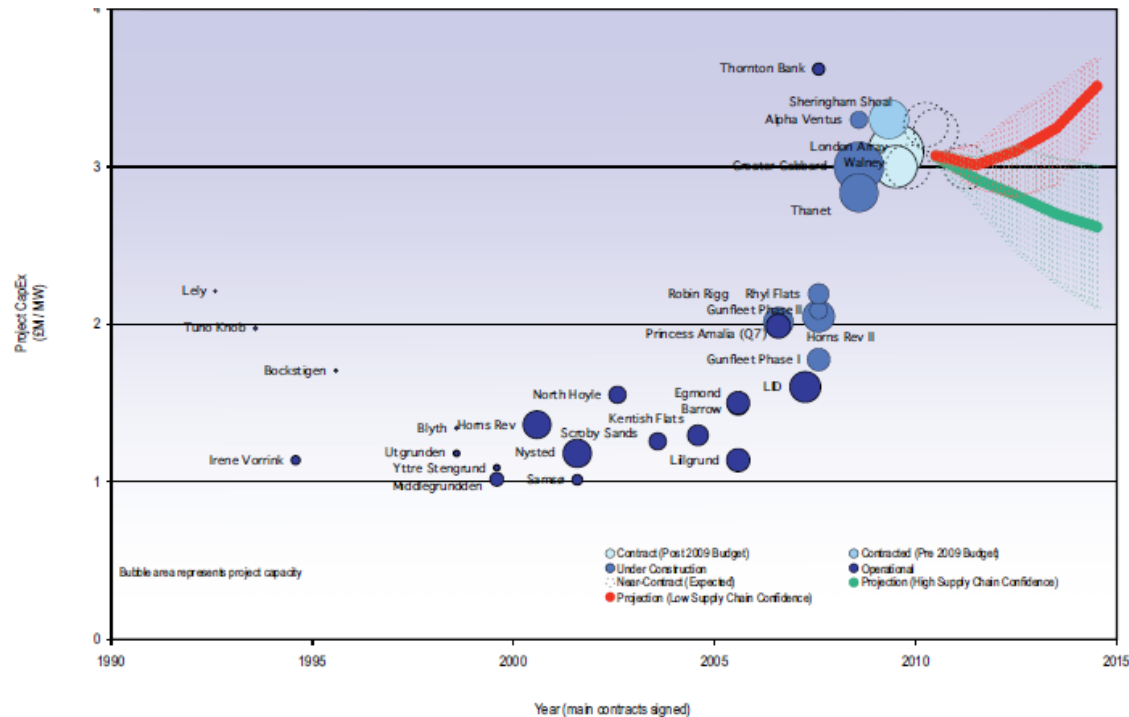
- **Forecasting**
- **Backup generation**
- **Storage**
- **Interconnection**
- **Smart grid technologies/demand side management**
- **Electric Vehicles**
- **Other ways to replace fossil fuels with electricity**



Last resort - shutting down wind farms during wind times BUT COSTLY – owner will need compensation

Increase overall flexibility of the system!

Offshore costs must stabilise and start decreasing



Capital Costs for Offshore wind projects Source BWEA/Garrad Hassan

- Industry is moving along the learning curve
- Developing market maturity in terms of financing, installation procedures and supply chain
- Must squeeze out perhaps 1/3 of the current cost base – about scale & standardisation
- Increasingly technically challenging sites further out in deeper water may prevent prices from declining in the short –term

Public deficit & debt

Dangers:

- more political focus on short-term problems (budget, employment etc) than long-term challenges of energy security, climate change
- Lower levels of public investments into enabling infrastructure



The financial crisis and economic downturn has had severe effects on public deficit in most countries

Tightening of the fiscal policy on the political agenda

Key recommendations

1. **Stable and positive policy framework incl. long-term government commitment**
 - a) E.g. timely clarification over the Support mechanism
 - b) E.g. government agrees an installed target for offshore wind by 2020 in collaboration with industry and includes target in the national action plan due for submission to the EU
2. **Ports & supply chain development**
 - a) Support the development of a limited number of strategically ideal harbours for installation of offshore turbines / de-risk manufacturing investments
 - b) Continuous flow of projects required
3. **Ensure continuing Finance**
 - a) Create right frameworks & investment climate where capital flows
4. **Improve Grid infrastructure**
 - a) Onshore grid reinforcements required to balance large amounts of offshore wind; needs to be driven STRATEGIC APPROCH BY authorities
5. **Tackle planning delays**
 - a) Coordinated planning & consenting process incl. grid connection
6. **Create Skills**
7. **DON'T FORGET ONSHORE WIND**
 - a) Enable Offshore industry to have sustainable learning curve
 - b) Steady / gradual expansion
8. **Support innovation & RD&D**
9. **Effective EU engagement**
 - a) International interconnection



Can the UK be a net exporter of Renewable Electricity?

Only with Political Will & understanding!

Is the will there?

“Energy Minister Charles Hendry underscored the Conlib government’s support for offshore wind at the ribbon-cutting ceremony for Dong’s 172 MW Gunfleet Sands OFS project”

Oil disaster is ‘stark reminder’ of need for renewables

Wednesday 16 June 2010

Energy secretary Chris Huhne has highlighted the need to expand the development of low-carbon technologies in response to the BP oil spill in the Gulf of Mexico.

The secretary of state told parliament this week (June 14) that the incident was a stark reminder of the environmental dangers of oil and gas production and the impact of high-carbon consumption.

Mr Huhne said: “Our concentration is on practical measures that can help in this. This disaster is a stark reminder of the environmental dangers of oil and gas production in ever more difficult areas.

“Coupled with the impact of high-carbon consumption this highlights yet again the importance of improving the energy efficiency of our economy and the expansion of low-carbon technologies. We must and will learn the lessons of these terrible events.”

Huhne’s comments came alongside US President Obama’s calls for renewables to feature prominently in future energy generation, after the US highlighted the USA’s dependence on oil.

Address from the Oval Office last night (June 15), Mr Obama said: “The consequences of the oil spill in the Gulf of Mexico



Energy secretary Chris Huhne has called for an expansion of low-carbon technologies in response to the oil spill in the Gulf of Mexico

Major wind projects escape government funding cuts

Thursday 17 June 2010

The Department for Business, Innovation and Skills (BIS) has today (June 17) confirmed that more than £72 million of support for offshore wind projects announced by the last government between January and May 2010 has escaped a Treasury spending review, which has seen 24 other spending commitments cancelled or suspended.

The projects, which include large development schemes at the National Renewable Energy Centre (Narec), in the North East, came under scrutiny as part of a review by the new coalition government of all funding commitments made by the last government since January 1

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at the projects for money for 17 projects worth 34 billion, 12 of which have already started.

Energy secretary Vince Cable has confirmed that an offshore wind turbine test site, requiring £18.5 million of investment, including £12.4 million for an offshore wind demonstration project, will go ahead.



Business secretary Vince Cable has confirmed government funding for offshore wind projects totalling more than £72 million will go ahead

Potential renewable energy ‘is in abundance’ in UK

Thursday 17 June 2010

The UK has abundant renewable energy potential and the resources to be a world leader in new low carbon technologies, but has so far not realised it, according to energy minister Charles Hendry.

Speaking at a ‘Sustainable Energy Security: Strategic risks and opportunities for business’ event at Chatham House in London last week (June 8), Mr Hendry claimed that he shares the commitment of prime minister David Cameron to make the UK government the ‘greenest ever seen’ and said renewable technologies have a key role to play.

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UK has not reached its target for renewable energy in the EU, but has the largest tidal resources

At the same time, Mr Hendry said the UK has the largest tidal resources in the world and so far the UK has not reached its target for renewable energy in the EU, but has the largest tidal resources



Energy minister Charles Hendry has claimed the UK has abundant renewable energy resources

THANK YOU FOR YOUR ATTENTION

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Strong winds

Danish wind turbine manufacturer, Vestas Wind Systems, is investing more than £50 million in UK R&D, including an R&D centre on the Isle of Wight and expansion in the South West

UK TRADE & INVESTMENT



Vestas

FAST FACTS
Company: Vestas Wind Systems
Country: Denmark
Industry: Environment
Website: www.vestas.com

Looking in the UK

The UK is considered to be one of the best European countries for harnessing wind energy. Following the merger with NEG Micon, Vestas already had a blade manufacturing centre on the Isle of Wight. Over the last 10 years, by strategically choosing locations and facilities to enhance its global technology capability and market position, the company had increased its position in the UK.

The British Government has a strategy of encouraging overseas companies to expand their UK presence further. In support of this strategy, UK Trade & Investment's Copenhagen team, part of the British Embassy in Denmark, met with Vestas several times between 2000 and 2005. Aware of the success Vestas had had in helping different countries to meet their climate change commitments, UK Trade & Investment was also keen to discuss how the company could help the UK to achieve its wind energy targets.

Vestas Wind Systems first entered the wind turbine industry in 1979. In 2002, the company merged with Danish wind turbine manufacturer, NEG Micon, to become the largest wind turbine manufacturer in the world.

Today, it has the widest range of turbines in the wind power industry, and has installed over 39,000 wind turbines in 63 countries on five continents. Of the approximately 20,700 people Vestas employs worldwide, more than 500 are in the UK.

"We believe that wind energy is one of the best solutions to modern day climate and energy challenges," says Matthew Delany, UK Policy Adviser at Vestas. "The key is to use technologically advanced turbines effectively and efficiently. For example, using one of our 3.0 MW turbines for three hours can produce enough electricity to supply an average European household with electricity for a whole year."

In October 2008, Vestas decided to create a new unit to specifically deal with the aftermarket supply chain. The company knew that it wanted a European location within around two hours of its HQ in Randers, Denmark, and drew up a short list of eight cities. One of these was Bristol.

"It was clear that Bristol offered the best overall opportunity for us," says Phil Jones, President at Vestas Spare Parts & Repair. "The South West Regional Development Agency and Bristol City Council worked hard to show us the benefits of its proximity to great universities and its cultural diversity. We now have fourteen very senior managers working there on engineering operations, quality, health & safety, continuous improvement, customer service and platform management and we are growing. We are also building a strategic partnership with the University of Bristol to work on R&D programmes with the Isle of Wight teams."

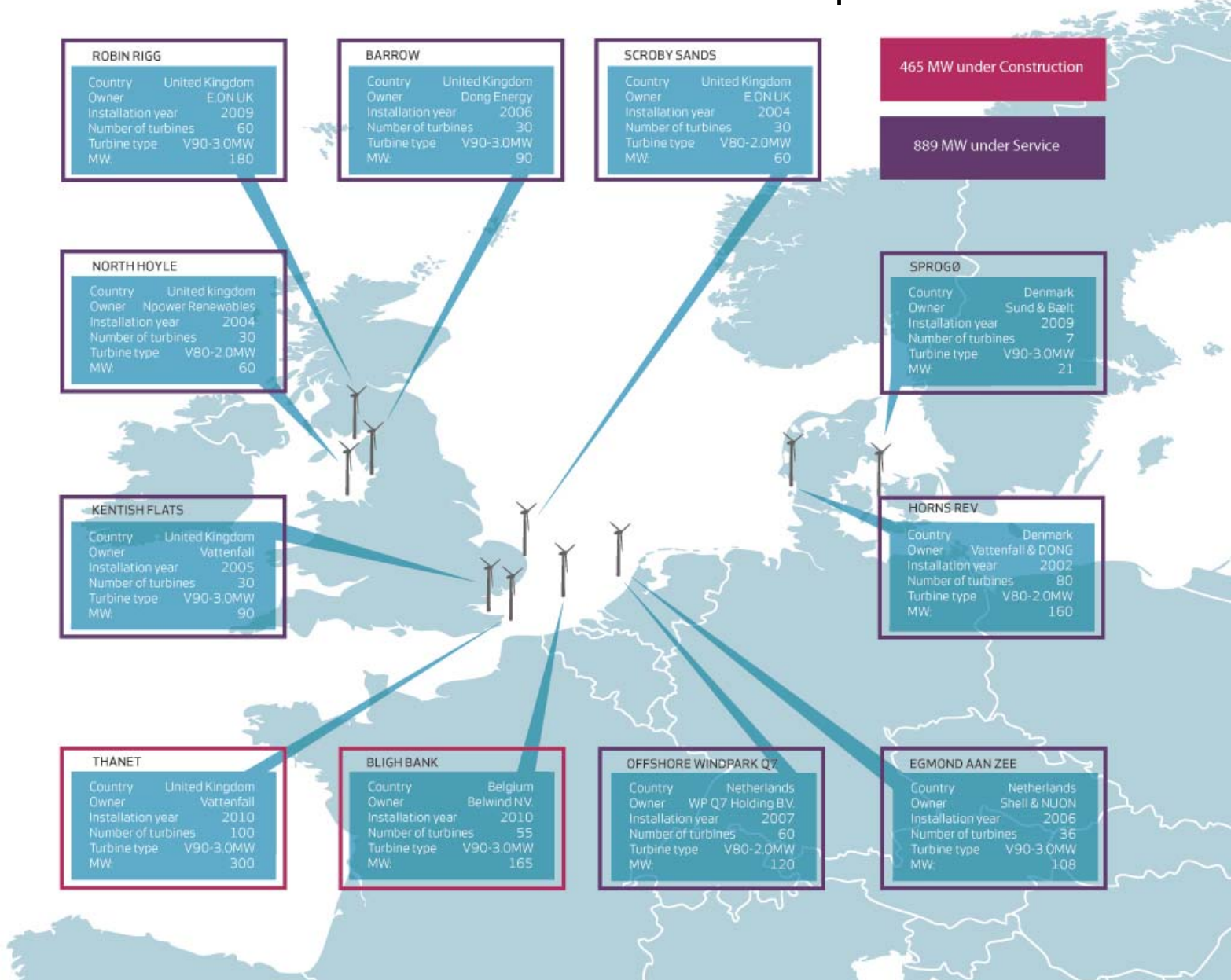
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Vestas

Vestas Offshore – MW Track Record as of April 2010

Back-up



COPENHAGEN – did not deliver as we hoped, but.....



Wind Industry never been so exposed as we were in Copenhagen



offshore is not the same as onshore...

	Onshore	Offshore
Resources	<ul style="list-style-type: none"> • 2,000 full load hours • Limited sites available • At full load, one wind turbine produces a household's annual consumption* in 200 minutes 	<ul style="list-style-type: none"> • 4,000 full load hours • Large sites available • At full load, one wind turbine produces a household's annual consumption* in 40 minutes
Dimensions	<ul style="list-style-type: none"> • 1 – 3 MW wind turbines • Wind farms of 20 – 50 MW • Investment of €30 – €70 million per wind farm 	<ul style="list-style-type: none"> • 3 – 5 MW wind turbines • Wind farms of 100 – 1,000 MW • Investment of €1 – €2 billion per wind farm
Environment	<ul style="list-style-type: none"> • Smooth conditions • Unrestricted access (24 hours / 7 days a week) 	<ul style="list-style-type: none"> • Rough marine conditions • Distance to shore 1 – 70 km • Access limited by high waves and storms
Foundations	<ul style="list-style-type: none"> • Built on solid ground • Standard concrete piles and foundations cast on site 	<ul style="list-style-type: none"> • Differing soil conditions (sand, clay, rock) and erosion • Foundation type depends on water depth and soil capacity (e.g. monopiles, gravity, tripod)

*based on average annual consumption of 3,500 KWh

Compared to onshore, offshore wind energy has greater potential but marine conditions pose great challenges to project delivery – weather, wind and waves are the dominating factors. All things considered, offshore wind energy requires a whole new approach to wind power in terms of wind turbine technology and scale, foundation types, logistics for installation and maintenance, as well as port infrastructure.

Highlights of global wind power development in 2009

- Record installation of 38 GW in spite of the financial/economic crisis.
- Strong presence of three Chinese wind turbine suppliers in the Top 10 list.
- China became the No. 1 market in the world, with 13.75 GW of new capacity.
- Offshore on track for increased contribution to wind power in Europe.
- Wind power will deliver 1.6% of the world's electricity in 2010.
- This year's forecast and prediction up to 2019 indicate that wind power can meet 8.4% of the world's consumption of electricity by 2019, ten years away.

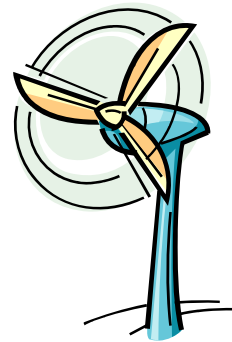
Efficient integration of large-scale wind power requires:

- **A strong transmission grid**
 - to trade and balance in a wide geographical area
- **High flexibility in generation and demand**
 - with technical connection requirements for all resources
- **A revised power system control architecture**
 - to mobilize all adequate resources in markets and operation
- **Efficient electricity markets**
 - with clear price signals and trading close to real-time
- **A closer coupling between energy systems**
 - to utilize synergies and create flexibility

How to achieve a high wind-power share



Effective balancing measures



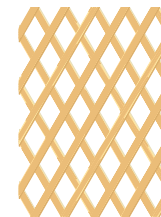
Wind-power capacity



Legislation and planning



Efficient markets



Strong transmission grid