

# Rising to the Offshore Challenge in Ireland

**Michael Hannibal, Vice President of Offshore Sales**

# Content



## **Siemens Wind Power A/S, Offshore Business Segment**



Our Offering



Key Challenges in the Offshore Business






The Irish Offshore Wind Market

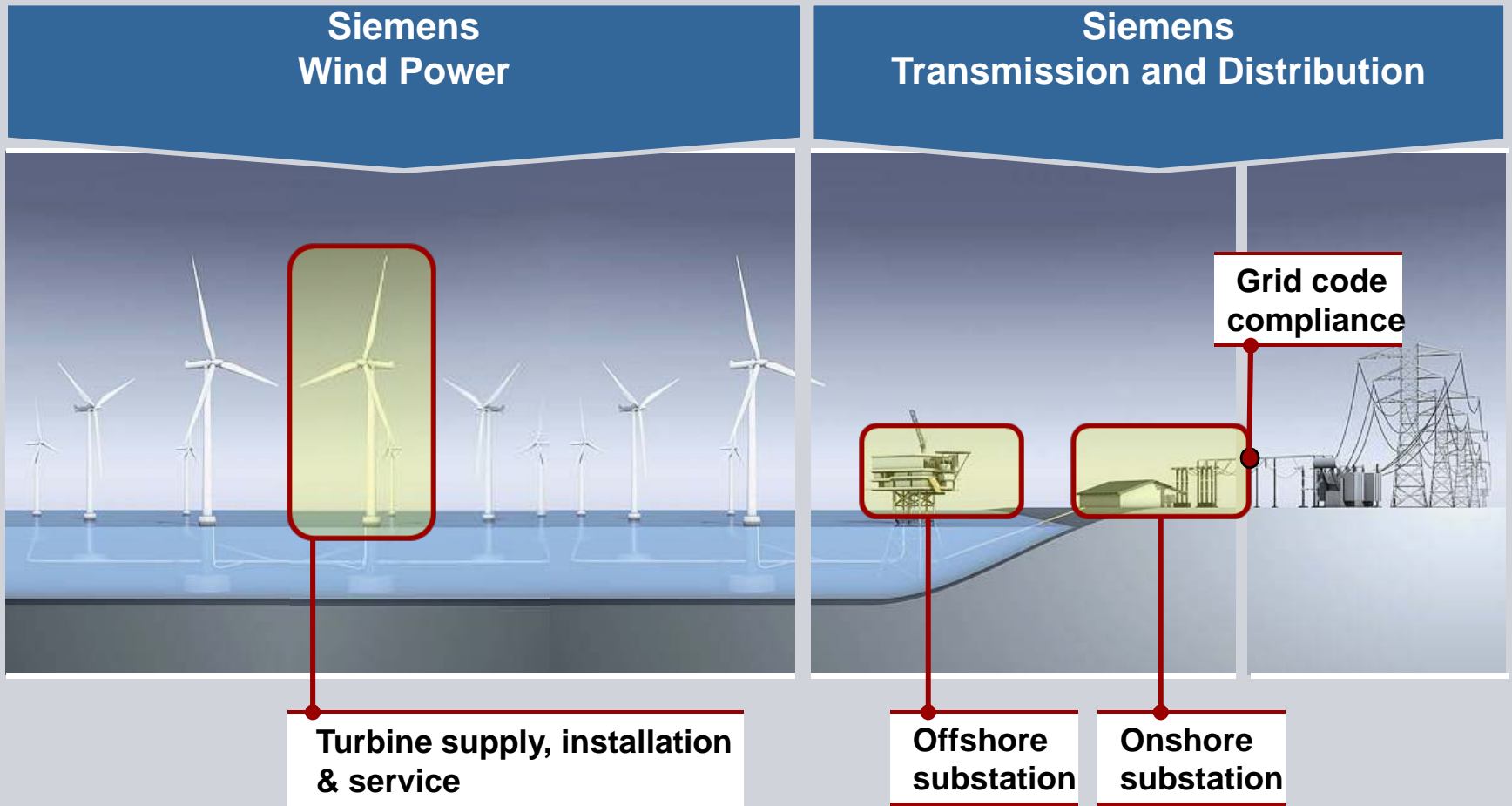


Our Strategy

## 15 divisions in 3 sectors

| Sectors    |   | Divisions   |  |
|------------|---|---|--|
| Industry   |    | <ul style="list-style-type: none"> <li>▪ Industry Automation</li> <li>▪ Drive Technologies</li> <li>▪ Building Technologies</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Osram</li> <li>▪ Industry Solutions</li> <li>▪ Mobility</li> </ul>                    |
| Energy     |    | <ul style="list-style-type: none"> <li>▪ Oil &amp; Gas</li> <li>▪ Fossil Power Generation</li> <li style="border: 2px solid red; border-radius: 10px; padding: 2px;">▪ <b>Renewable Energy</b></li> </ul> | <ul style="list-style-type: none"> <li>▪ Energy Service</li> <li>▪ Power Transmission</li> <li>▪ Power Distribution</li> </ul> |
| Healthcare |  | <ul style="list-style-type: none"> <li>▪ Imaging &amp; IT</li> <li>▪ Workflow &amp; Solutions</li> <li>▪ Diagnostics</li> </ul>   |  |

# Siemens offers turbines, the complete electrical solution, installation and service



## Market leader in offshore with >1,4GW installed

### Burbo Banks, UK

→ 25 x SWT-3.6-107 (2007)

### Lynn / Inner Dowsing, UK

→ 54 x SWT-3.6-107 (2008)

### Gunfleet Sands, UK

→ 48 x SWT-3.6-107 (2009)

### Rhyl Flats, UK

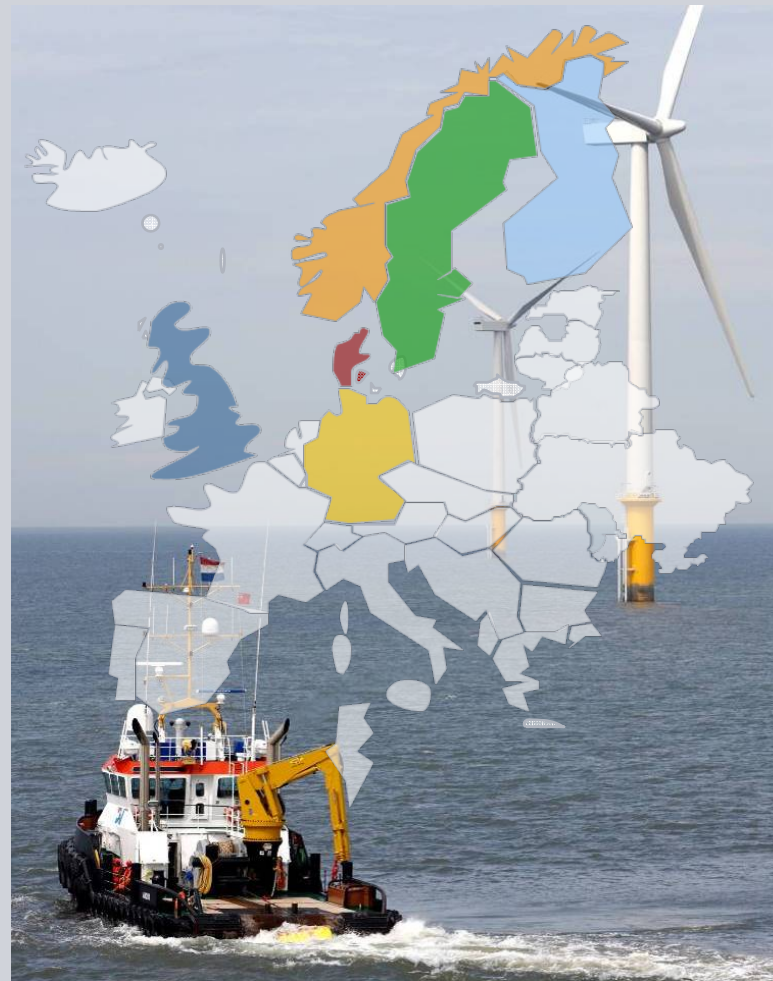
→ 25 x SWT-3.6-107 (2009)

### Pori, FIN

→ 1 SWT-2.3-101 (2010)

### Baltic I, DE

→ 21 SWT-2.3-93 (2010)



### Vindeby, DK

→ 11 x 0.45 MW (1991)

### Middelgrunden, DK

→ 20 x SWT-2.0-76 (2000)

### Samsø, DK

→ 10 SWT-2.3-82 (2002)

### Rønland, DK

→ 4 SWT-2.3-93 (2002)

### Rødsand/Nysted, DK

→ 72 SWT-2.3-82 (2003)

### Frederikshavn, DK

→ 1 SWT-2.3-82 (2003)

### Horns Rev II, DK

→ 91 SWT-2.3-92 (2009)

### Rødsand II, DK

→ 90 SWT-2.3-93 (2010)

### Lillgrund, SE

→ 48 SWT-2.3-93 (2007)

### Hywind, NO

→ 1 SWT-2.3-82 (2009)

## Continue as market leader in offshore projects...

**Greater Gabbard, UK**  
→ 140 x SWT-3.6-107<sup>1)</sup>

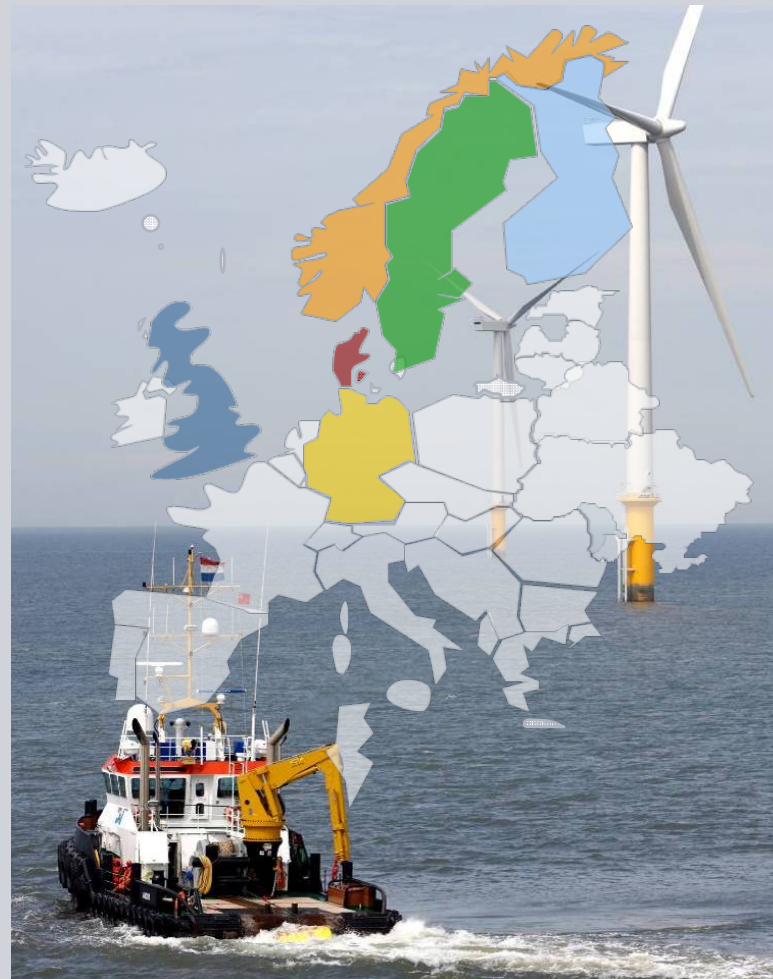
**Sheringham Shoal, UK**  
→ 88 x SWT-3.6-107<sup>1)</sup>

**London Array, UK**  
→ 175 SWT-3.6-120<sup>1)</sup>

**Walney, UK**  
→ 51 x SWT-3.6-107<sup>1)</sup>  
→ 51 x SWT-3.6-120<sup>1)</sup>

**Lincs, UK**  
→ 69 X SWT-3.6-120<sup>1)</sup>

**Gwynt Y Mor, UK**  
→ 160 X SWT-3.6-107<sup>1)</sup>



**Anholt, DK**  
→ 111 SWT-3.6-120<sup>1)</sup>

**Baltic 2, DE**  
→ 80 SWT-3.6-120<sup>1)</sup>

**Borkum Riffgat, DE**  
→ 30 SWT-3.6-107<sup>1)</sup>

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## Siemens offers a turbine for every site

### Our offshore turbines

#### SWT 2.3

- IEC class: IA/IIA/IIB
- Rotor diameters: 82, 93 and 101m
- Installed offshore: 339 units

#### SWT 3.6

- IEC class: IA / IA\*
- Rotor diameters: 107 and 120 m
- Installed offshore: 210 units

#### SWT 3.0 DD

- IEC class: IA
- Rotor diameters: 101
- Prototype installed: 2009



\* Target, certification process ongoing

# Our answer for advanced turbine technology: Integral Blade without glue joints

**SIEMENS**

## Siemens Integral<sup>®</sup> Blade

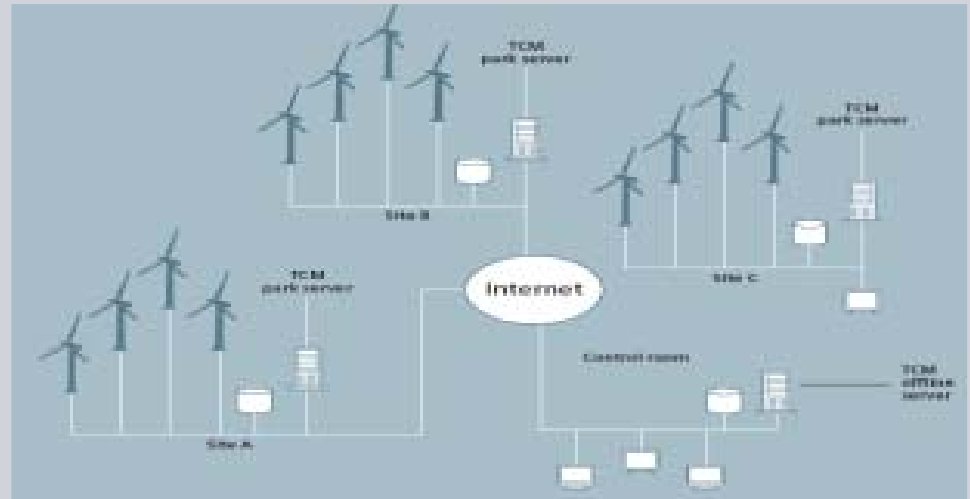
- The blade is manufactured in a single operation, using a closed process invented by Siemens
- No glue joints between spars and shells, no weak points, no easy access for water or lightning
- Combining superior strength with excellent power and noise performance



# Our answer for advanced turbine technology: Continuous monitoring to prevent failures

## Turbine Condition Monitoring

- Designed to continuously monitor the external and internal state of the wind turbine
- 24 / 7 precise online vibration measurement on the gearbox, the generator and the main shaft bearings
- Detect significant deviations from its normal operating condition
- Prevention of costly breakdowns
- Reduced service costs
- Optimized availability and energy generation



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## Challenges in the offshore business

**Optimize technology for larger projects, farther offshore**



**Optimize installation technology and secure vessels**

**Industrialize logistics for growing the industry**



**Apply experience gained to new markets**

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## 25 MW installed offshore in Ireland to date...

Offshore installed base in Europe (in MW as of September 2010)



|                        | Installed capacity | % of total Installed capacity in Europe |
|------------------------|--------------------|---|
| <b>UK<sup>1)</sup></b> | 1,500              | 46%                                     |
| <b>Denmark</b>         | 871                | 27%                                     |
| <b>Netherlands</b>     | 247                | 8%                                      |
| <b>Germany</b>         | 230                | 7%                                      |
| <b>Belgium</b>         | 189                | 6%                                      |
| <b>Sweden</b>          | 164                | 5%                                      |
| <b>Finland</b>         | 26                 | 1%                                      |
| <b>Ireland</b>         | 25                 | 1%                                      |
| <b>Norway</b>          | 2                  | 0%                                      |
| <b>Total installed</b> | 3,254              |   |

1) England+Wales

Source: SWP

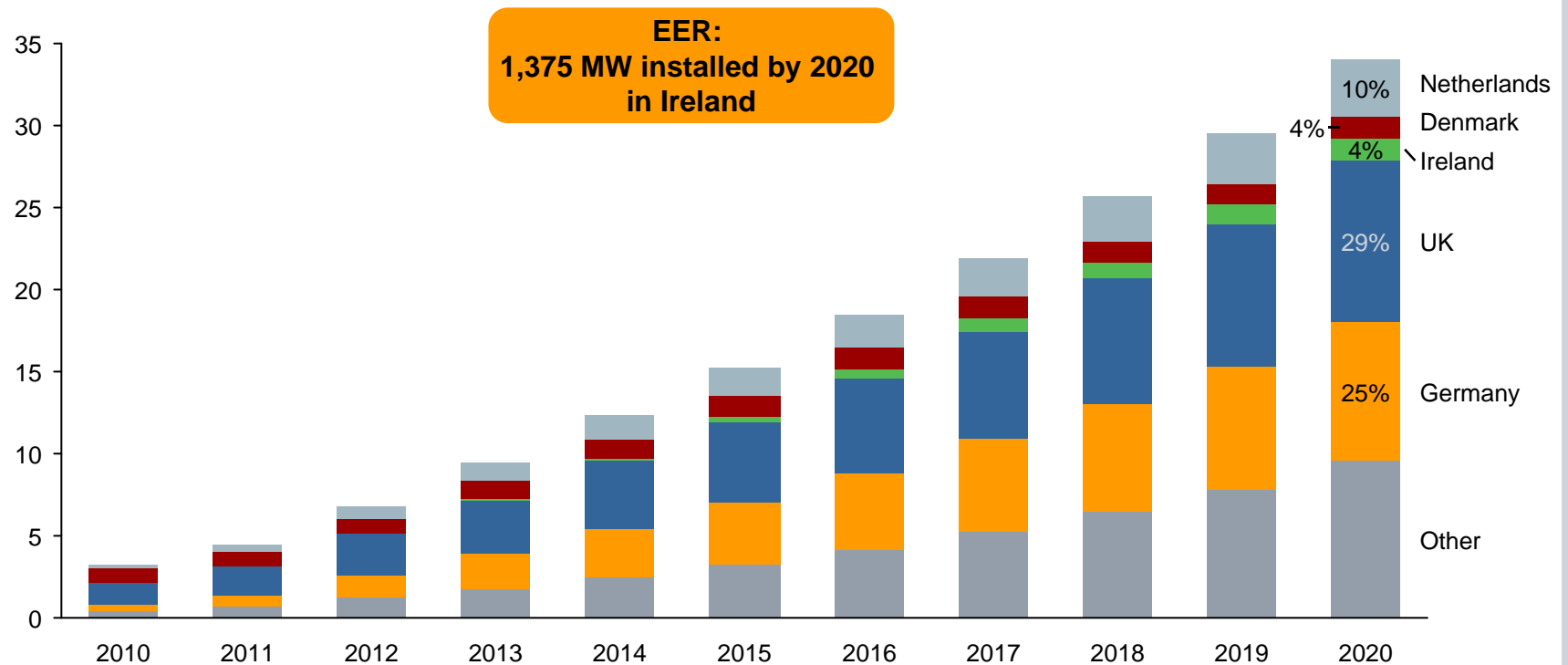
# ...due to low offshore wind development in Ireland

## Ireland and Denmark offshore developments

|  | 1991   | 2003   | 2008  | 2009   | 2010   |
|--|--|--|---|--|--|
|    |  | <p><b>First offshore project</b> installed: Arklow Bank; 7x GE 3.6MW</p> | <p>Feed in tariff of <b>€140 /MWh</b> from offshore wind announced</p> <p>Increased renewable target: 40% by 2020</p> <p>Gate 3: Between 2010 – 2017, 601.5 MW of offshore wind is due to be connected to the grid.</p> | <p>Minister for Energy announces that Government policy provides for 2GW offshore wind by 2020</p> | <p>Ireland hopes to sign a MOU with ten other North Sea countries in the North Sea Countries Offshore Grid Initiative</p> <p>Wind industry players call for government support to develop offshore wind</p> <p><b>Installed: 25 MW</b></p> |
|  | <p><b>First offshore project</b> installed: Vindeby; 11 x SWT 450 kW</p> | <p>418 MW installed offshore (cumulative)</p>                            |   | <p>The world's largest offshore wind farm is installed; Horn's Reef (209 MW)</p>                   | <p>Denmark approves the Anholt offshore wind farm of 400MW with <b>€140/MWh</b></p> <p><b>Installed: 870 MW</b></p>  |

## 1.3 GW could be installed in Ireland by 2020

Estimated cumulative offshore installation in Europe (GW)



## High targets, but need for strong political support



### Drivers

- Good wind resources
- Suitable water depths
- Long coast lines (16% of Europe's)
- High 2020 target: 40%
- Offshore incentive in place: €140/MWh for 15 years
- Grid reinforcement process started



### Inhibitors

- Long application process
- Grid bottleneck – need for execution of e.g. East-West interconnector
- Lack of clear strategy
- Low awareness of offshore wind benefits

# Government support required for offshore development

Key success factors to foster development of offshore wind

## What government can do

- ✓ Implement clear and fast approval processes
- ✓ Ensure grid development to accommodate the government targets
- ✓ Ensure appropriate infrastructural to receive, produce, and ship goods
- ✓ Identify sites for development of offshore wind
- ✓ Support R&D for offshore technology
- ✓ Support the development of a mature supply base

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**Our aim is to stay #1, with the best-controlled risk**

## Best controlled risk in growing the business

- **Long-term No. 1 in offshore wind**
- **Build on experience and learning curve**
- **Strong focus on large projects with multiple-season installation**
- **Stringent risk management in project selection and execution**
- **Continuous R&D for maximum profitability**
- **Selective steps into new markets**



**Contact us for more information**

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**Back up**

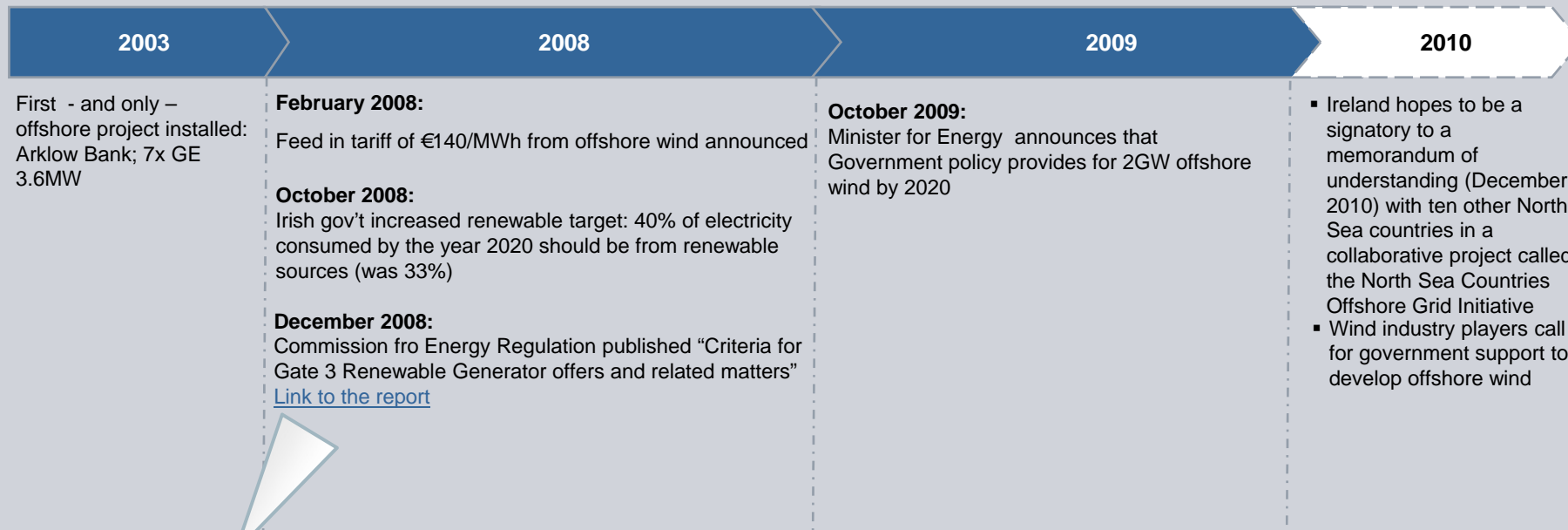
## Permit system should be simplified

### Permit System

The licensing procedure for offshore projects is cumbersome with three stages to be completed prior to submission. This makes application, both difficult and expensive. While we fully recognize the importance of community consultation, we feel that the process should be simplified as it will lead to a greater incentive for investment in this market. The practice of demanding large scale extra work at the Lease application stage must end, while NPWS need to be properly resourced and make their requirements known to developers at the appropriate stage - EIS scoping. The hiatus on moving the Foreshore Administration from the Dept of Agriculture to the Dept of Environment is adding to permitting delays, and needs to be resolved without any further delay.

# Slow offshore wind development in Ireland

## Ireland overview



### Gate 3 :

Specifically designed to ensure that Ireland meets the Government's renewables target of 40% of electricity consumption from renewable sources by 2020. The following points indicate the scale and importance of Gate 3:

- Renewable power connected to the system will increase five-fold between 2008 and 2020;
- Of this five-fold increase, 3,900MW will be connected
- An estimated 6,700 MW of renewables on the system by 2020
- Within the first 8 years of the Gate 3 ITC programme (2010 - 2017) 601.5 MW of offshore wind is due to be connected to the grid. The new connections are on the east coast of Ireland at Carrickmines (364 MW) and Oriel (237.5 MW).

# Our answer for advanced turbine technology: SWT-2.3: Well-suited to sites close to shore

**SIEMENS**

## Main data

- IEC Class: IA / IIA / IIB
- Rotor diameter: 82 / 93 / 101 m
- Blade length: 40 / 45 / 49 m
- Swept area: 5,300 / 6,800 / 8,000 m<sup>2</sup>
- Hub height: Site specific
- Annual output at 9 m/s: 9,326 / 10,491 MWh
- Rotor weight: 54 / 60 / 62 t
- Nacelle weight: 82 t
- Tower weight: Site specific
- Prototype installed: 1999 / 2004 / 2008
- Serial production: 2002 / 2005 / 2010
- First installed offshore: 2002 / 2007 / 2010
- Installed offshore: 227 units
- Ordered for offshore: 112 units



**Combine**