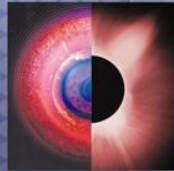


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Providing technical expertise to support offshore wind development



A presentation by Dr Nick Wells: 24 November 2011

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Offshore Wind

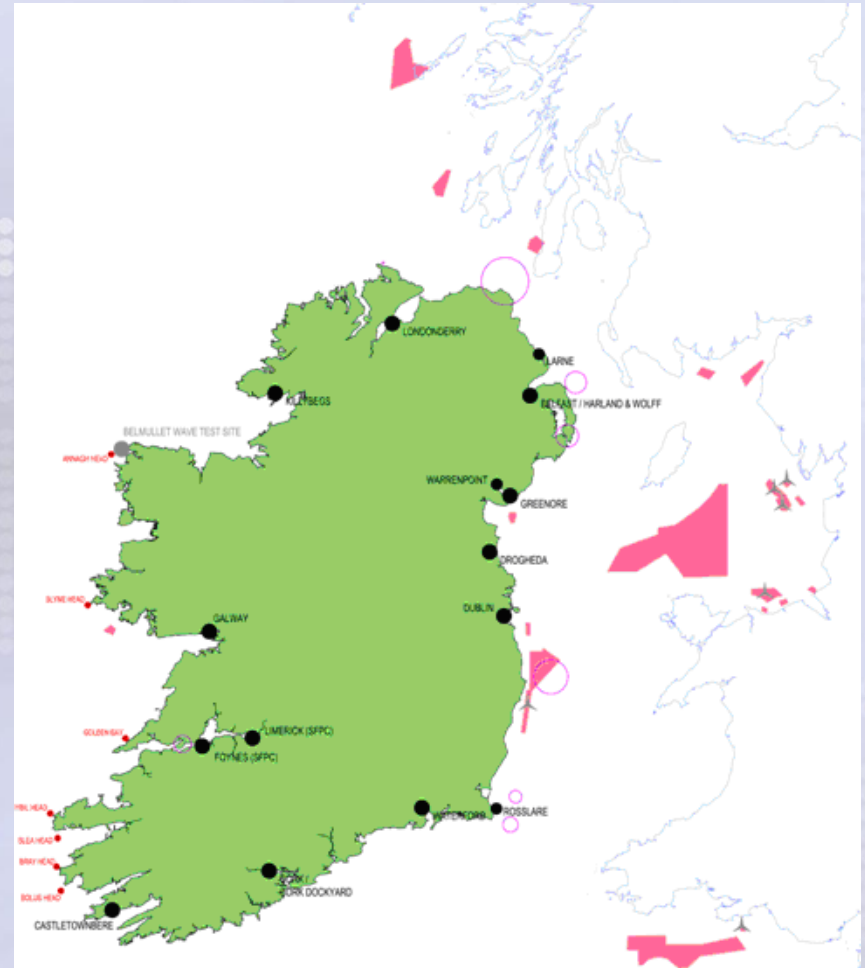


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Irish Sea Zone Awards

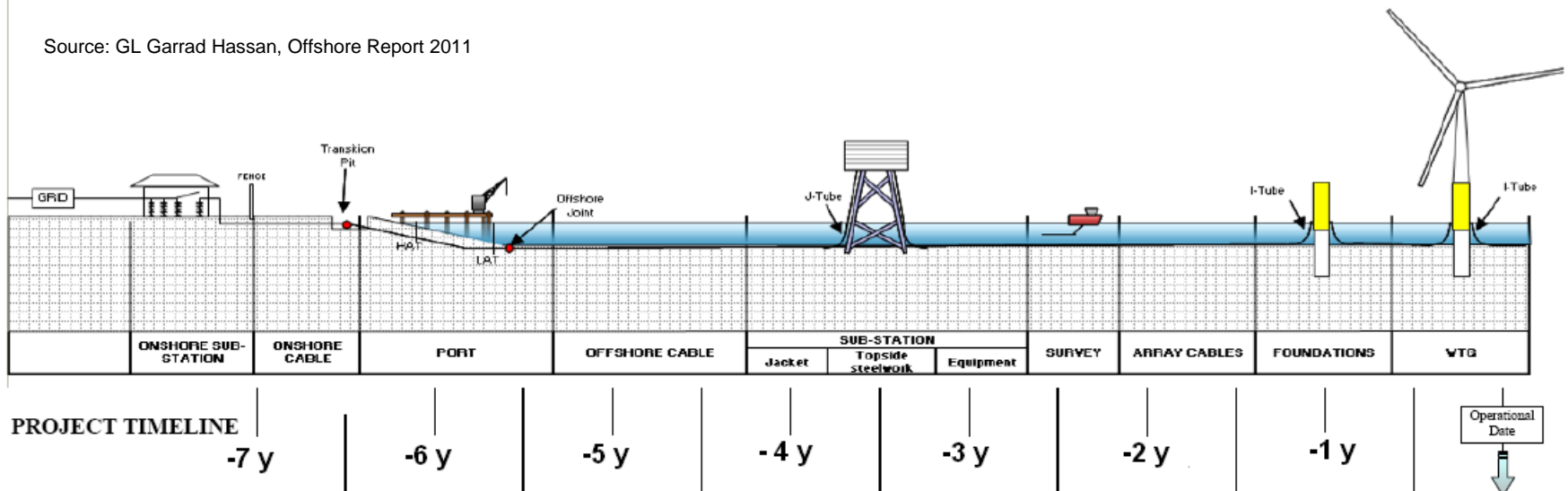
**Development
zones in the Irish
Sea & UK West
Coast**

**17.8GW accessible
to Irish ports**



Timeline of an Offshore Windfarm

Source: GL Garrad Hassan, Offshore Report 2011



Market Summary

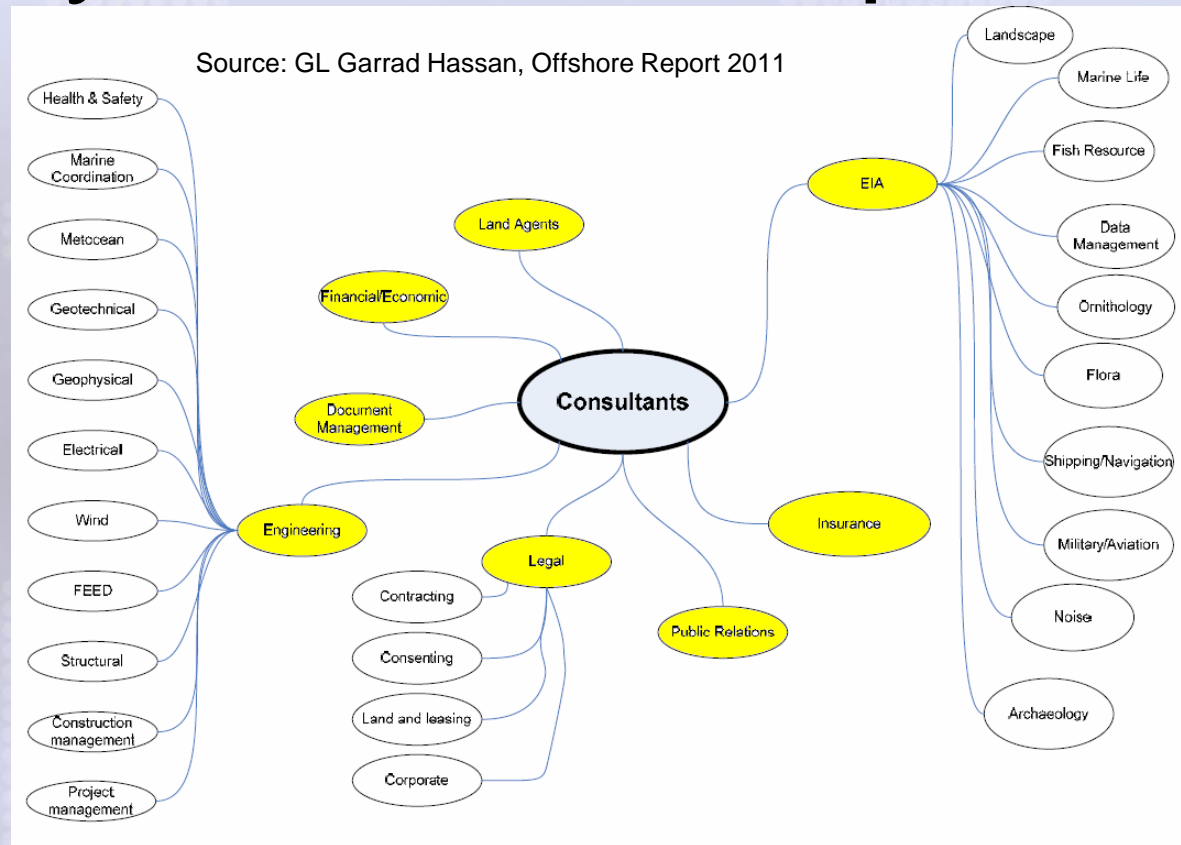
- Developments: Approx. 7 / 8 Years from Initiation to Operation
- Developers dominated by the “big 6” power utilities,
i.e. SSE Renewables, Scottish Power, Centrica, RWE npower,
E.ON and EDF.
- Typical Consultant services across the project life-cycle:

Site selection and feasibility studies - formal EIA/planning and
consenting (incl. visual impact, noise, archaeology, ornithology
etc) - survey design and management - data integration -
construction and operational phase support (geotechnical staff,
planners, HSE input, environmental scientists etc).



Development Support:

- Engineering
- Legal
- Public relations
- Insurance
- EIA
- Land Agents
- Financial & Economic
- Document management



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EIA Development

Environmental Discipline

**SEA / EIS / Habitats Assessment for
Infrastructure / Plans**

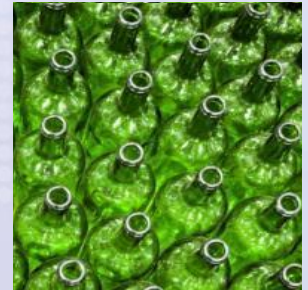
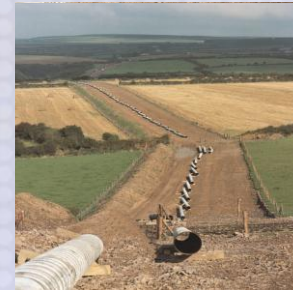
Marine Ecology, Noise

Electricity Grid Development

Renewables (Offshore Wind)

Stakeholder Communications

Project Communications



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Planning Services

**Management of
Planning
applications**

Planning Appeals



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Specialist Reports

The
writing of
Reports
Covering
Background
Information

Assessment of the
Irish Ports & Shipping Requirements for the
Marine Renewable Energy Industry

June 2011



ENGINEERING & SPECIALIST SUPPORT REQUIREMENTS FOR THE O&S SECTOR | JUNE 2009

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Review of Engineering &
Specialist Support Requirements
For the Ocean Energy Sector

June 2009

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ISLES Project

Larger European Studies



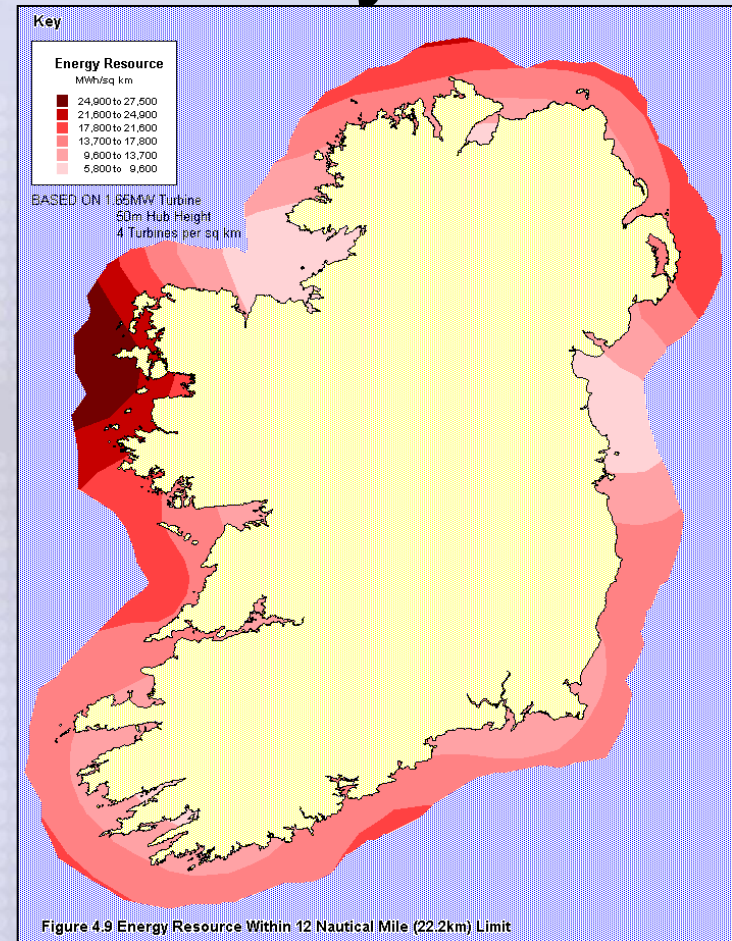
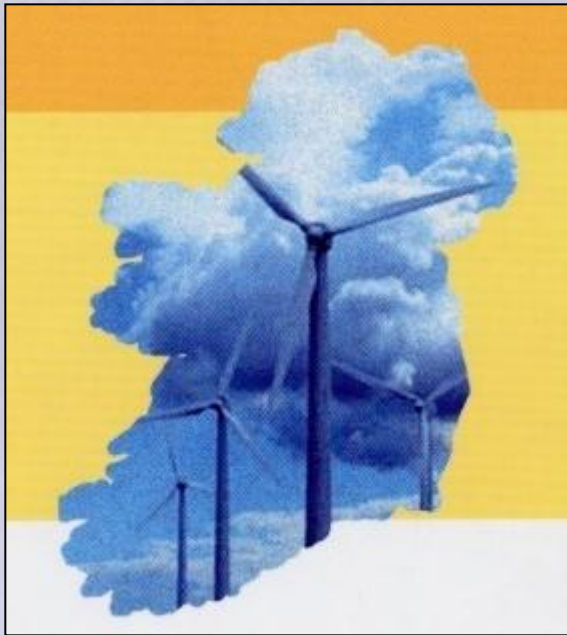
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Wind resource analysis

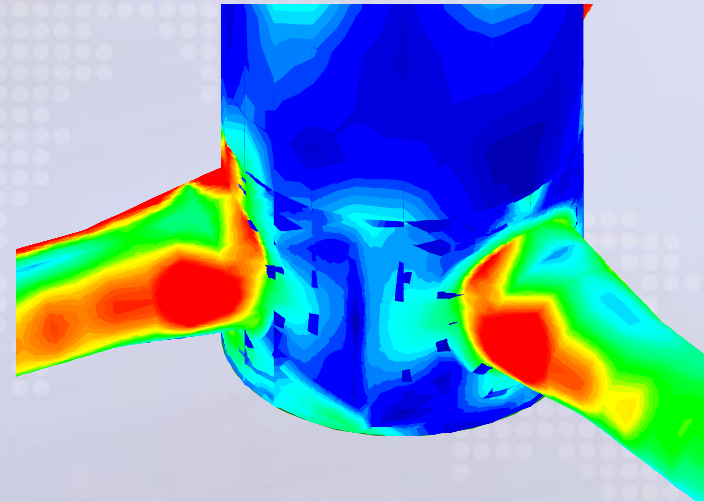
Assessment of Offshore Wind Energy Resource in Republic of Ireland and Northern Ireland



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Structural Design Opportunities

- Tender Bid Assessment
- Design & Build Tenders
- Feasibility Study into Alternative Foundation Concepts



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Specialist Marine Surveys

Seismic
Survey



Geotechnical
Survey



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Port Development Opportunities

**Port layout
design**

Quay design

**Traffic flow
design**

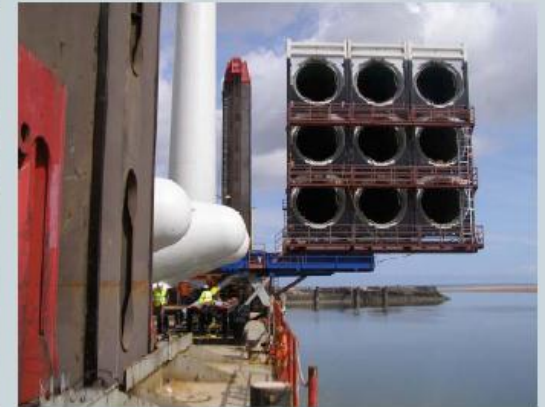
**Linkspan and
structural
design**



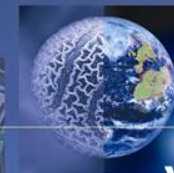
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Burbo Banks & Mostyn

Recent
example
of what is
possible



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Mostyn quay facilities



Storage: 25 ha

Dedicated road between storage and quay side

Quay length: 150 m - 250 m

Quay bearing capacity: 3 to 6 Ton/m²

Seabed with sufficient bearing capacity near the pier

Draft: minimum 6 m

Ware house facilities 1000-1500 m²

Access for smaller vessels

Access 365 - 24/7

Access for heavy/oversize trucks

License/approvals for helicopter transfer



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DONG Energy in Belfast



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DONG Energy Facility



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Harland & Wolff

Effective adaption of existing facilities



Killybegs port development

Killybegs

Completion: 2004

Value: €50M

Service: Strategic Planning,
Maritime,
Environmental,
Construction
Management,
Infrastructure, Built
Environment

Study

Team: RPS Consulting
Engineers, Belfast



Developments in installation vessels



Barge with a Crane



Jack up



Faster & More WTG & Extend the Season

?
60 required

1 WTG per sail

3 WTG per sail

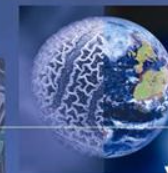
6 WTG per sail

10 WTG per sail

- Pre-Installation at harbour
- Transport to wind farm site
 - Transportation and down time has a cost impact
 - New vessels longer operating season
 - Faster jacking



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Jack-up turbine installation



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New installation vessels

Trends:

- All weather
- Larger capacity
- Helicopter support

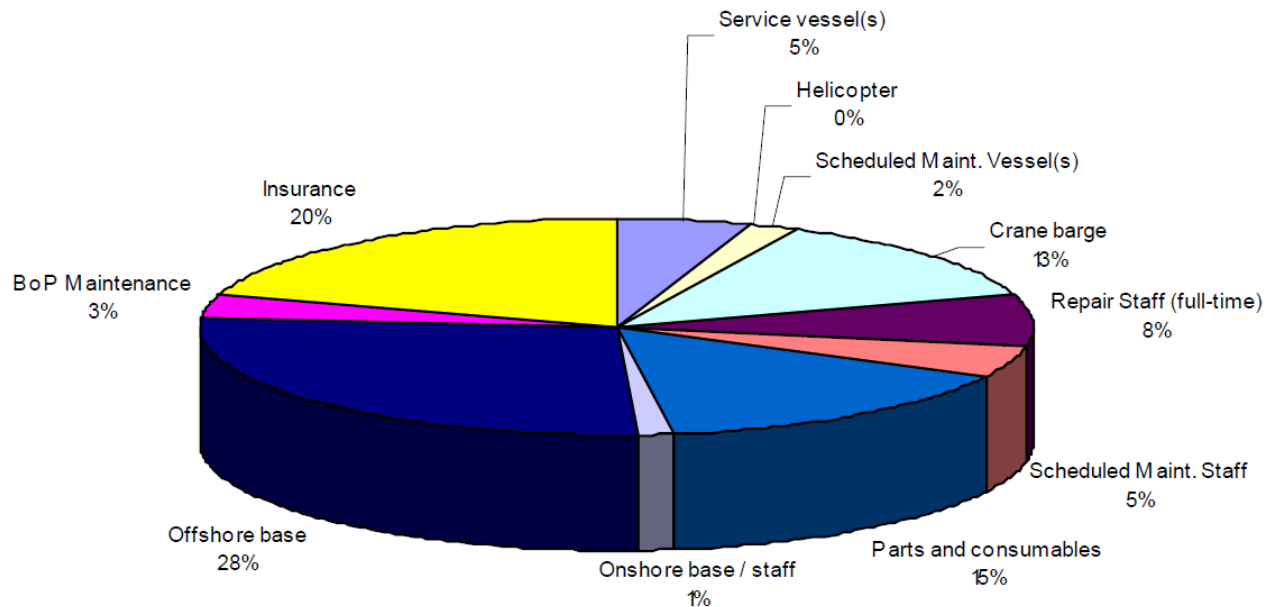
A2SEA 'Sea Installer'



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O&M Opportunities



Source: GL Garrad Hassan, Offshore wind energy supply chain opportunities, for Invest NI and Carbon Trust, 2010



O&M Service Vessels



Technical Opportunities

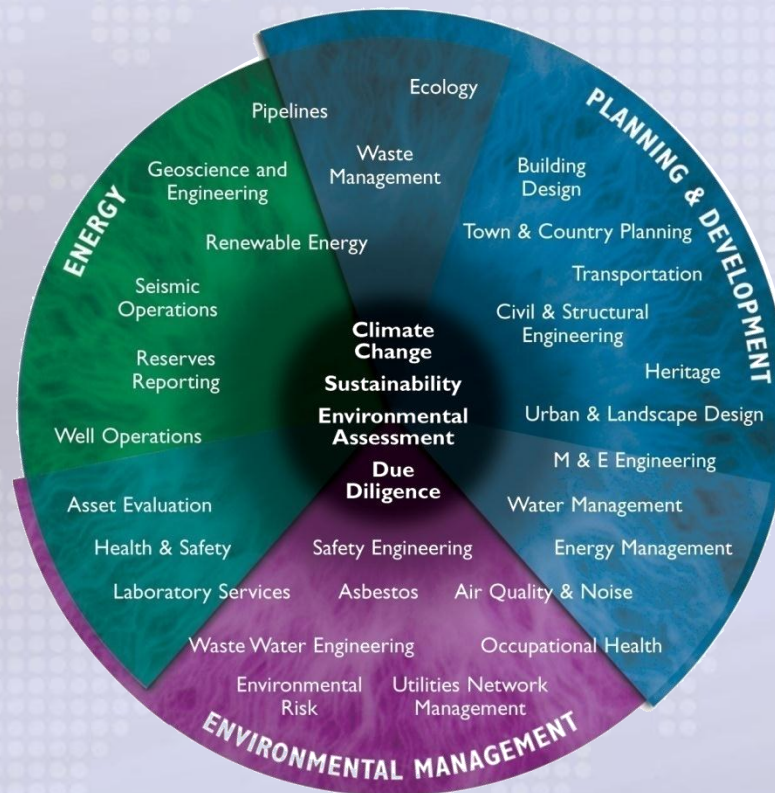
17.8GW of offshore wind developments in the Irish Sea are opening up a wealth of opportunities for the technical supply chain



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An integrated international business

Thank you



Dr Nick Wells
November 2011



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