

# “Wind Mills of the Mind”

## Delivering large scale offshore wind

Andy Kinsella  
CEO, Offshore  
*September 3rd, 2012, Ballina*



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# “Mountains of the Mind”

Delivering large-scale offshore wind energy

“The mountains one gazes at, reads about, dreams of and desires are not the mountains one climbs. These are matters of hard, steep, sharp rock and freezing snow; of extreme cold; of vertigo so physical it can cramp your stomach and loosen your bowels; of hypertension, nausea and frost-bite; and of unspeakable beauty.”

Robert MacFarlane

# “Wind Mills of the Mind”

Delivering large-scale offshore wind energy

“The wind mills society gazes at, reads about, dreams of and desires are not the wind mills that we, the industry, have to deliver. These are matters of hard logistics, steep learning curves, unknown geology and storm ridden seas ; of extreme winds; of a commitment from industry so physical it will cramp your stomach and loosen your bowels; but will deliver benefits to society of unspeakable importance.”

Andy Kinsella

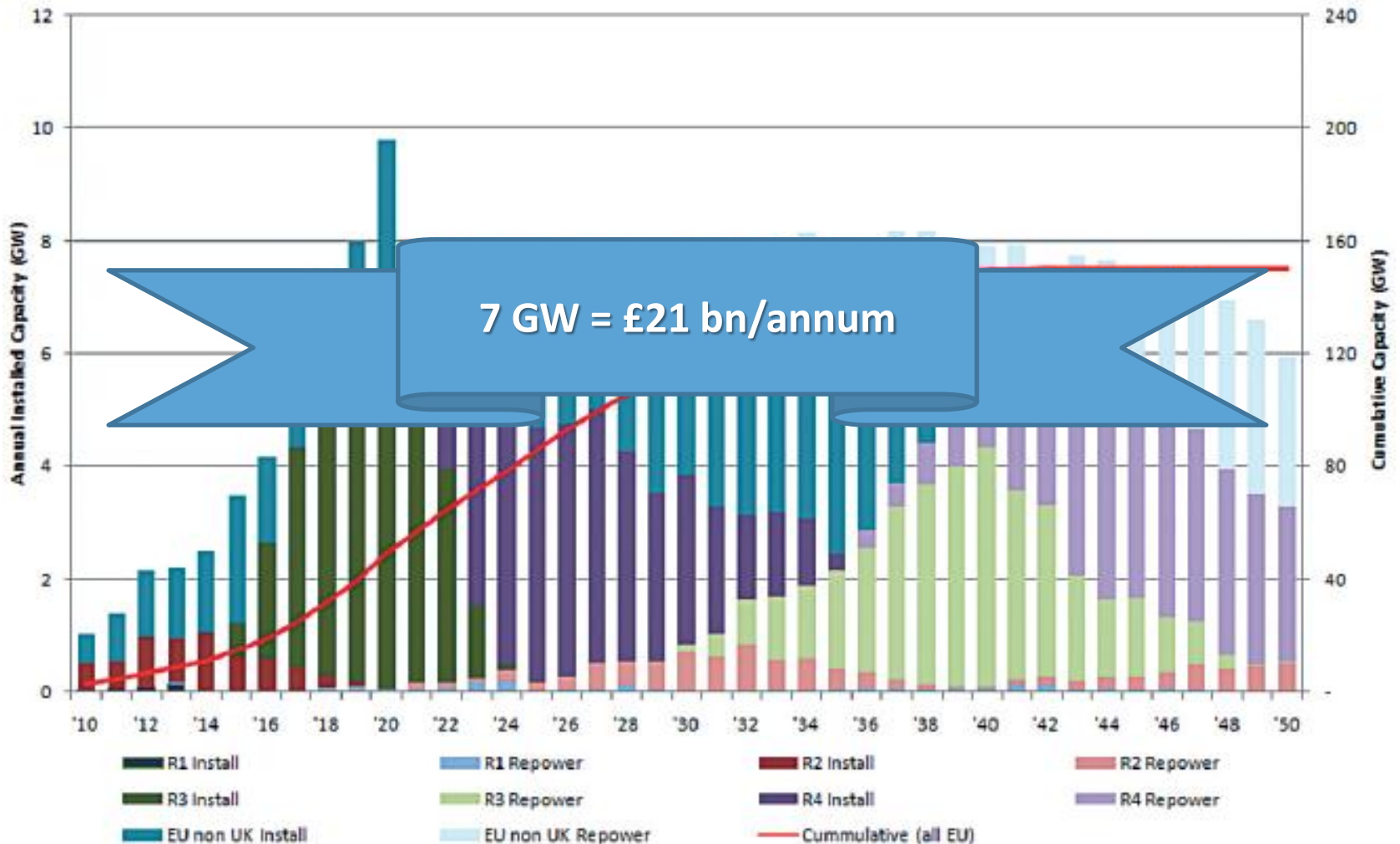
# Delivering Large Scale Offshore Wind

UK Offshore Experience



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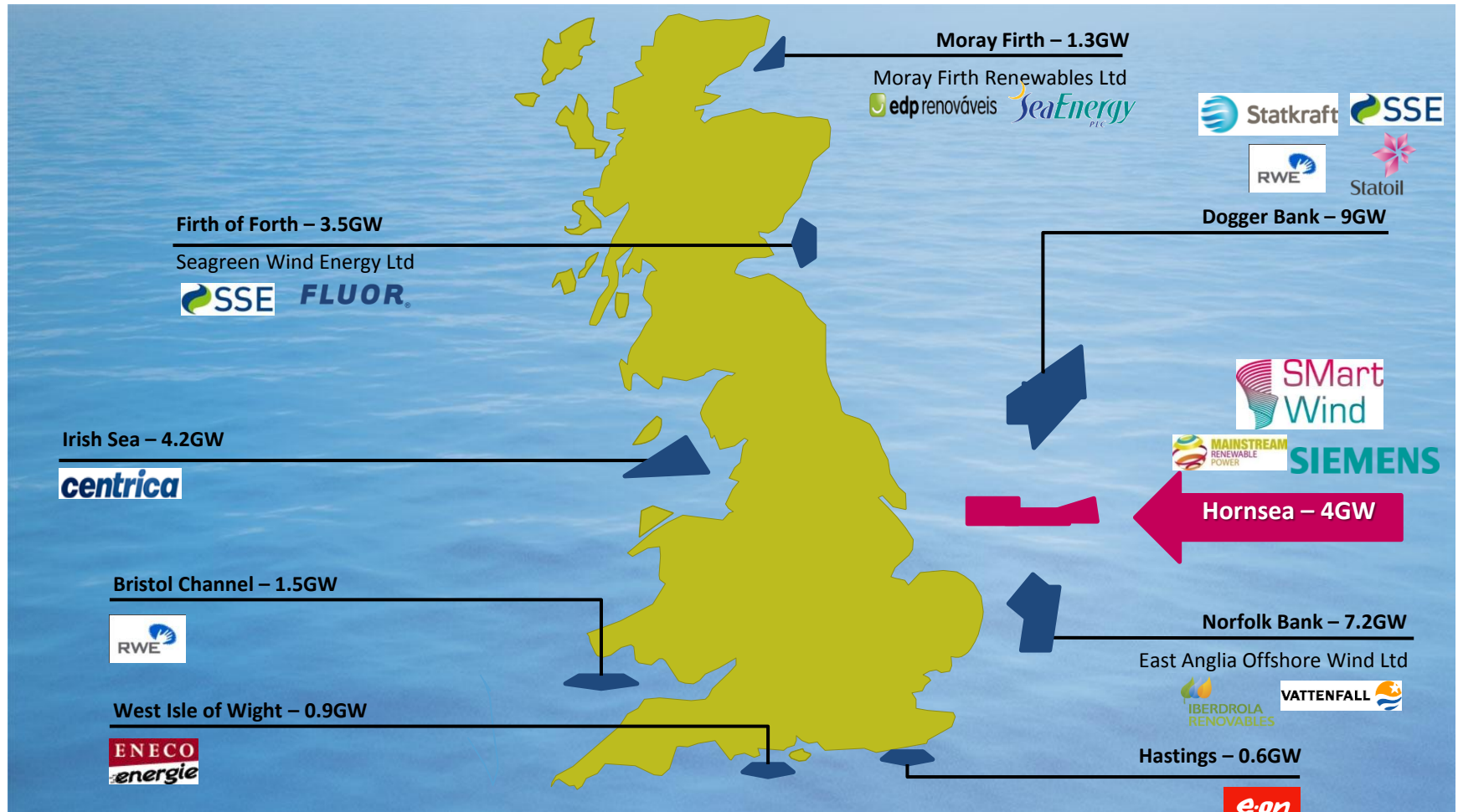
# Annual & cumulative EU offshore installation to 2050



Source: BVG Associates for The Crown Estate, 2009



# Offshore UK: Round 3, 18GW, £60bn, by 2020



# SMart Wind: 4,000MW, £12.0bn

- 50/50 joint Venture: Mainstream Renewable Power and Siemens
- Siemens Wind Power: World's leading offshore wind turbine provider
- Hochtief: World's third largest construction contractor
- Beluga shipping: World's biggest heavy lift shipping company
- A2Sea; Dong Siemens Joint Venture installation ship contractor
- Siemens T&D:
  - Siemens global centre of competence, interconnection- Manchester
  - One of only three suppliers of HVDC technology
- Prysmian: World's largest supplier of HV sub-sea cable

- First in Round 3 to **Consent**
- First in Round 3 to **Commercial Operation**
- **Lowest Cost of Energy** solution in the marketplace

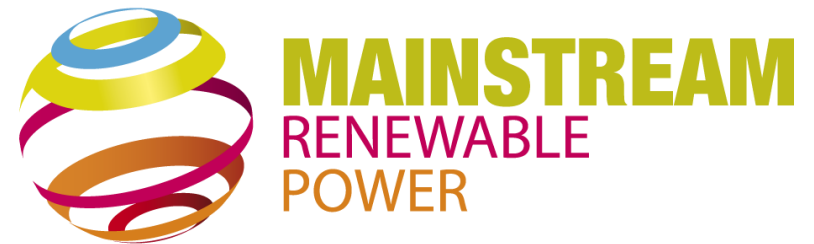
# Valuation of the UK's offshore resource

In harnessing 29% of practical offshore resource by 2050:

- Energy production equivalent to North Sea oil and gas production
- Potential to become a net energy exporter
- Carbon reduction equivalent to 1.1 billion tonnes
- 145,000 jobs potential

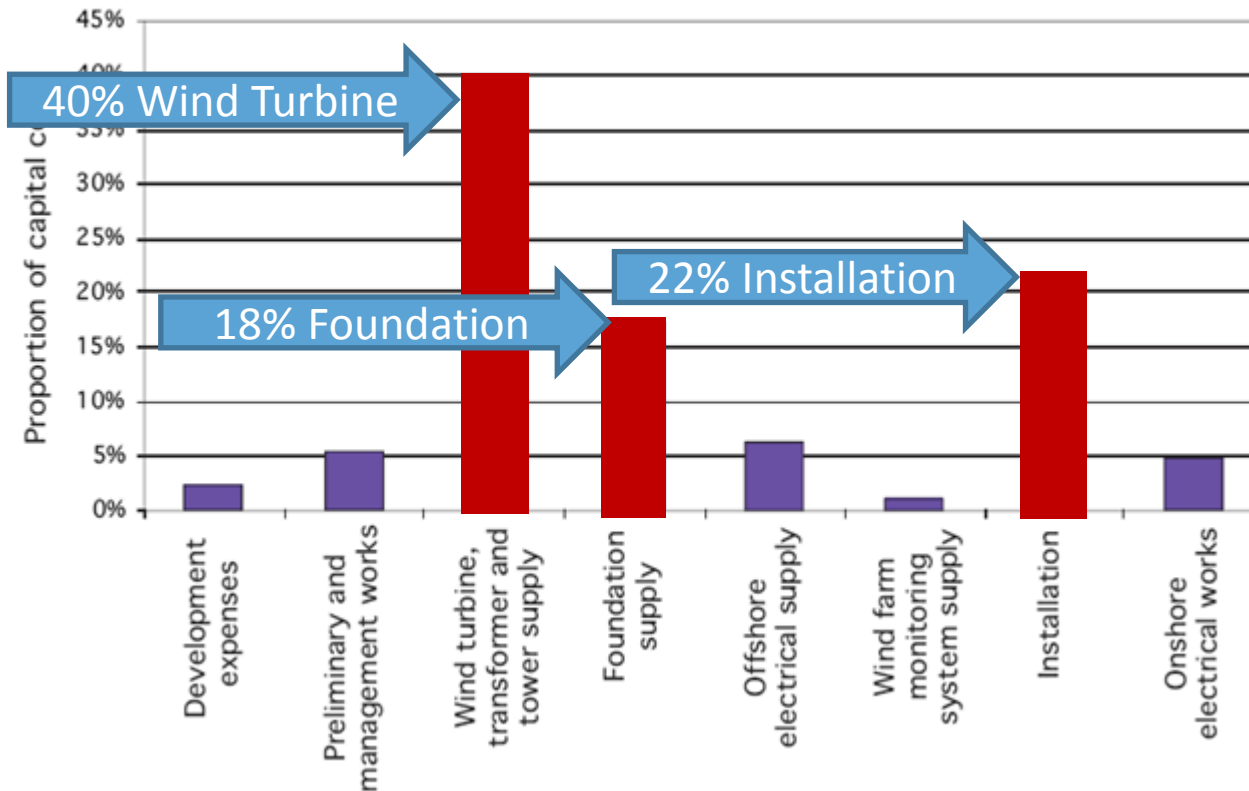
Scenario 1 - Utilisation: 13%	Scenario 2 – Utilisation: 29%
78GW	169GW
Cap Ex: £170bn	Cap Ex: £443bn
Revenue: £28bn	Revenue: £62bn
50% of UK Demand	<b>Net Exporter</b>

# Cost of an Offshore Wind Farm



# Cost of Energy: Offshore wind farm typical costs

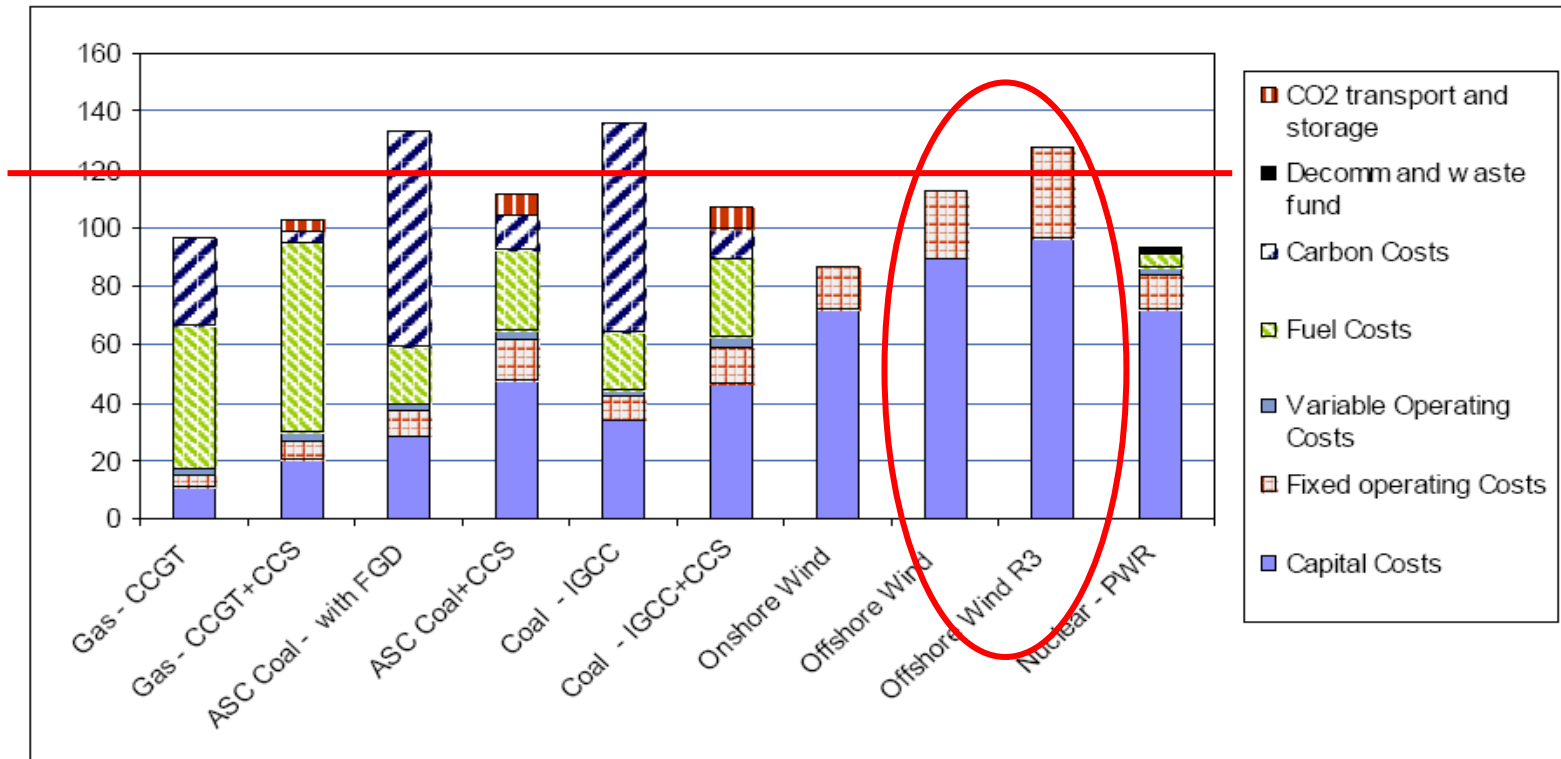
Figure 2.1 Typical breakdown of capital costs (UK Round 1) (Garrad Hassan, 2003)



Source: Garrad Hassan, 2003

# Cost of Energy: Levelised costs of main technologies

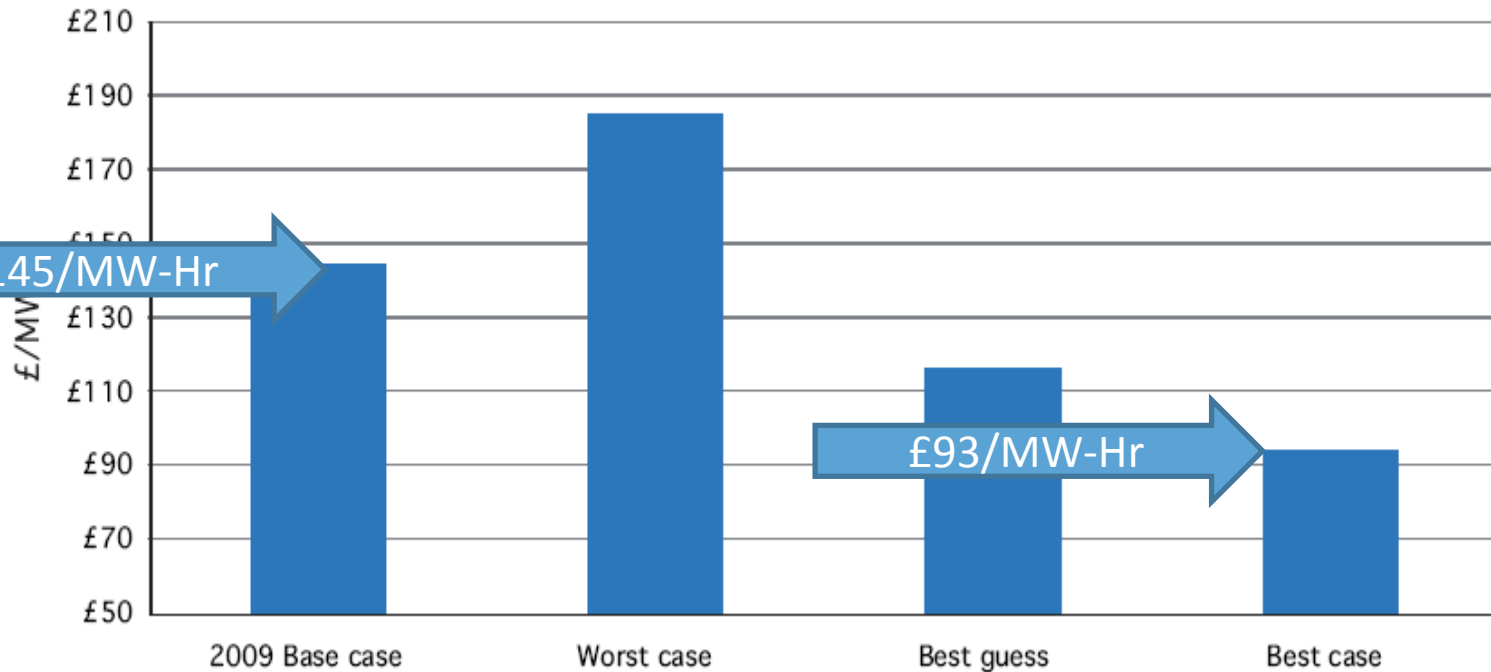
Figure 7.5: Levelised costs of main technologies on NOAK basis for project started in 2017: £/MWh



Source: Mott MacDonald

# Offshore Wind cost projections

Offshore wind levelised costs projections (mid 2020s)



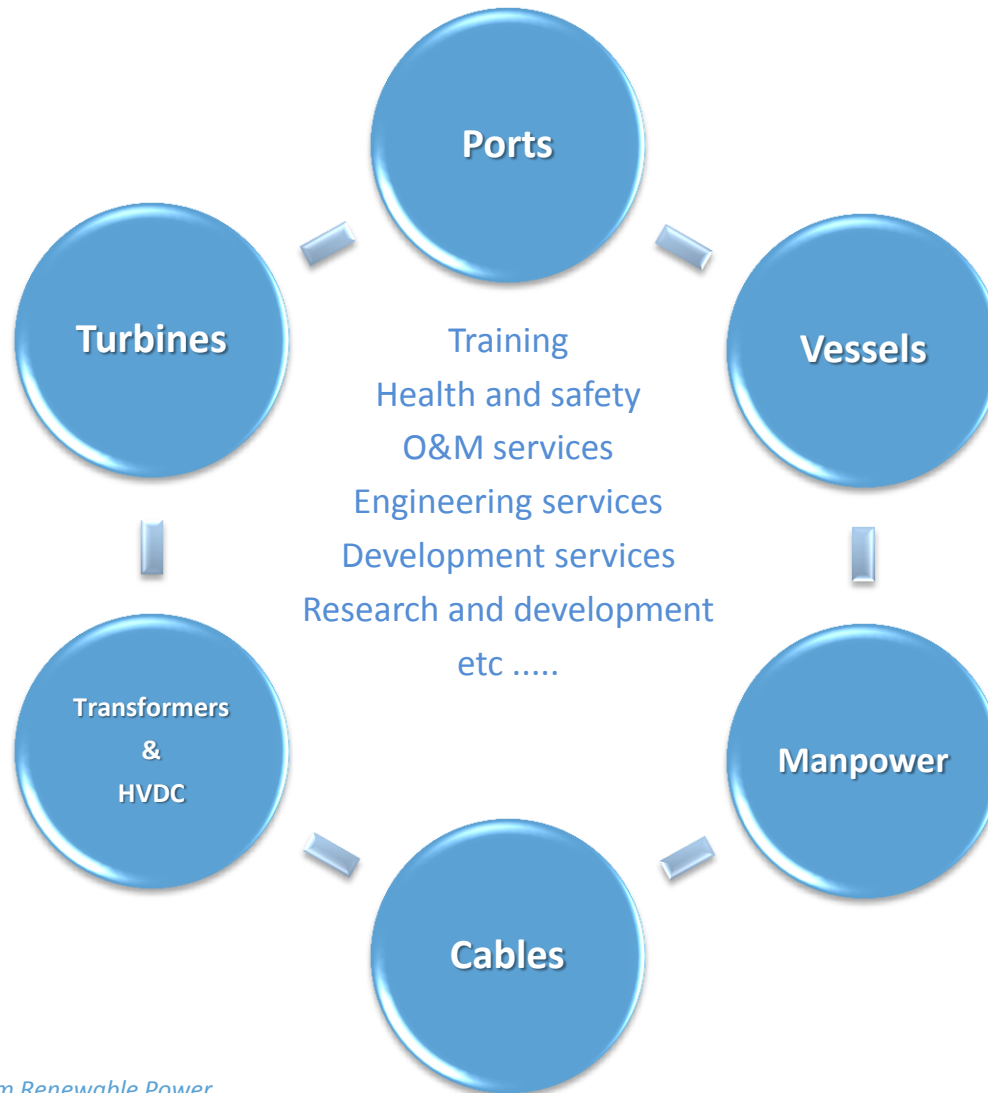
# Delivering Large Scale Offshore Wind

SMart Wind: A world class supply chain consortium



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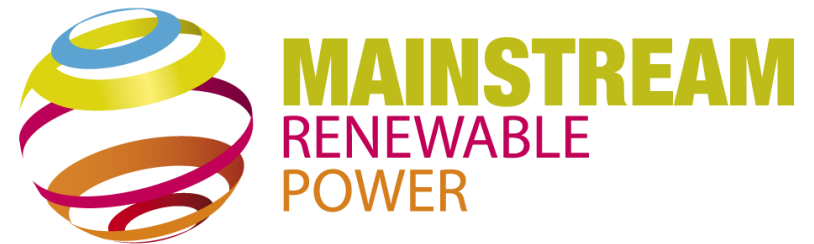
# The supply chain elements

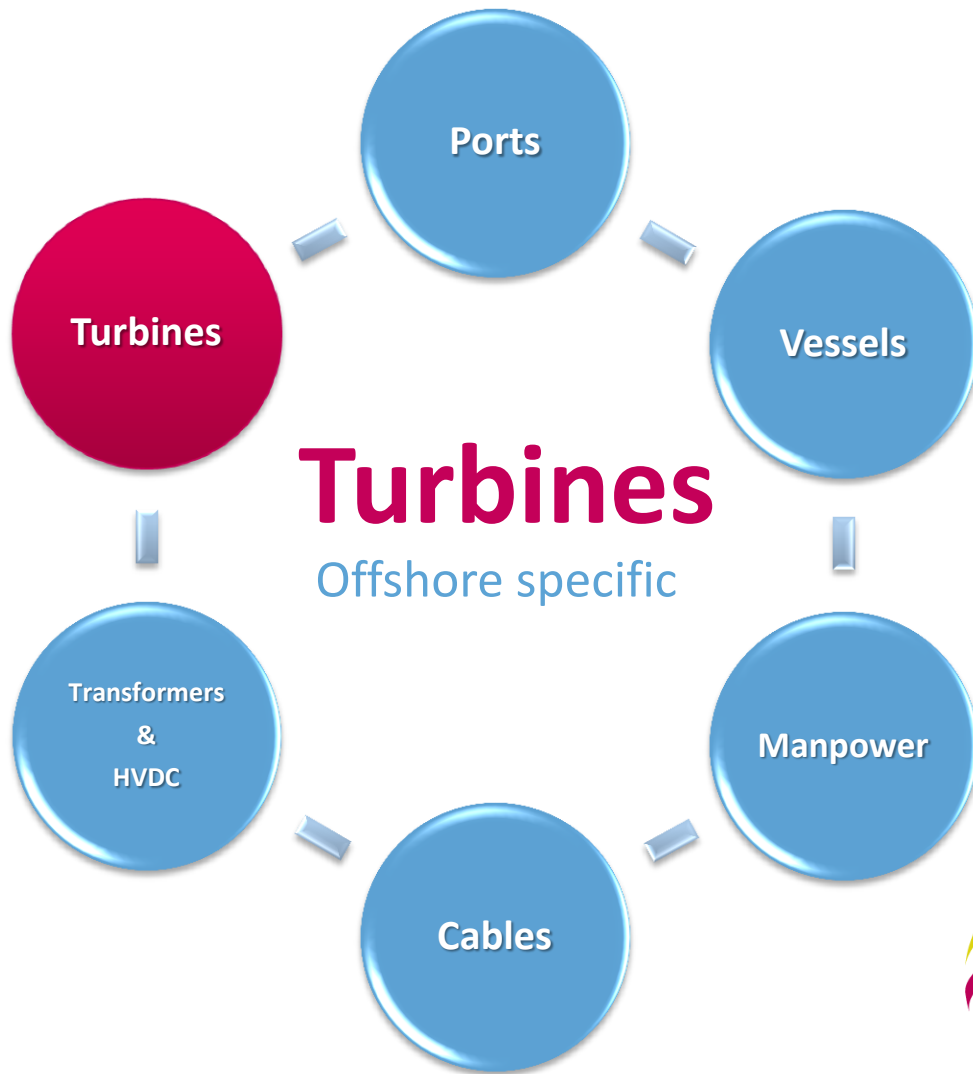


Source: *Mainstream Renewable Power*

# Supply Chain

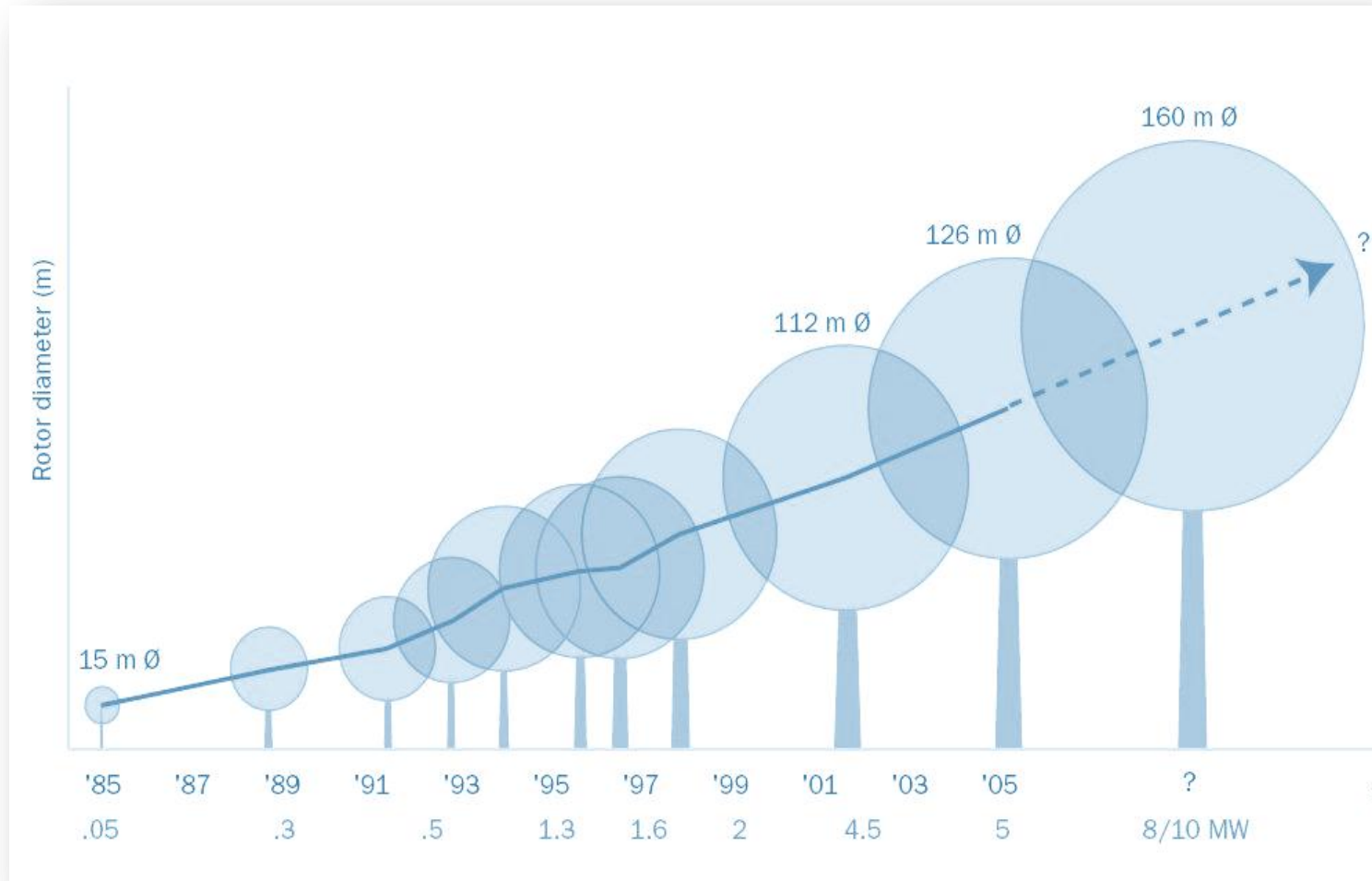
The challenges of large scale offshore wind





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# Turbines: Development

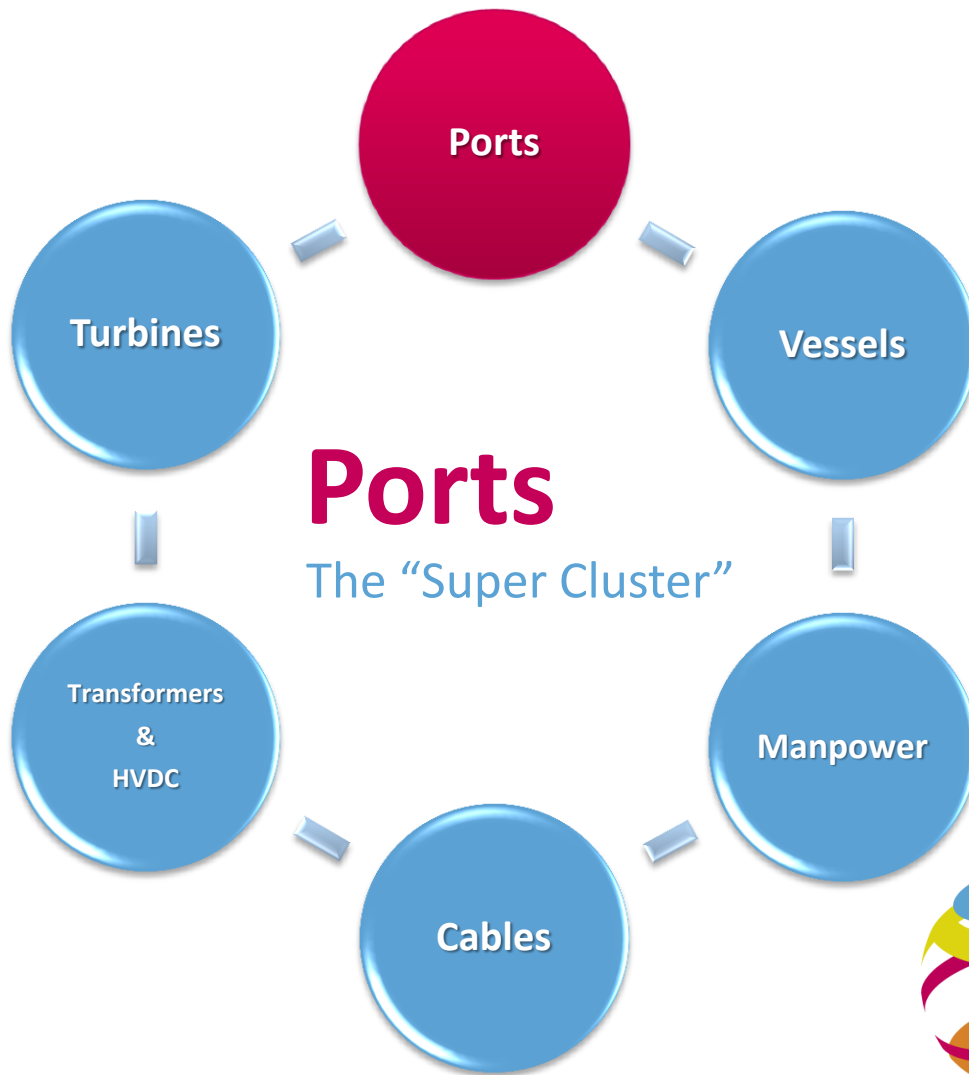


Source: Industry, various

# Attracting Industry – Turbine Nacelle Assembly

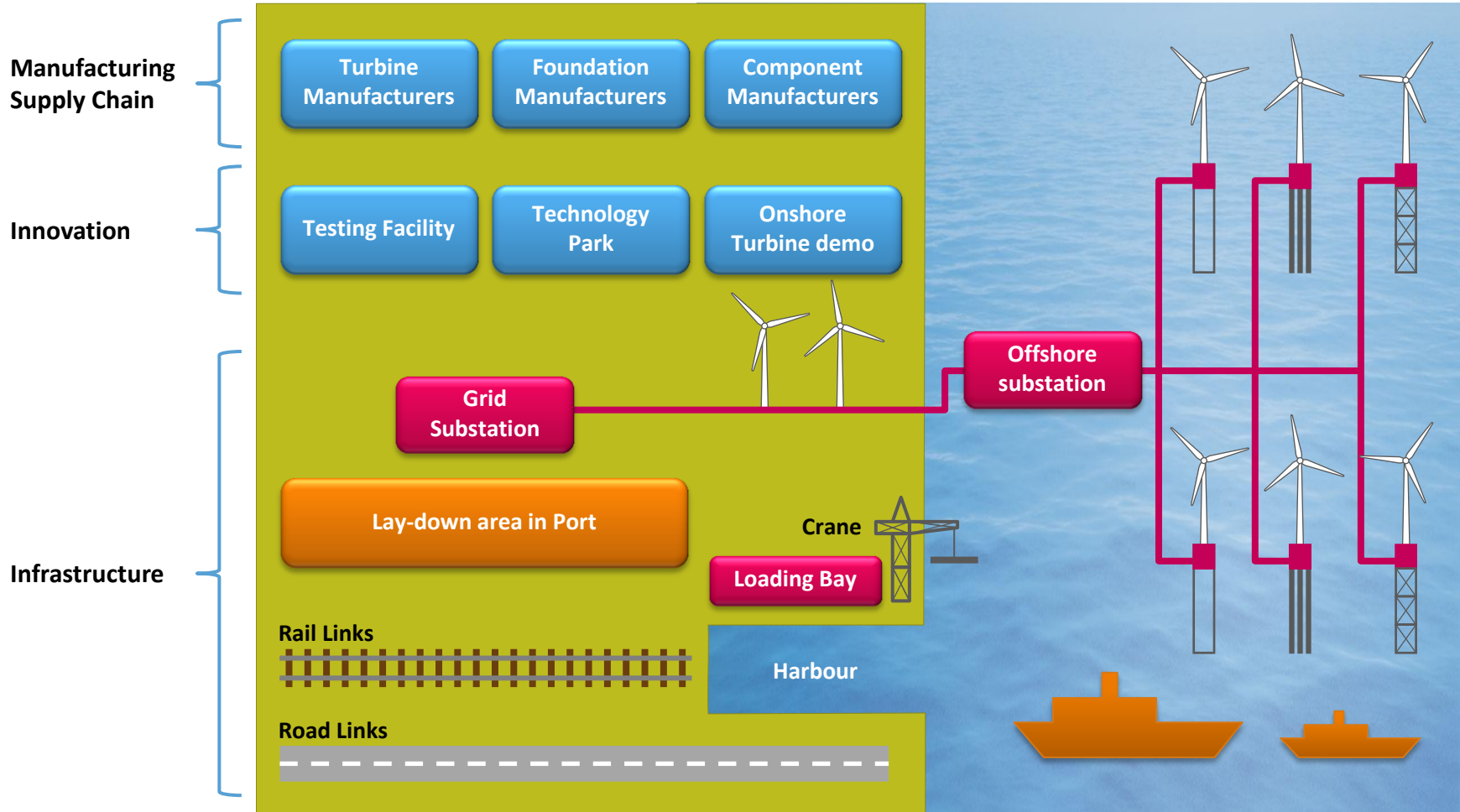


- Contains over 3000 components
- Several components suppliers already based in Ireland
  - CG Power Systems
  - ABB
  - Siemens
- Labour Requirement = medium to high skilled engineering roles
- Considerable spin off from secondary component suppliers & subcomponent suppliers
  - Boost for domestic industry
  - Attract foreign suppliers in



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# Ports: The Super Cluster



# Turbines: Harland & Wolff



Source: Harland & Wolff

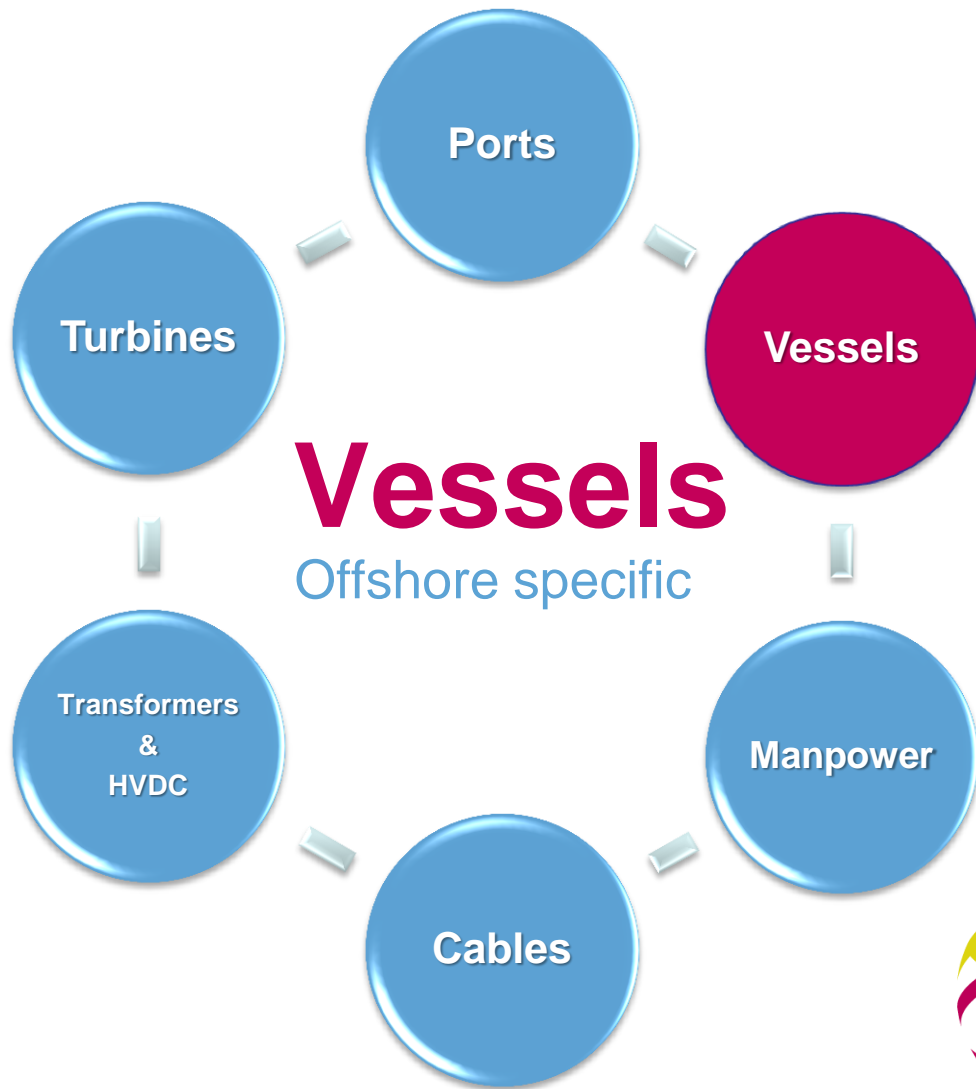
# DONG Energy; Belfast Port



# Offshore Foundation Manufacturing

- Significant Portion of Irish Sea developments suitable for gravity base foundations
  - Shallower water depths
  - Reduced environmental impact
- Foundations manufactured onshore & floated out to site
  - Required to locate manufacturing within 100-150kms of development
- Labour Requirement – medium skilled construction / Engineering
- Strabag Offshore Wind Proposing to install facility on Irish East Coast

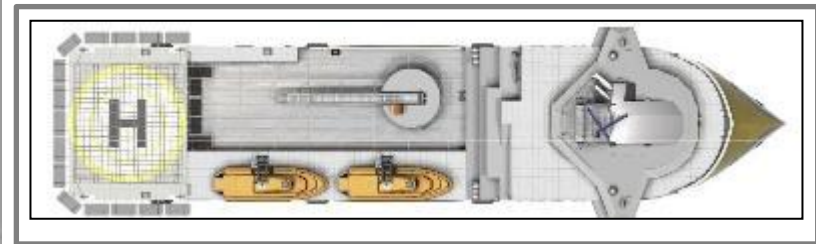




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# Vessels

- All-weather ship(s) able to operate all year round
- Enormous increases in size & capabilities
- CAPEX around €200m each
- Minimum of ten of these constructor ships
- Additional flotilla of new special purpose vessels
- Cost effective Helicopter support solutions
- Total cost about £5bn





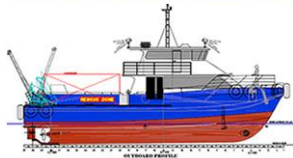
# ARKLOW

## MARINE SERVICES

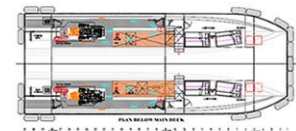
Incorporated under Rappel Enterprises Limited

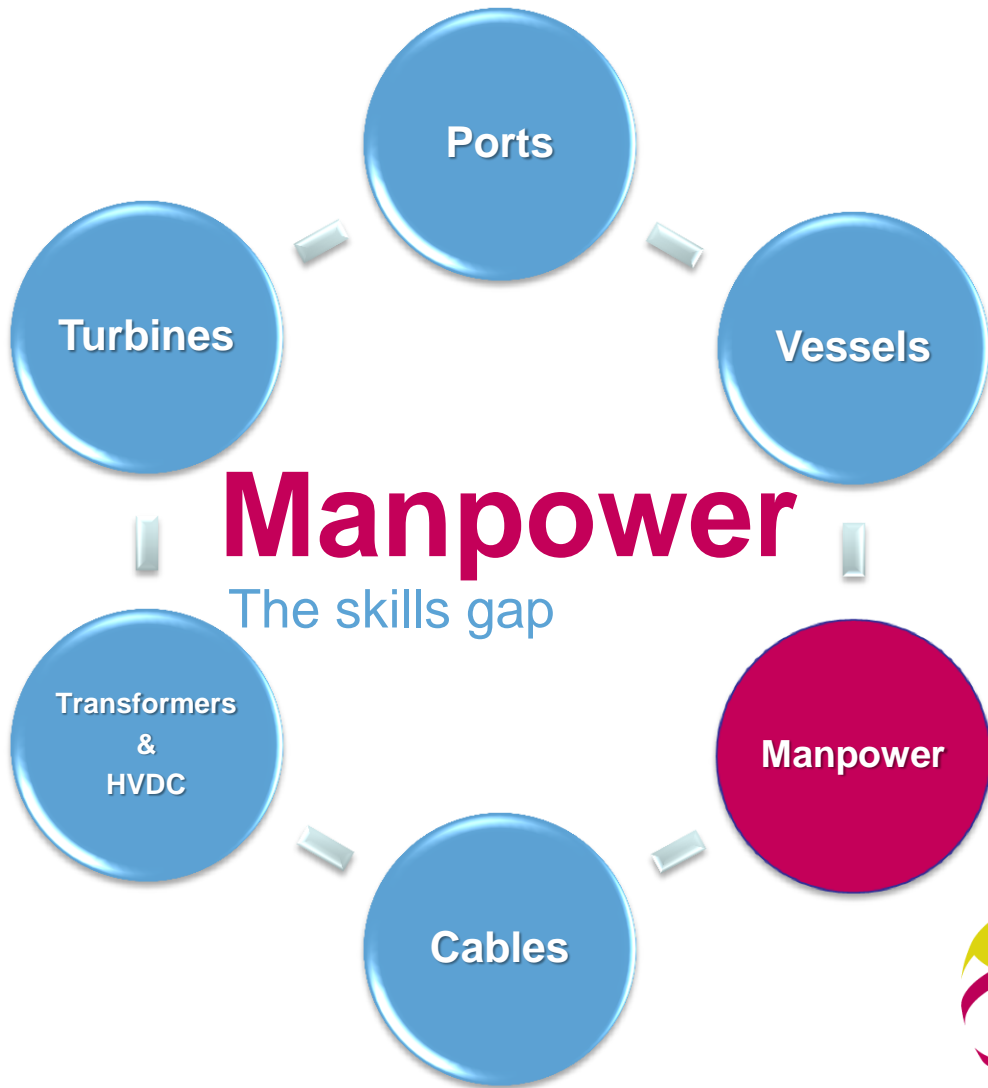


21m Offshore Windfarm Catamaran



21m Offshore Windfarm Catamaran

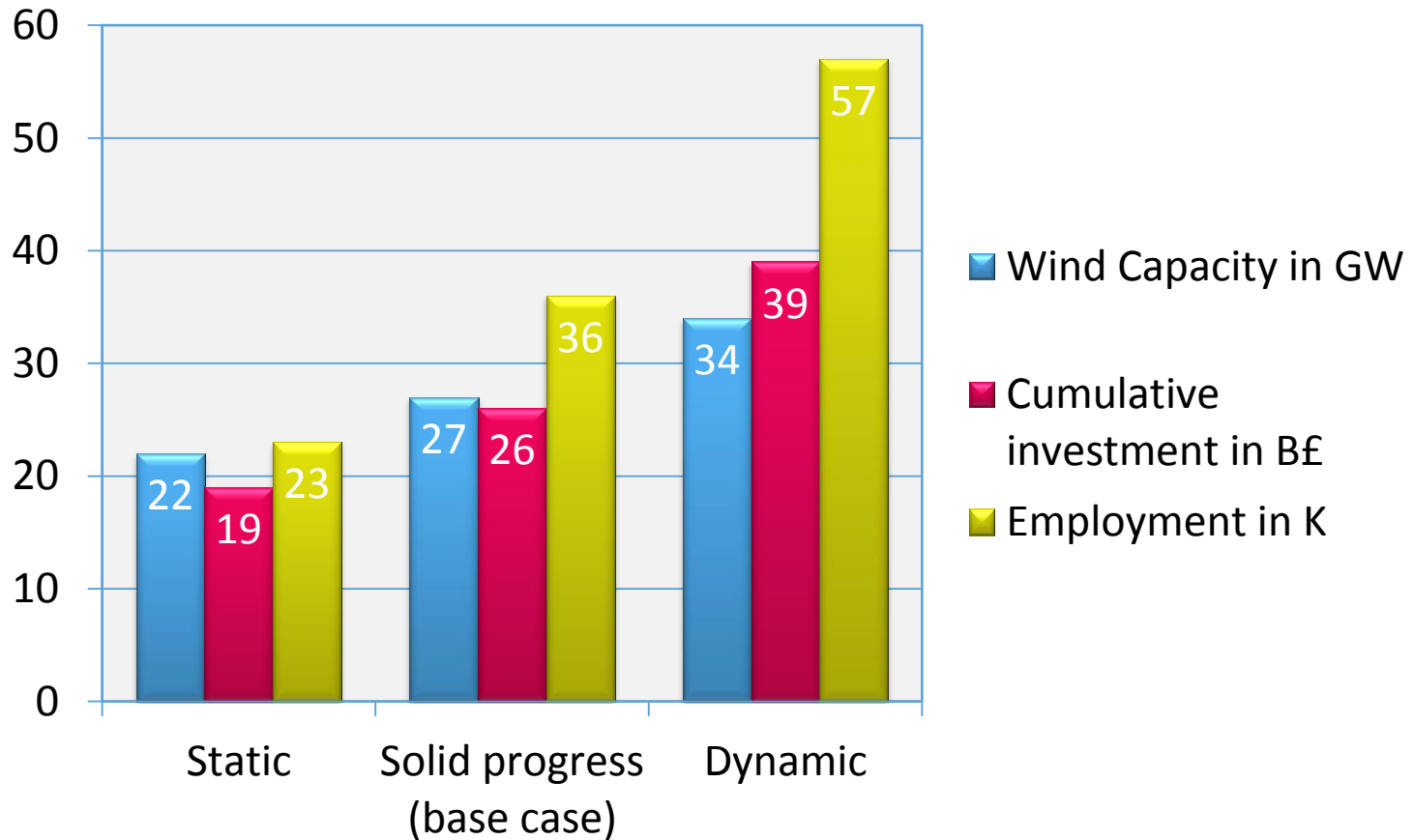


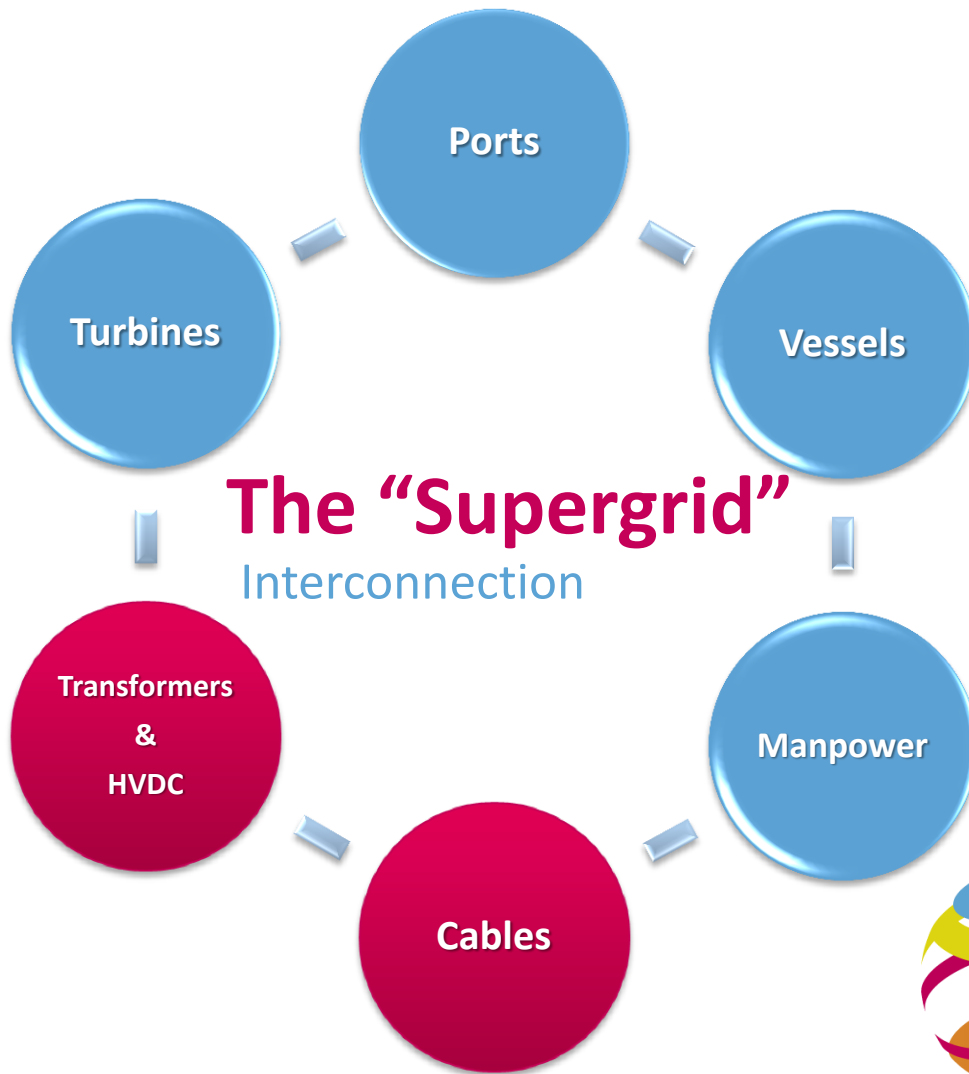


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# Supply Chain: Manpower

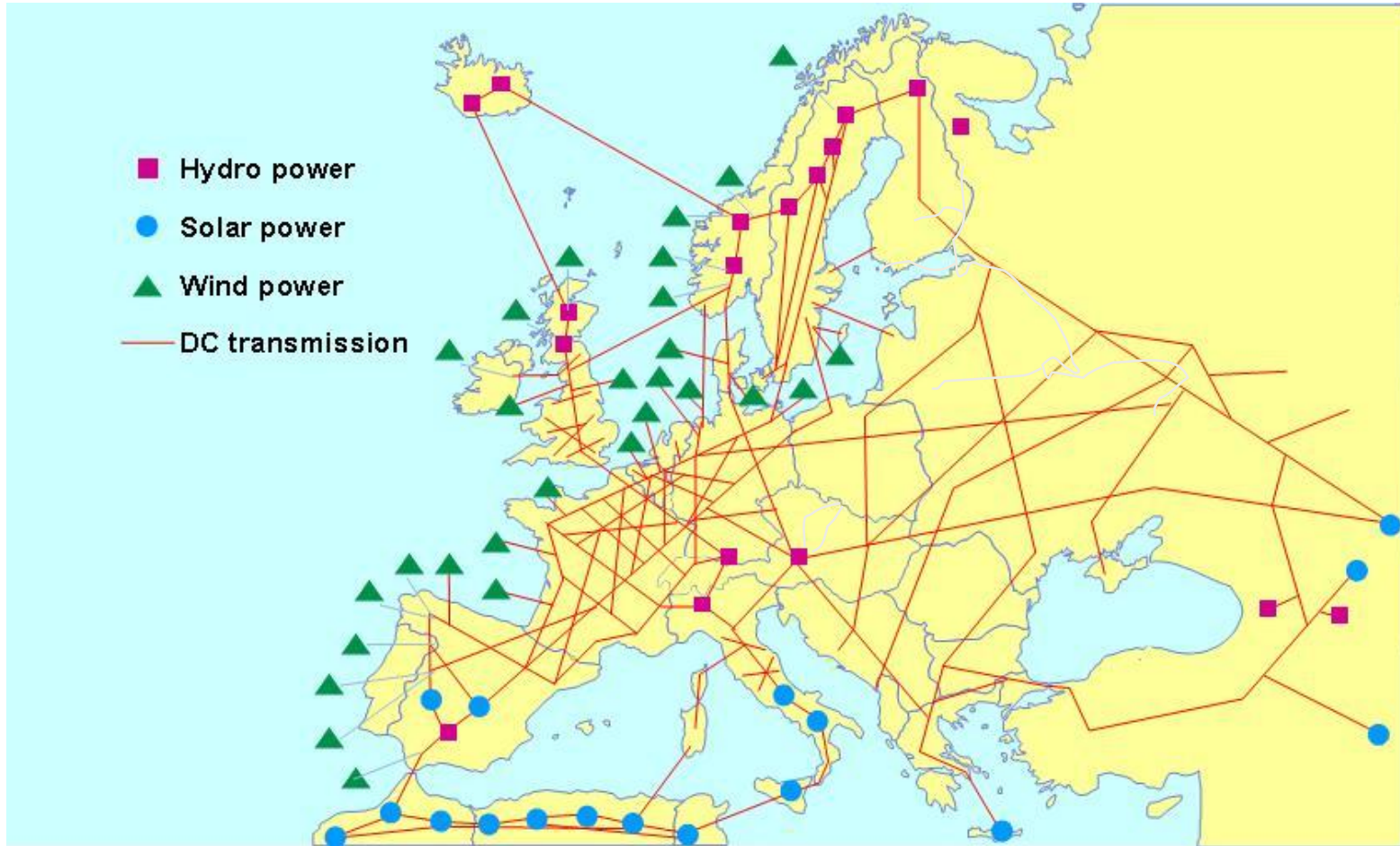
Potential benefits by 2020 in three industry development scenarios





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# Renewables Supergrid



Source: *Friends of the Supergrid*



“is a group of companies and organisations with a mutual interest in promoting the policy agenda for a European Supergrid and empowered to build, the know-how to deliver it in practice”.

**ALSTOM**



**nationalgrid**

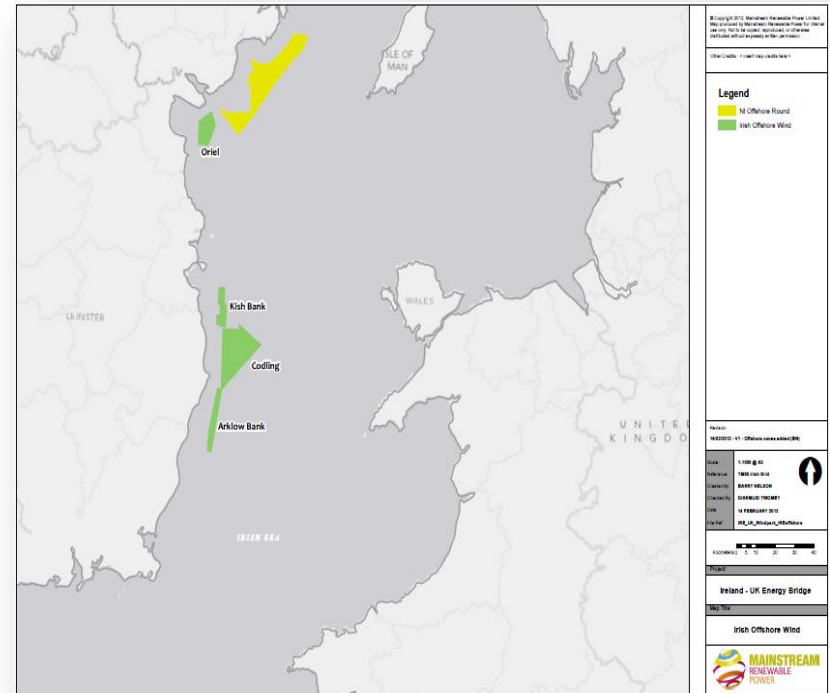
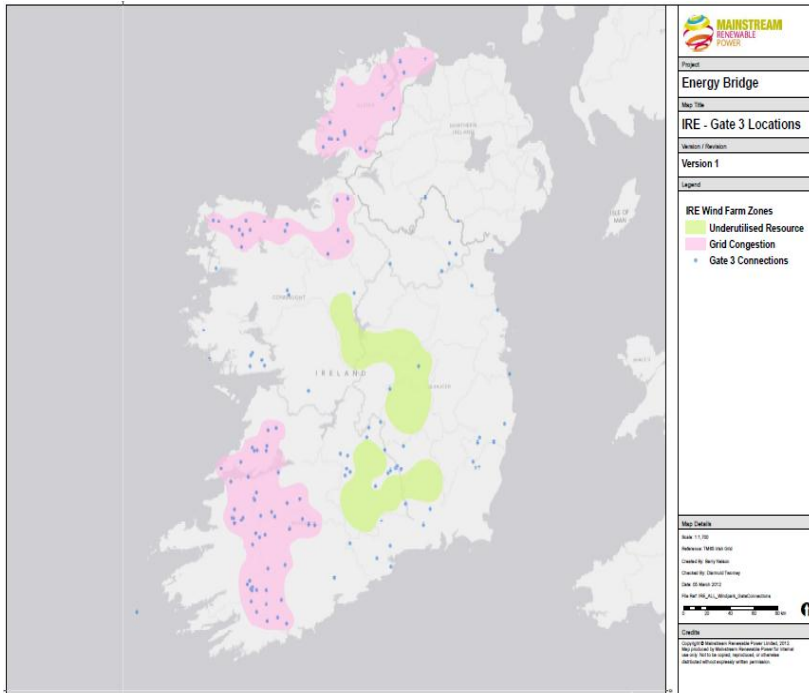


**SIEMENS**



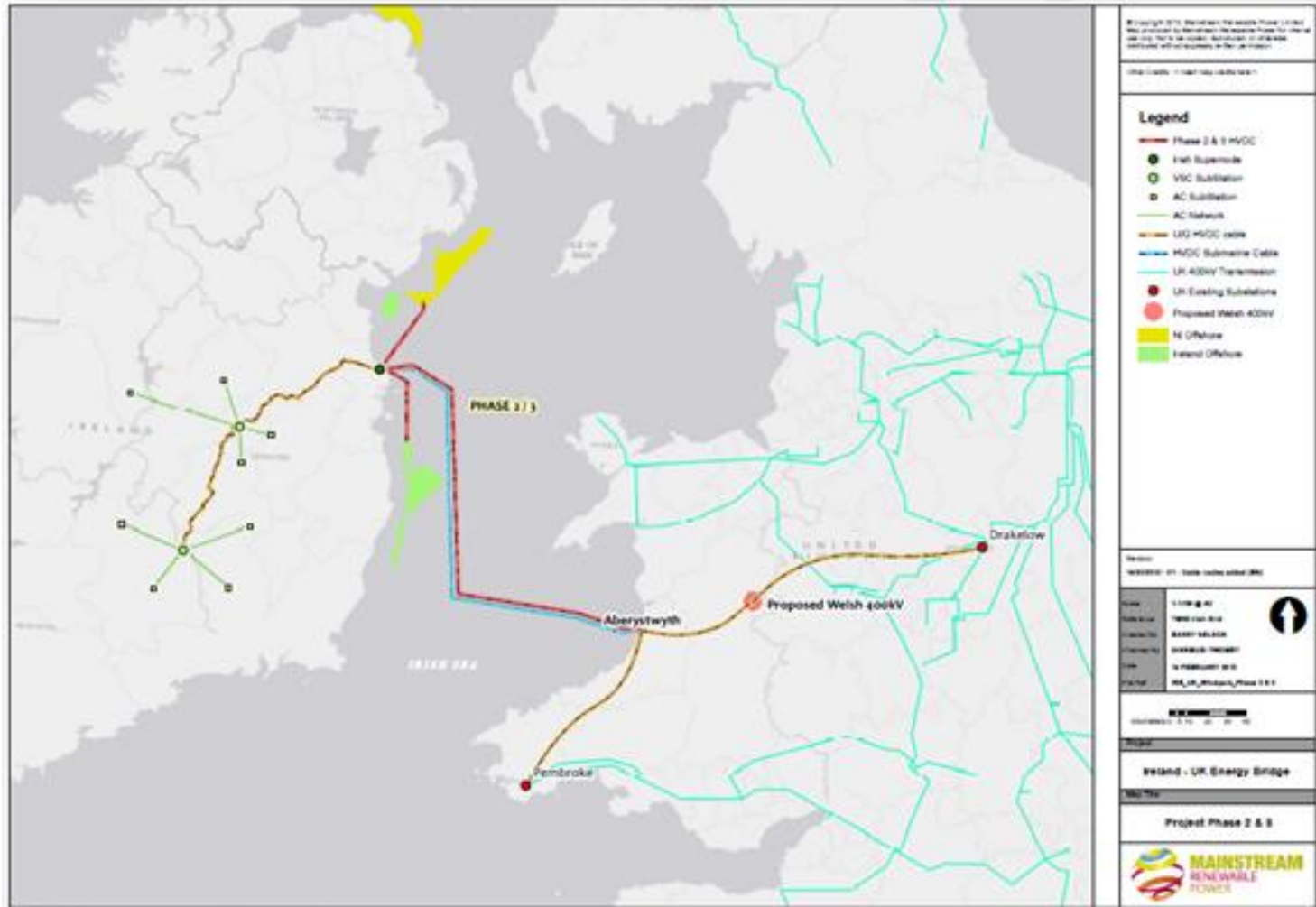
# Energy Bridge

2000 MW onshore, 3000MW offshore for export



# Energy Bridge

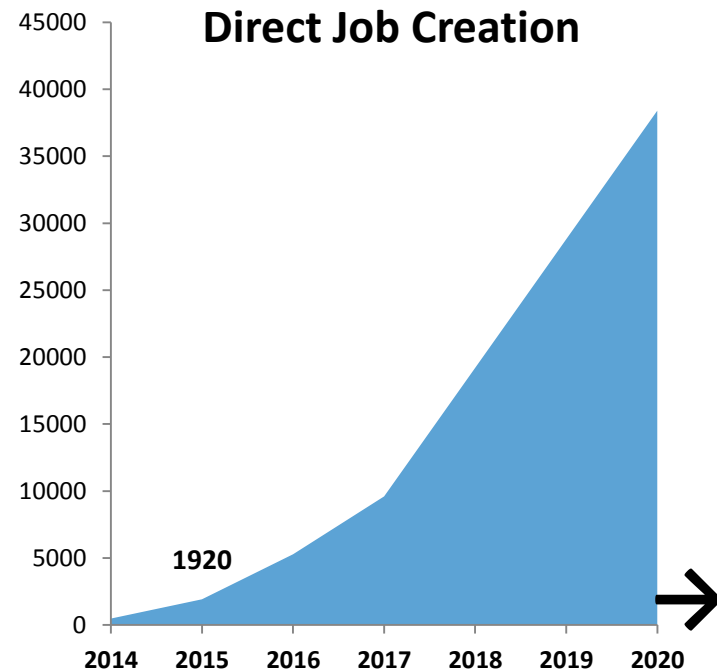
2000 MW onshore, 3000MW offshore for export



# Energy Bridge

## Ireland as a Manufacturing Hub: 54,000 Jobs

- 40,000 direct jobs created by 2020
- Manufacturing related employment not captured in Ireland today
- Huge opportunity for locating manufacturing in Ireland
- Multiplier effects → 54,000 jobs



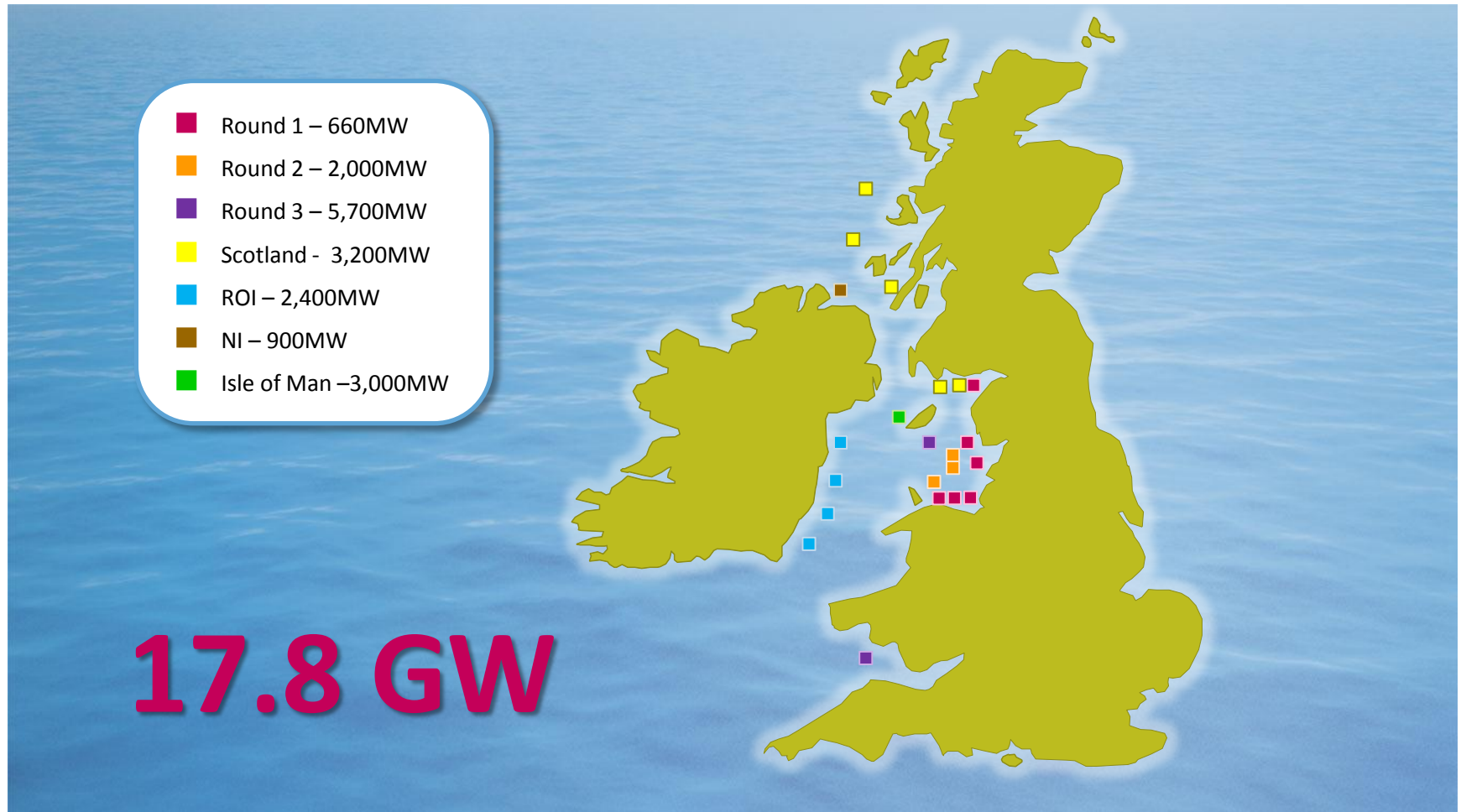
# Irish Sea

Opportunity at scale



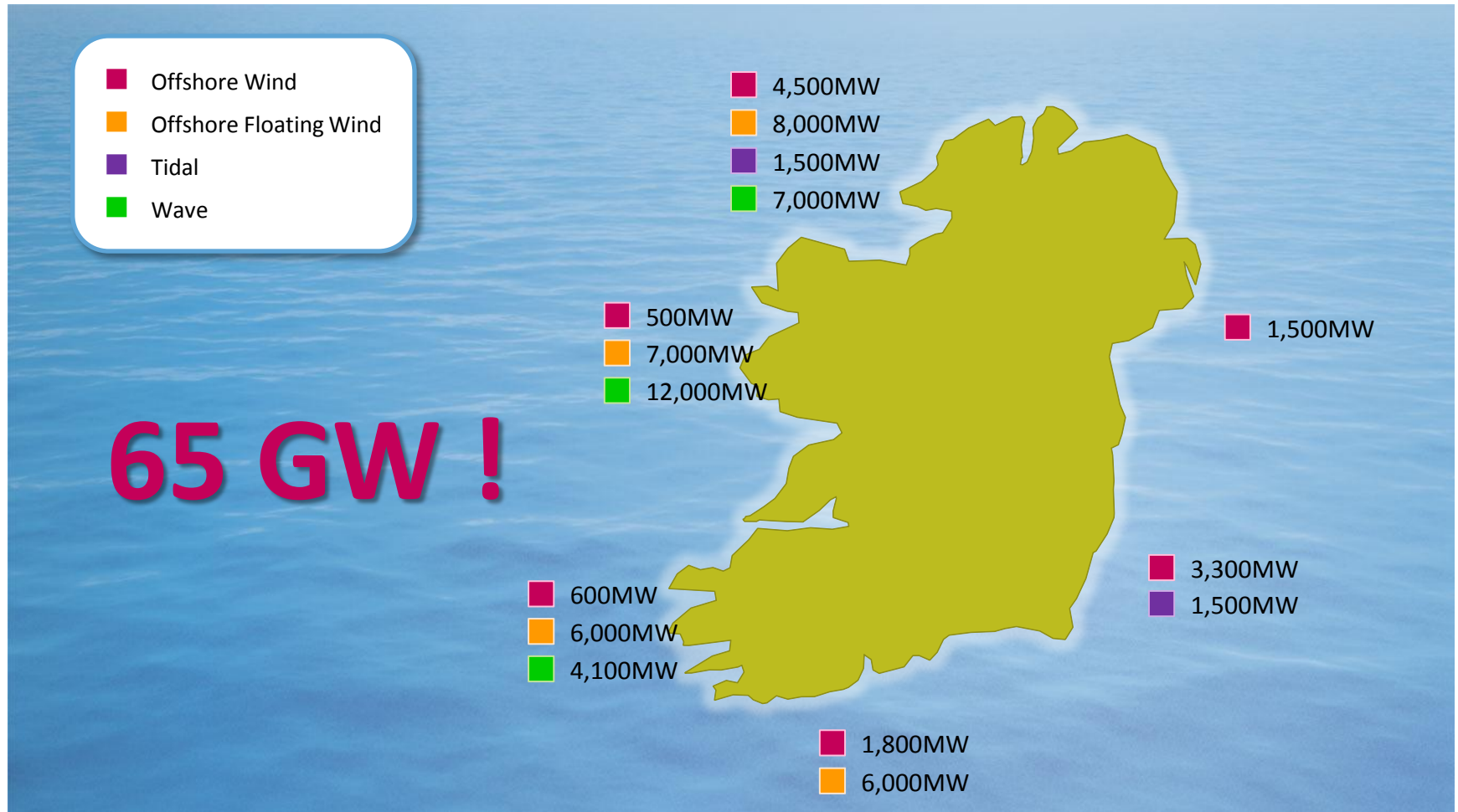
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# Current “Irish Sea” Zone Awards: 17.8 GW



Source: TCE, DETI, DCMNR, Gov Isle of Man?

# The Opportunity: Ireland's Offshore Energy Resource 65GW



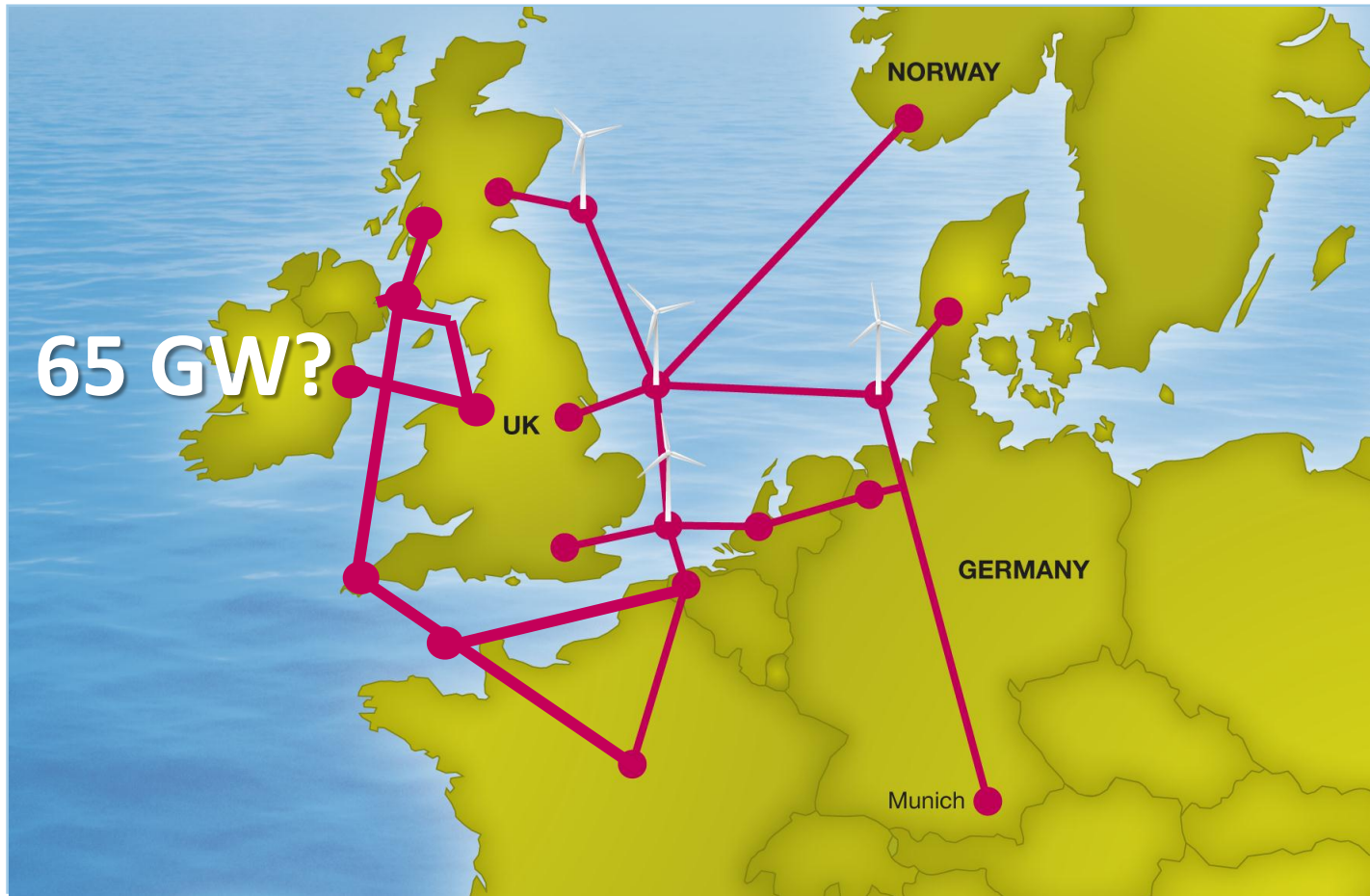
Source: *Offshore Renewable Energy Development Plan, SEAI*

# Getting to Market: “Irish and North Sea” Grid



Source: TCE, DETI, DCMNR, Gov Isle of Man?

# Ireland: An opportunity to be lost?



# “Wind Mills of the Mind”

Delivering large scale wind in the North Sea

## Thank you

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