

Offshore Wind Cost Reduction: Findings of The Crown Estate and the Cost Reduction Taskforce

BIEE Parker Seminar

10th October 2012

Richard Howard, Chief Economist

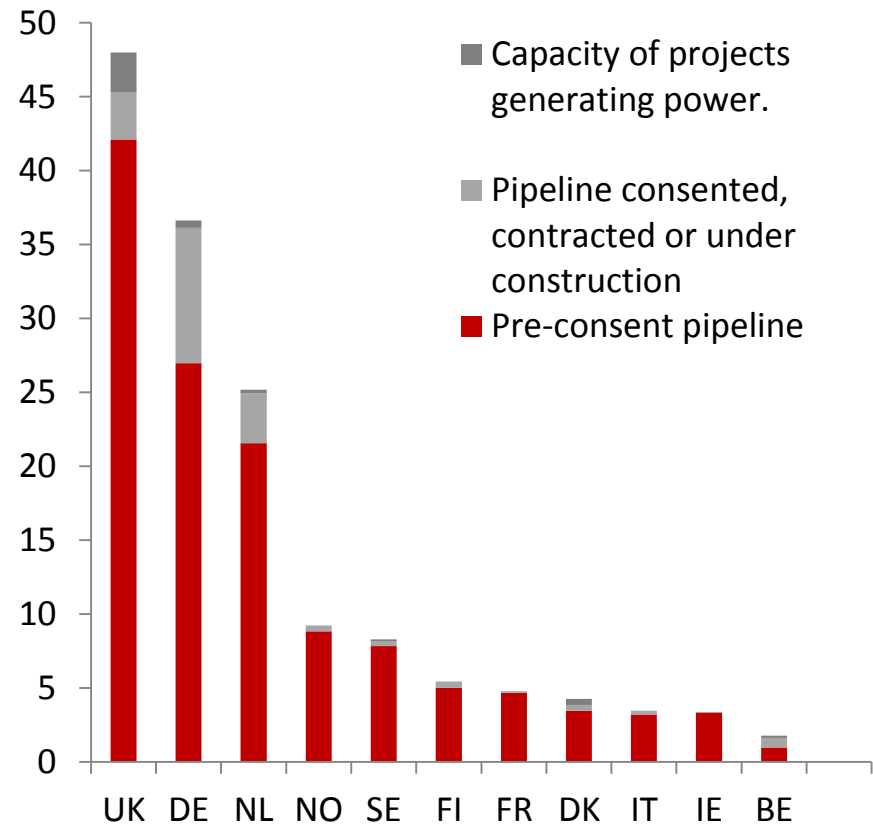
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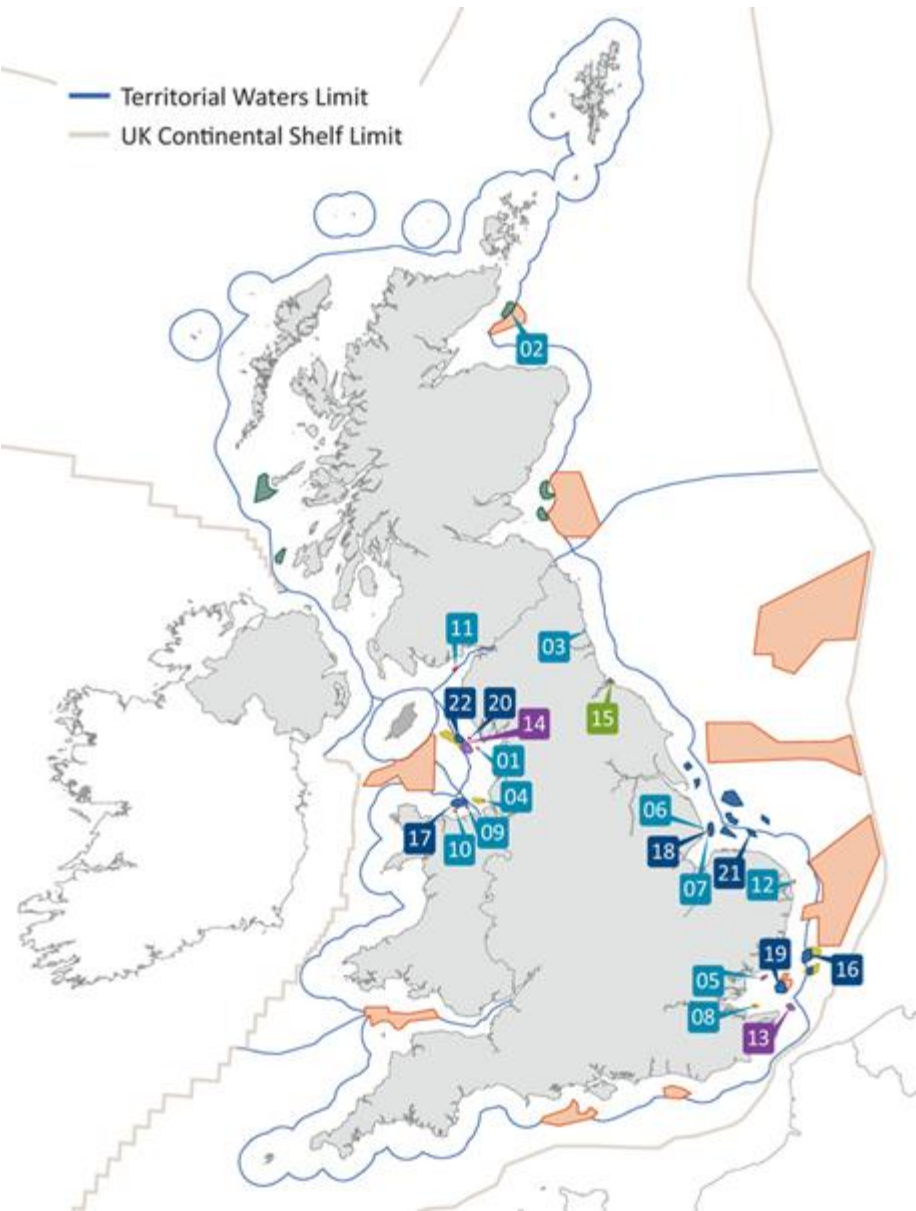
- Summary of UK offshore wind
- Role of The Crown Estate
- Offshore Wind Cost Reduction

UK: Global offshore wind leader?

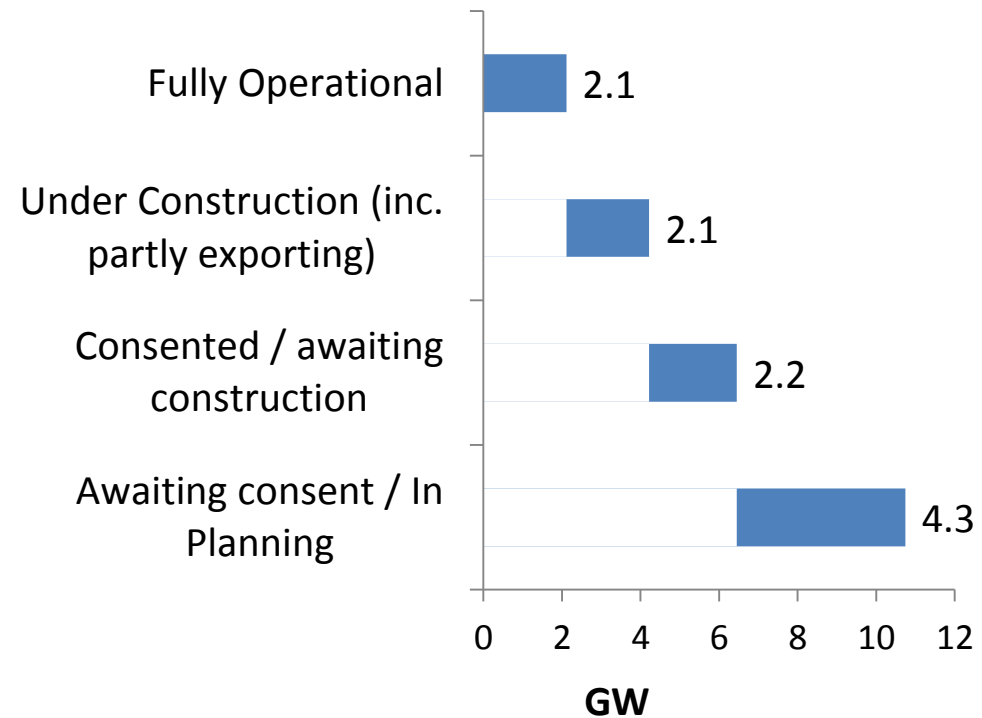
- Potentially the largest offshore wind resource in the world
- Largest pipeline of offshore wind projects (46GW+)
- Largest operational capacity in the world



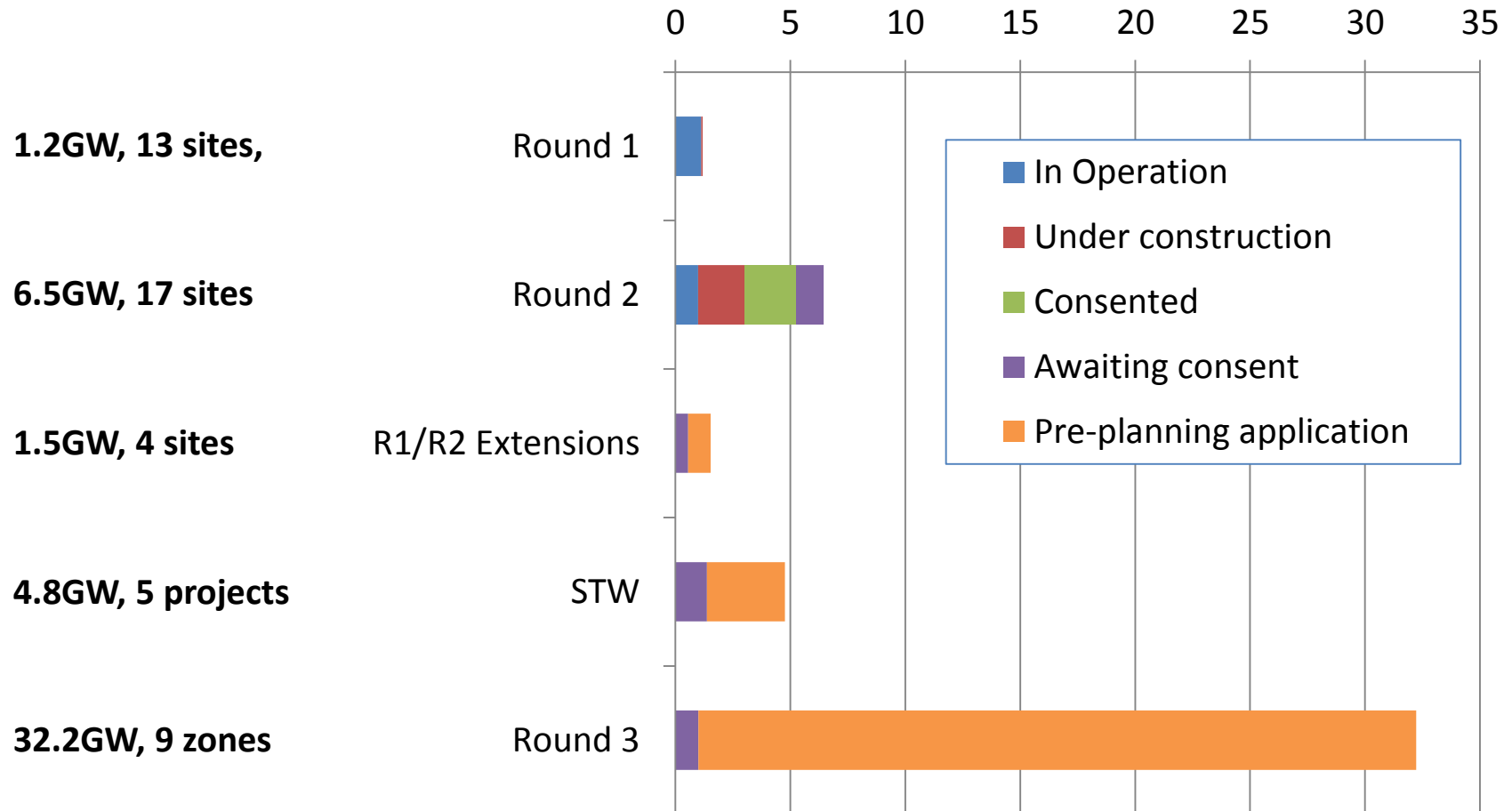
State of play



Immediate pipeline (GW) – as at June 2012

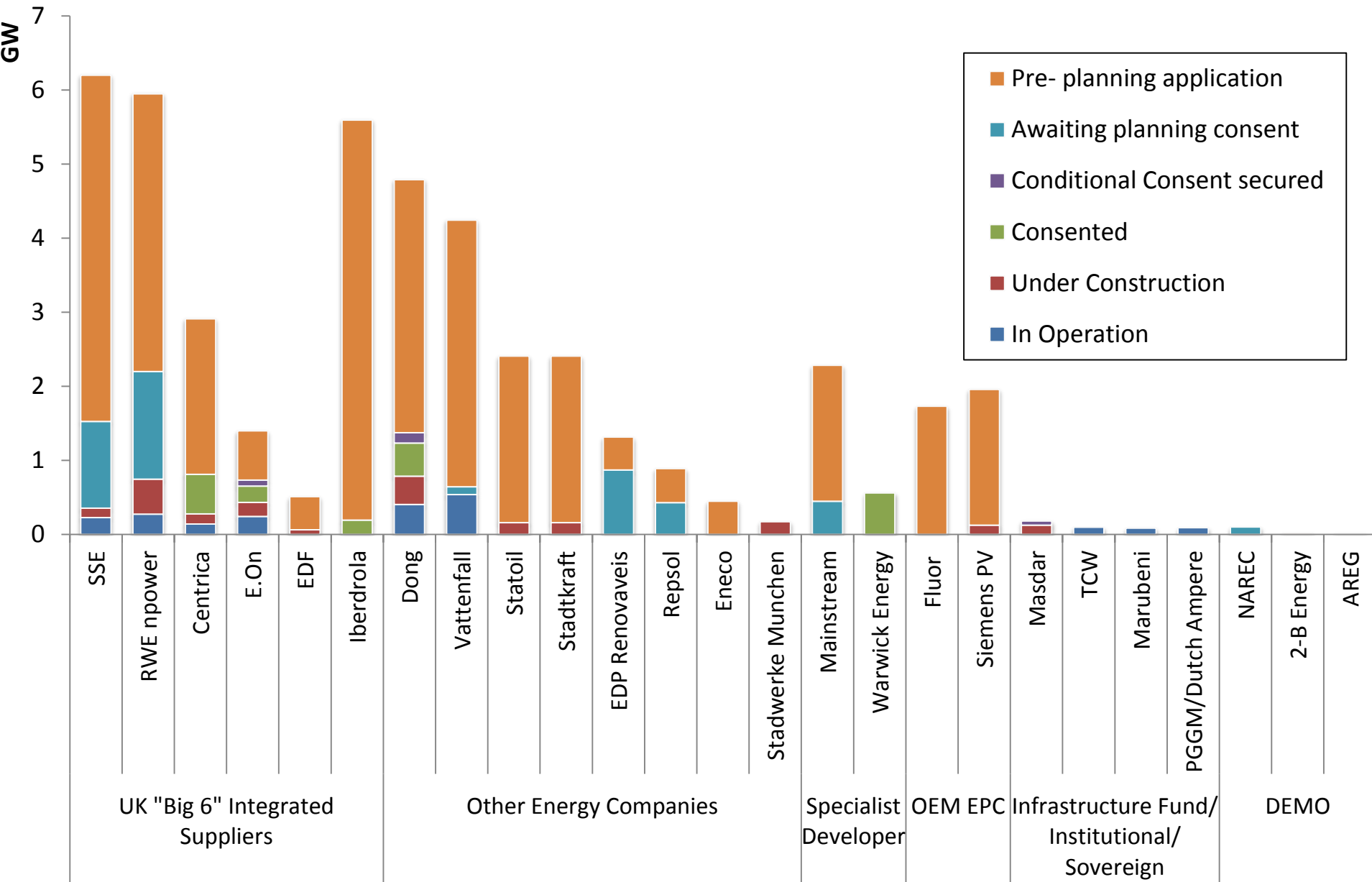


Opportunity from current leasing rounds



Offshore wind demonstration sites (4 projects)
Northern Ireland – tender results imminent

Developers / Investors



Regulatory Environment

Targets

UK Climate
Change Act

2020
renewables
target

Scottish
renewables
target

Economic Support Mechanisms

Renewables
Obligation

Electricity
Market Reform

Feed in Tariff
Contract for
Difference

Carbon Price
Floor

Planning

National Policy
Statements

IPC / PINS
regime

SEA

Grid / transmission

Project Transmit

OFTO regime

Grid
Coordination

THE CROWN ESTATE

Is a landowner

Is not a regulator

Is a public body – The Crown Estate Act 1961

Is not part of Government – but works closely with Government, statutory bodies *etc.*

Assets of £8.1b, surplus paid to Treasury (£240m in 2011/12)



Urban Portfolio



Rural & Coastal
Portfolio



Energy & Infrastructure
Portfolio



Windsor
Estate

Our sectors



The Crown Estate Offshore Activity UK Waters



Offshore Wind Activity

- Demonstration Wind Farm Site
- Round 1 Wind Farm Site
- Round 2 Wind Farm Site
- Round 1 or 2 WF Extension Site
- Scottish Wind Farm Site
- Round 3 Wind Farm Site
- ▨ Round 3 Wind Farm Zone

Wave and Tidal Activity

- Wave Lease or Agreement
- Tidal Lease or Agreement

Cable & Pipeline Activity

- Cable Lease
- Active Cable Outside 12nm
- Pipeline Lease
- Active Pipeline Outside 12nm

Marine Mineral Activity

- Aggregate Licence Area
- Aggregate Application Area
- Aggregate Option Area
- Potash Mine Lease
- Potash Exploration and Option Agreement

Natural Gas Storage

- NGS Lease or Agreement

Aquaculture Activity

- Aquaculture Lease

Base Map

- Territorial Waters Limit
- UK Continental Shelf Limit
- International Waters

MaRS
Marine Resource System

0 100 200
km

1:7,500,000

**THE CROWN
ESTATE**

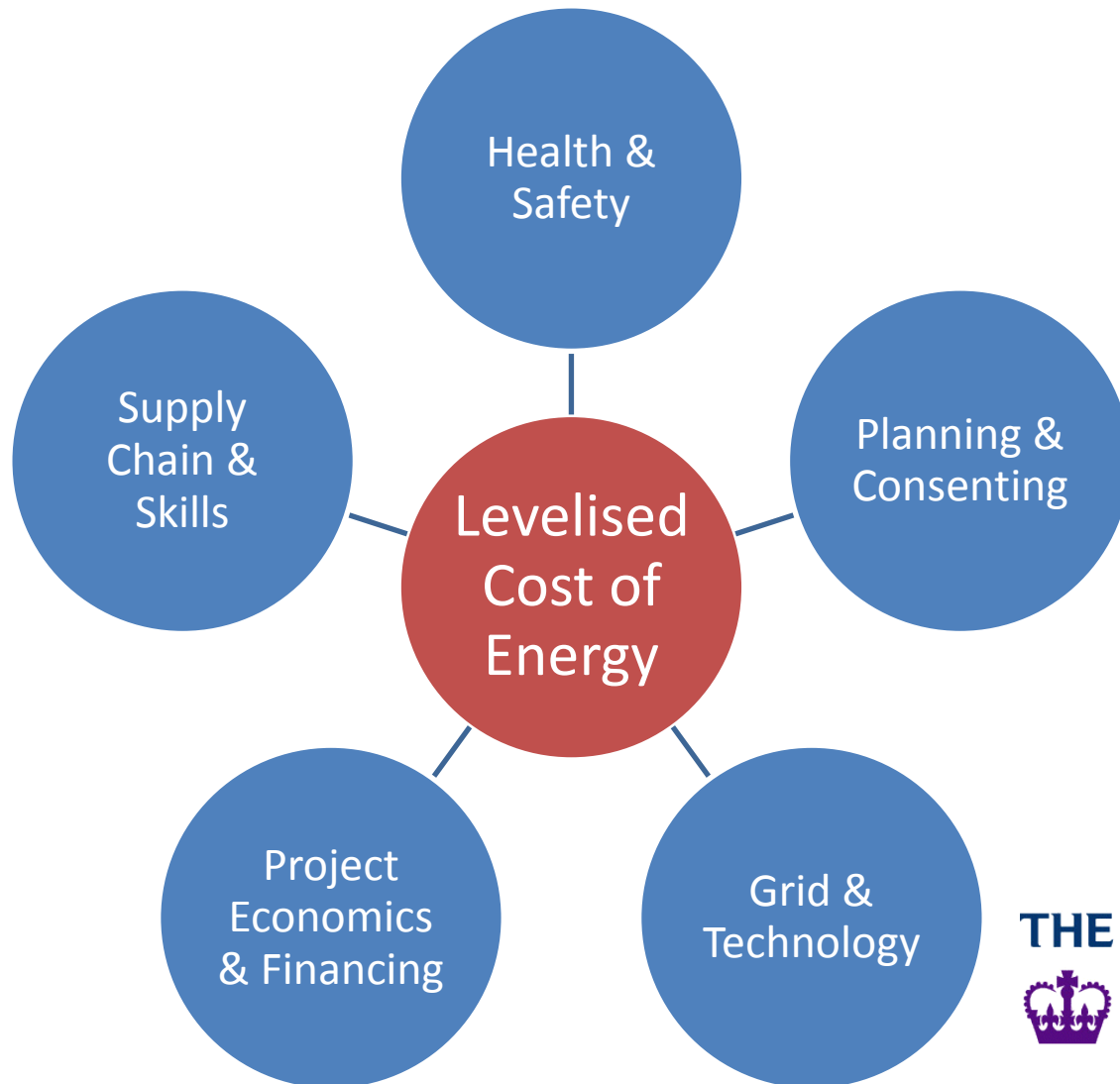
© Crown Copyright 03 July 2012. Reproduction in whole or part is not permitted without prior consent of The Crown Estate. © Crown Copyright, 2012. All rights reserved. License No. EK001-20120401. Not to be used for Navigation. Ordnance Survey Data: <http://www.thecrownestate.co.uk/ordnance-survey-licence/>. Cable data created from Kingfisher, OceanWise and Global Marine Systems data. Pipeline data created from UK Deal, OceanWise and Global Marine Systems data.
OffshoreActivity_UK_ppt.mxd -- 03/07/2012 -- 15:02:54

How do we work in offshore wind?



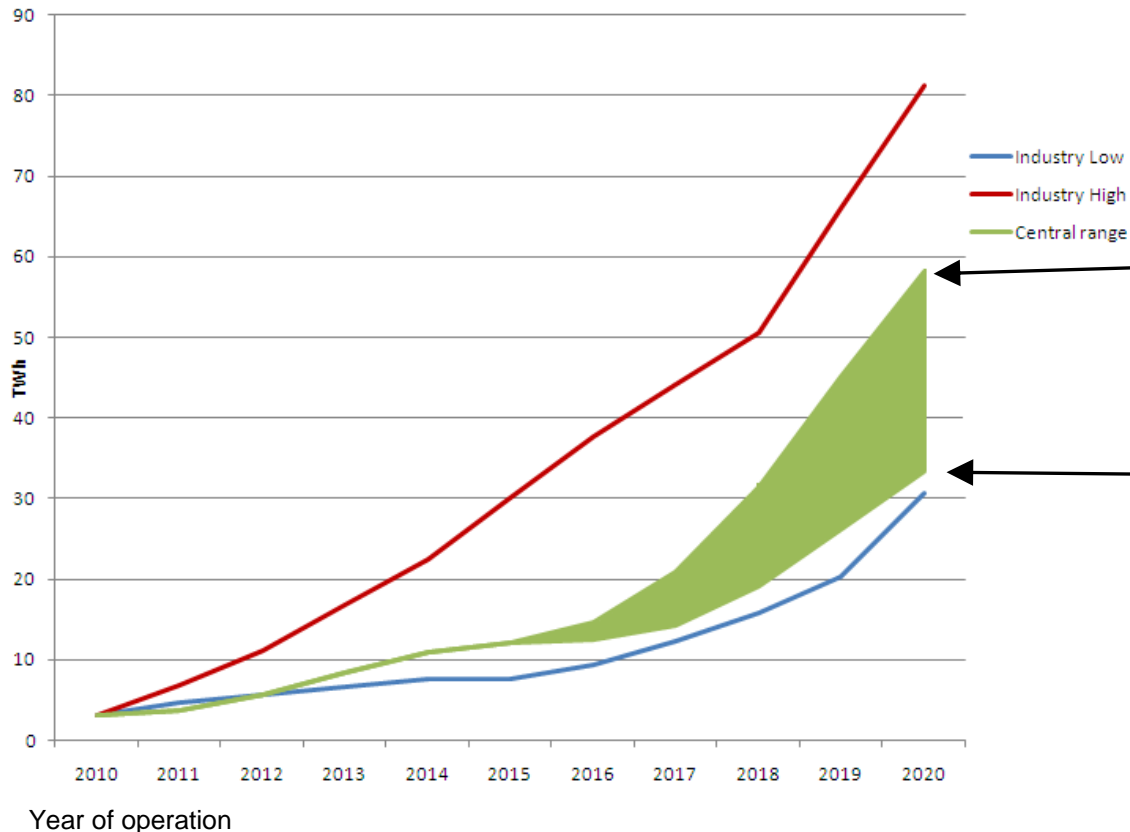
- Leasing rounds
- Rental charge based on energy output
- Co-investment in development (in Round 3)
- Facilitator and advisor – working closely with industry and government
- Strategic workstreams to accelerate and de-risk the programme

Strategic Challenges To Programme Delivery



Renewables Roadmap & Cost Reduction

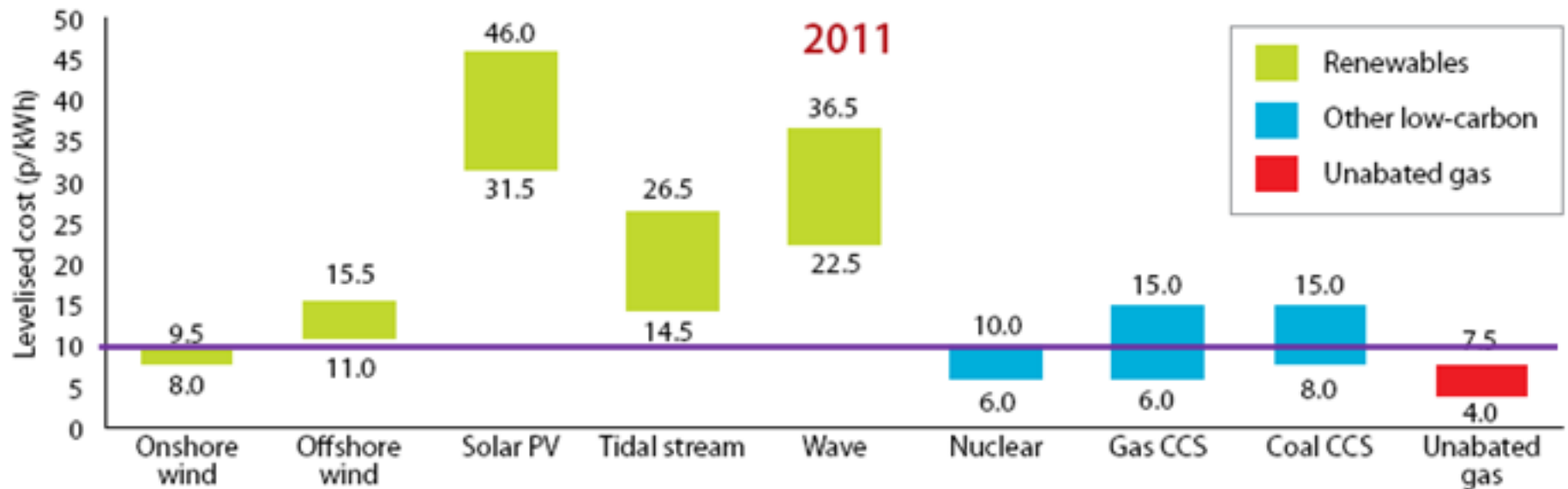
Gov't ambition: 11-18GW offshore wind by 2020
18GW conditional on reducing cost to £100/MWh



18GW by 2020 – high end of central scenario. Consistent with £100 / MWh

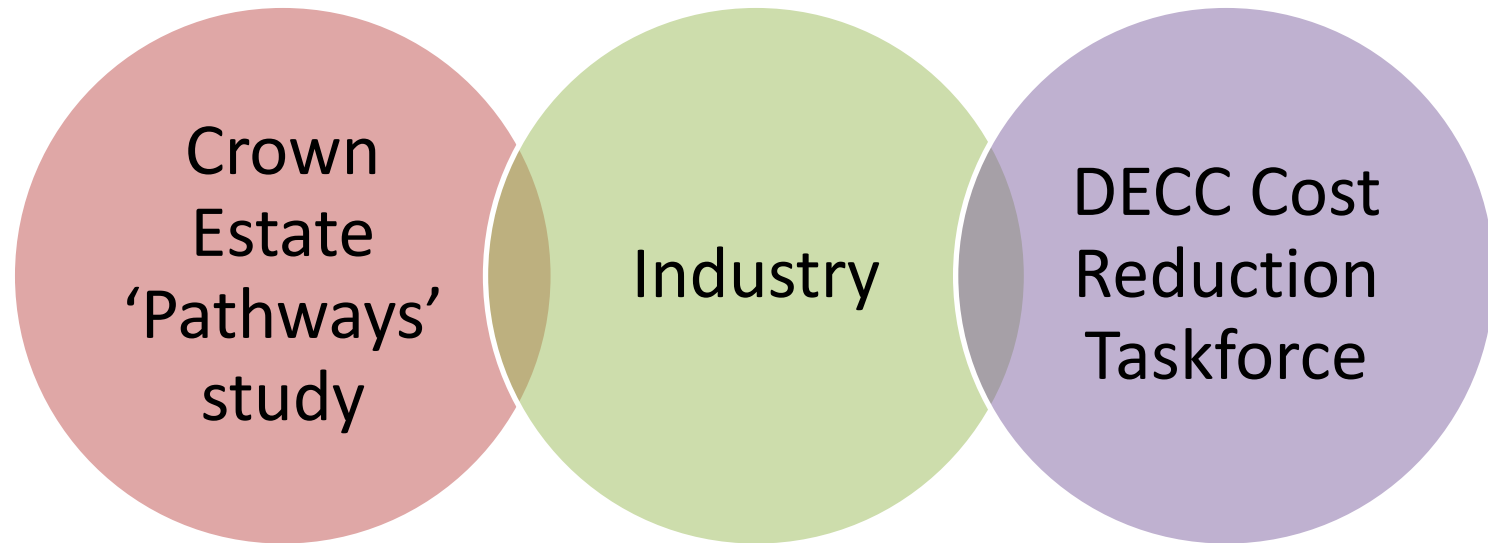
11GW by 2020 – low end of central scenario

Relative cost of technologies



Source:
Committee on Climate Change, Renewable
Energy Review, May 2011 (part chart).

Cost Reduction Pathways study



Establish baseline costs

- Levelised cost of energy basis
- Costs for FID 2011

Develop pathways framework

- Market development
- Speed of technology development
- Supply chain maturity

Assess cost reduction from baseline

- Technology, supply chain and finance impact
- Overall pathways
- Health and safety impact

Formulate prerequisites

- Identify key decisions
- Determine required prerequisites

Unprecedented industry participation

100+ companies
involved

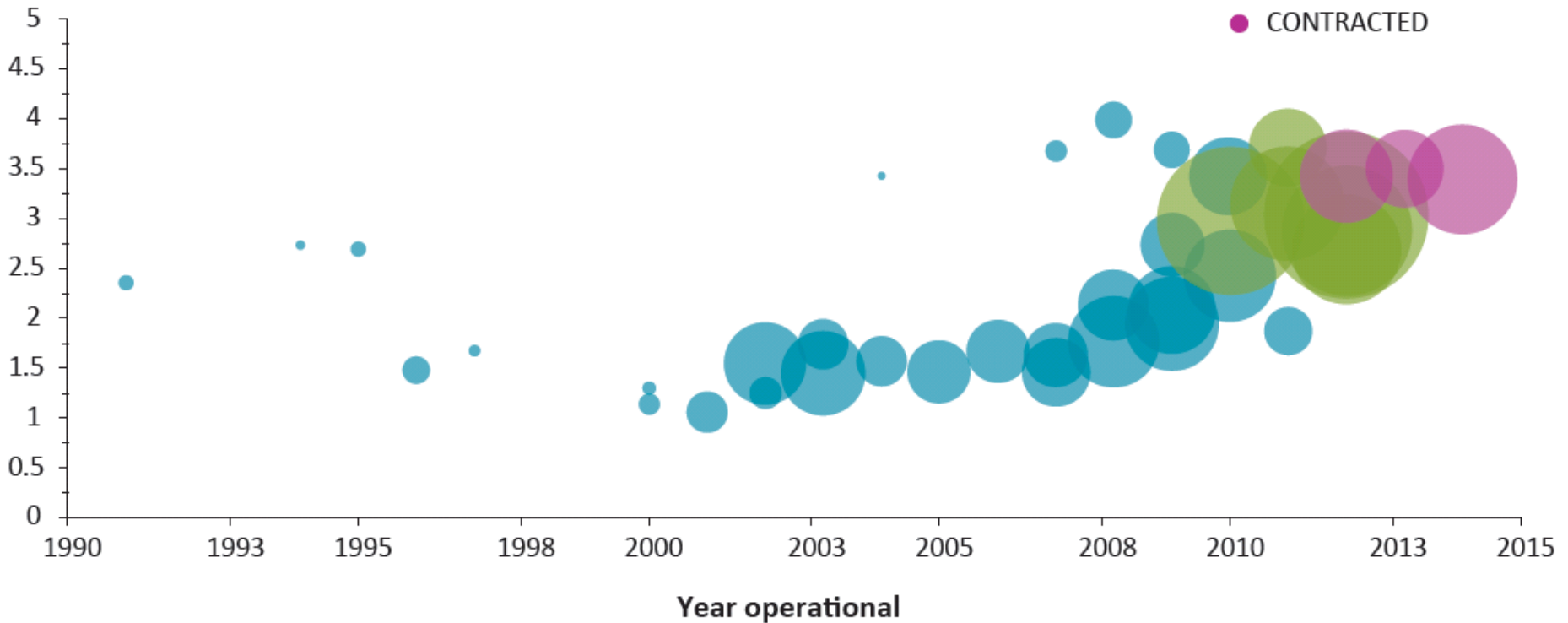
60 one:one
meetings

20 workshops

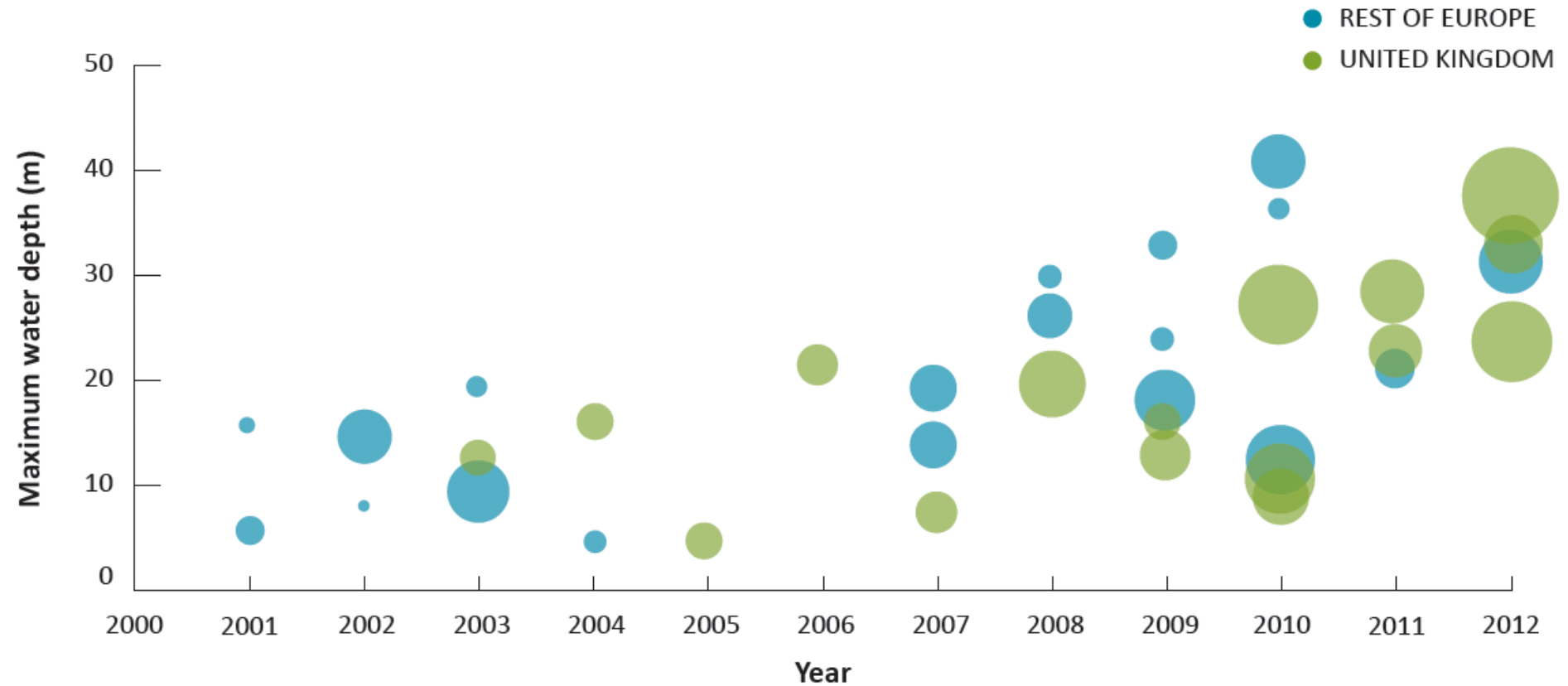
Steering group
representing
industry and
government

Baseline: Costs appear to have stabilised

Offshore wind farm capital
cost (2011£m/MW)

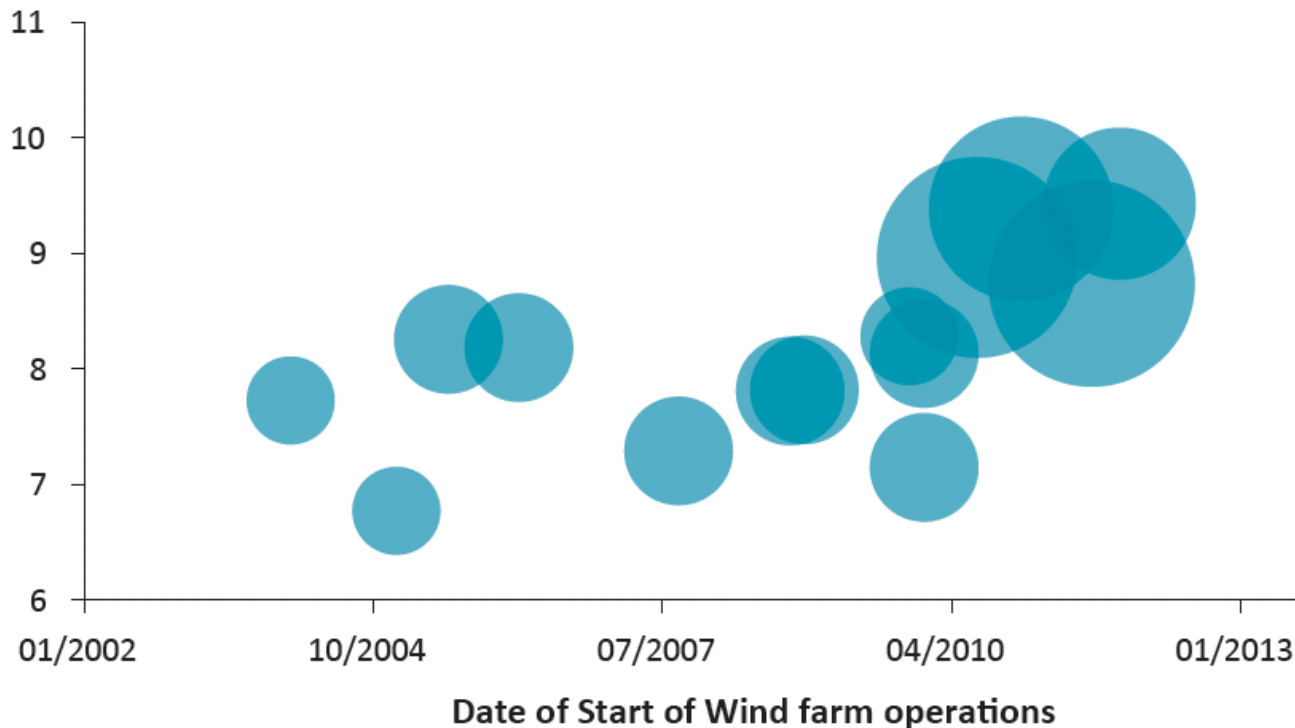


...despite the move to deeper water



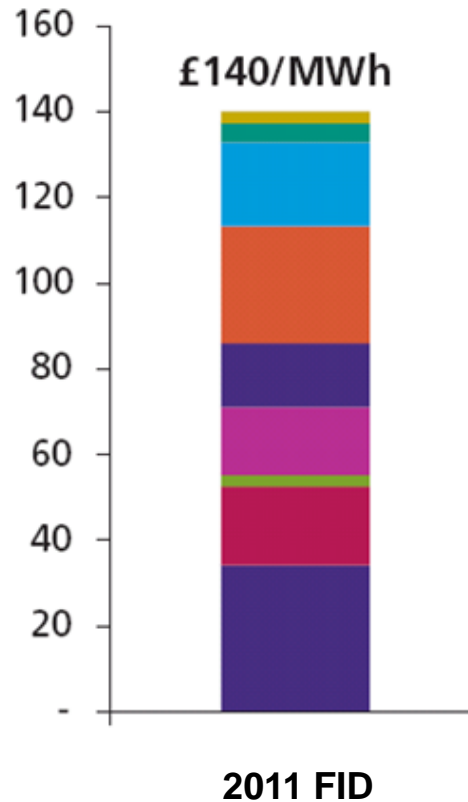
And we are generating at windier sites, resulting in greater energy capture...

Long-term annual mean
wind speed at 100m
above MSL (m/s)



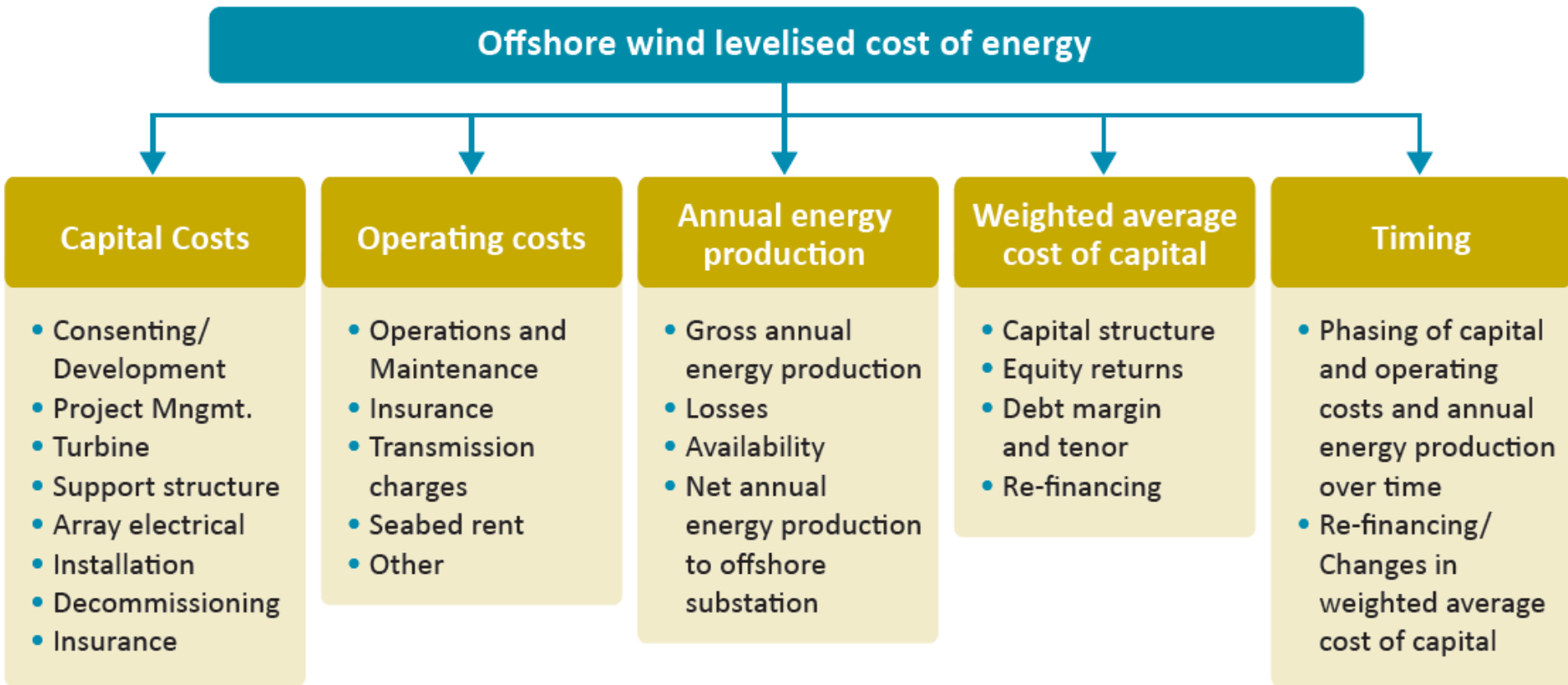
Baseline LCOE of £140/MWh

Levelised Cost of
Energy (£/MWh)

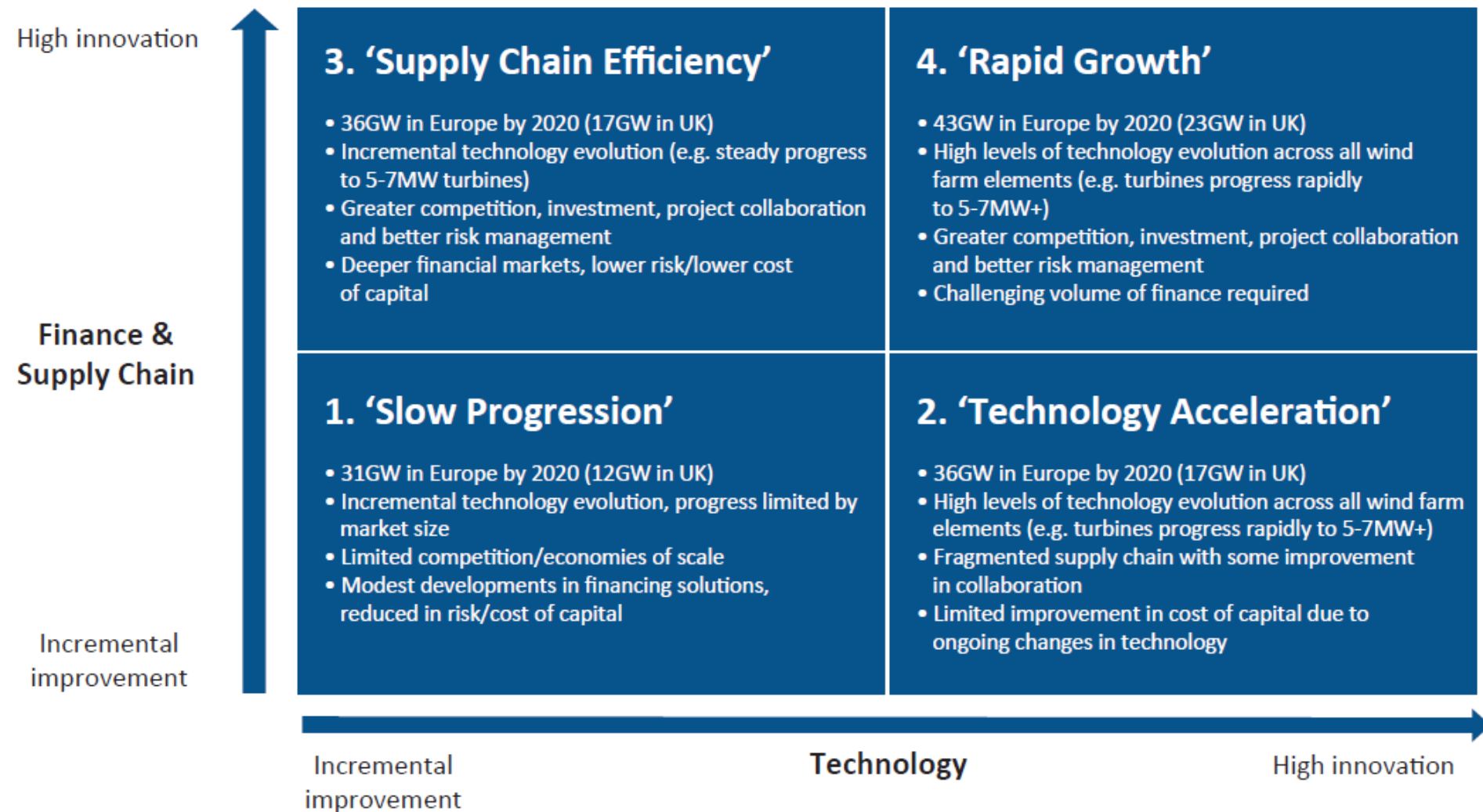


- Seabed Rent
- Decommissioning
- Transmission charge
- Operating costs (exc. transmission)
- Other capital (inc. contingency)
- Installation
- Array cables
- Support structure
- Turbine (exc. tower)

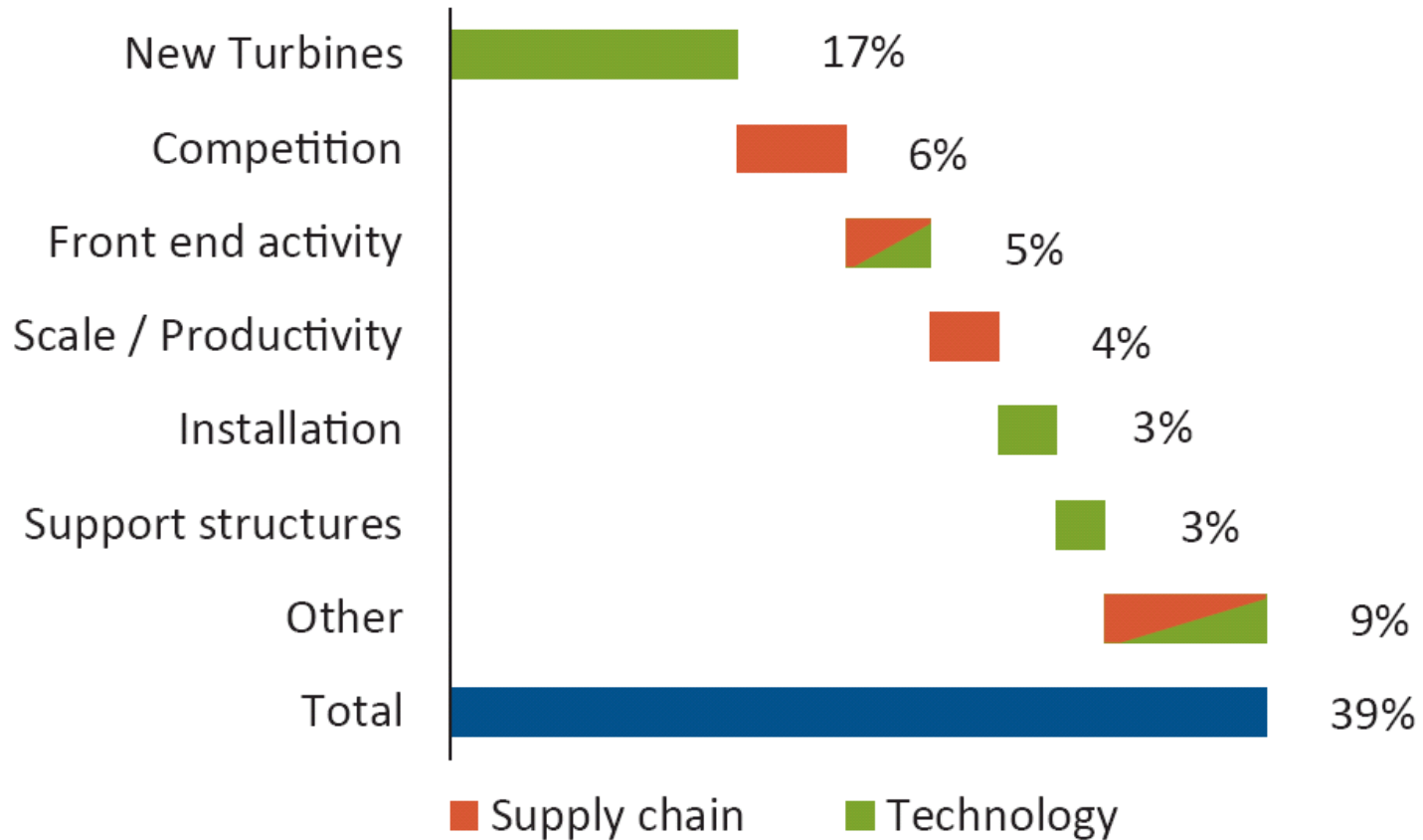
LCOE model structure



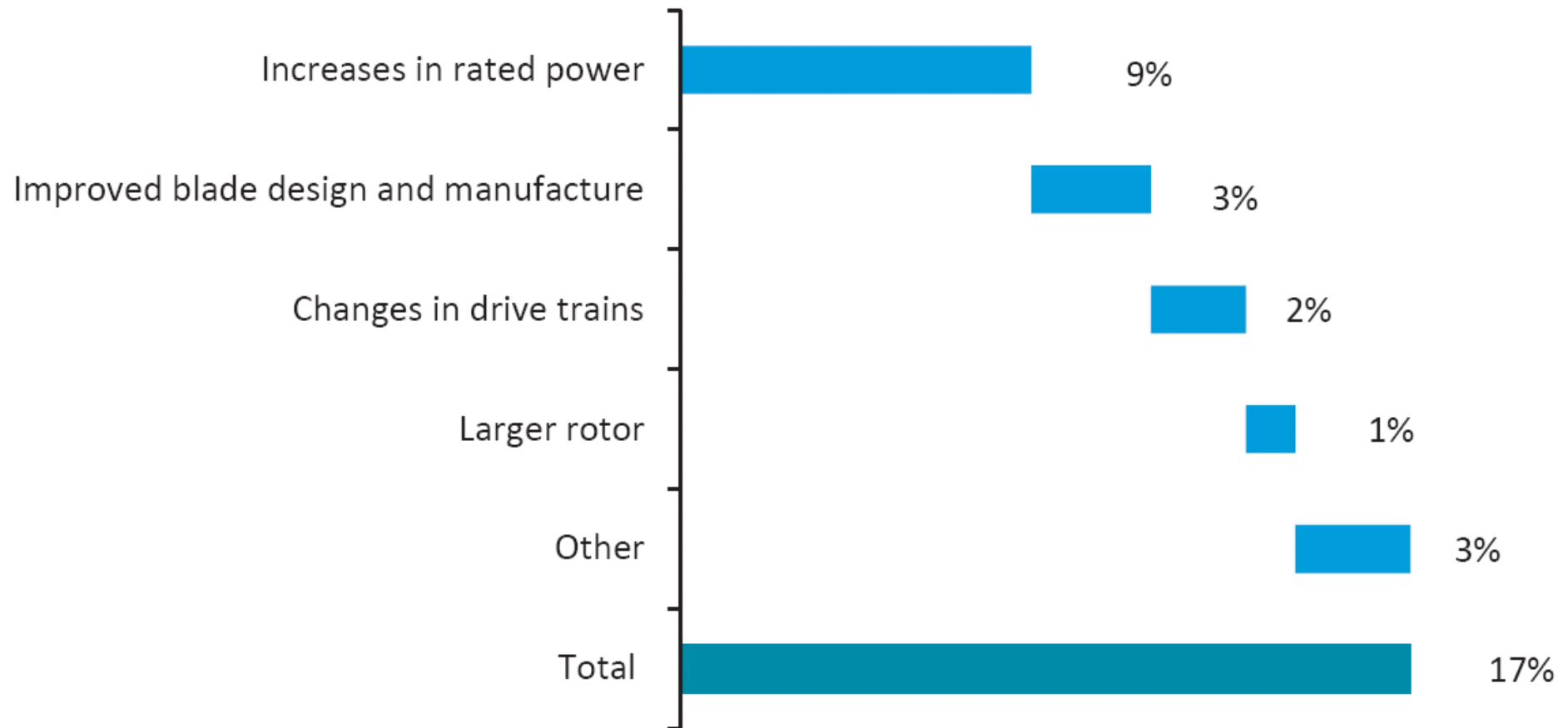
Industry 'Stories'



Technology & Supply Chain: Key areas of cost reduction

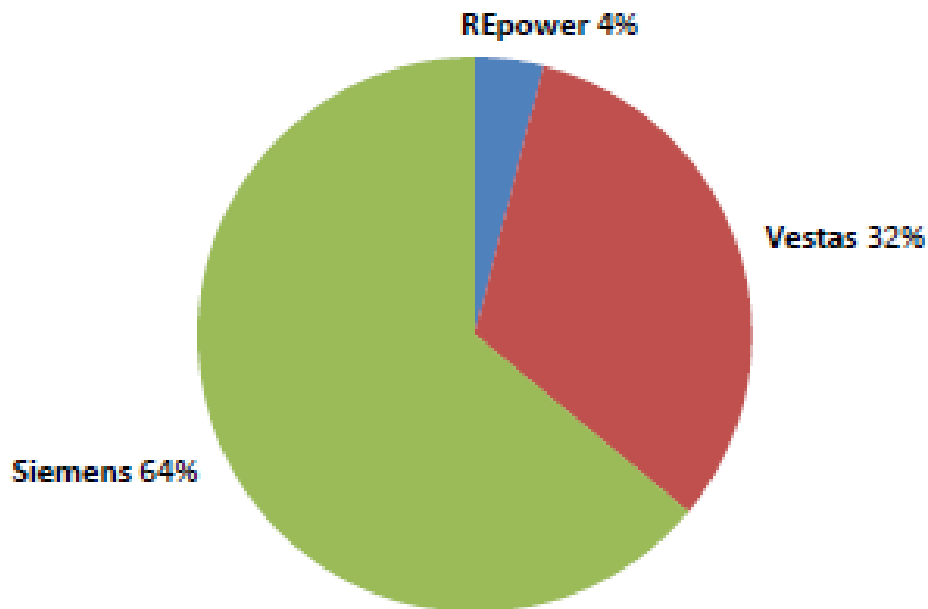


Turbine cost reductions



Increased Competition

UK offshore wind - current turbine market share



Supply Chain Capacity

	Development and Consenting			Turbines					Balance of plant						Installation and Commissioning				Operations and Maintenance					
	Environmental impact assessment	Wind farm design	Survey vessel operation	Offshore wind turbines	Blades	Castings and forgings	Gearbox, large bearings and direct drive generators	Towers	Subsea array cables	Subsea export cables	AC substation electrical systems	DC substation electrical systems	Steel foundations	Concrete foundations	Wind farm construction facilities	Turbine Installation	Foundation Installation	Subsea cable Installation	Civil engineering and construction management	Maintenance and service	Operations	Onshore maintenance facilities	Transport and accommodation	RD&D and testing
2012	<div>g</div>	<div>a</div>	<div>g</div>	<div>r</div>	<div>g</div>	<div>a</div>	<div>g</div>	<div>g</div>	<div>g</div>	<div>r</div>	<div>g</div>	<div>a</div>	<div>a</div>	<div>a</div>	<div>a</div>	<div>g</div>	<div>a</div>	<div>a</div>	<div>a</div>	<div>g</div>	<div>g</div>	<div>g</div>	<div>g</div>	<div>a</div>

Key

 An area of significant concern requiring immediate analysis and strategic action

 Area of concern requiring some proactive intervention

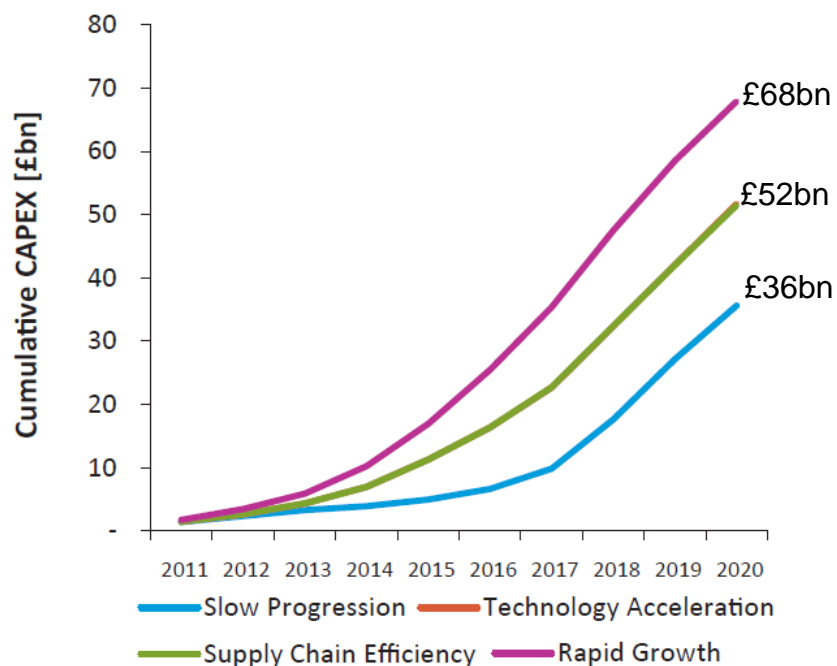
 Not currently an area of concern, investment required, maintain watching brief

 Improving from last year

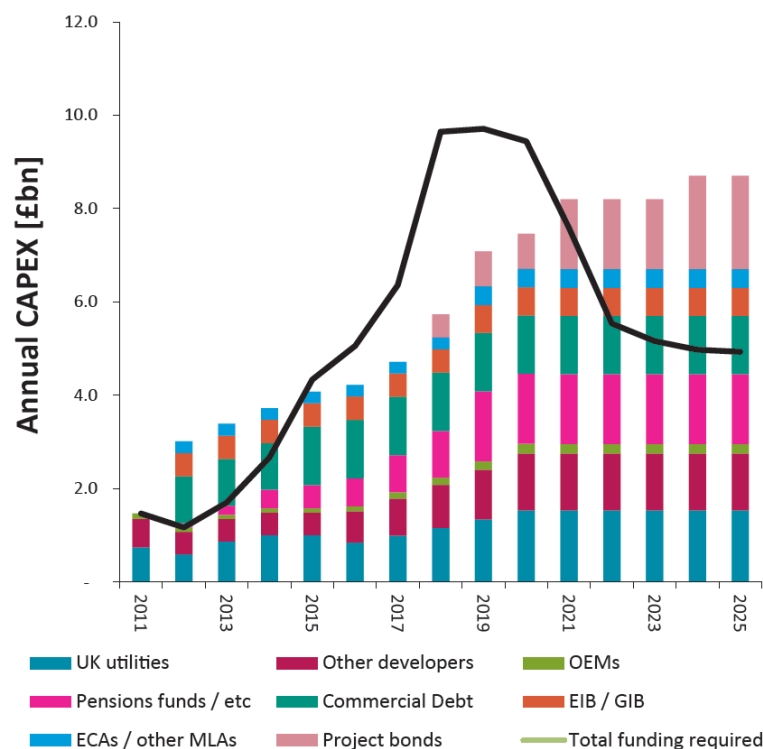
 Deteriorating from last year

Offshore wind funding requirements and availability

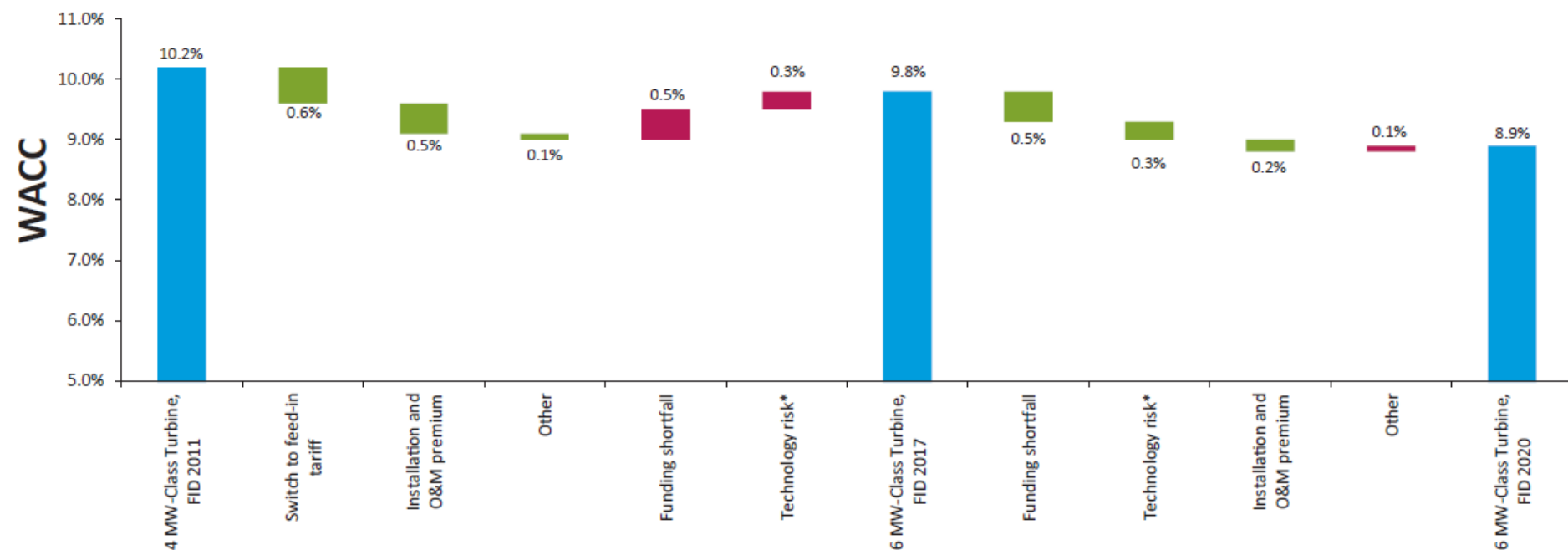
Offshore Wind Capital requirements to 2020



Annual funding requirements compared with available funding (Supply Chain Efficiency Story)

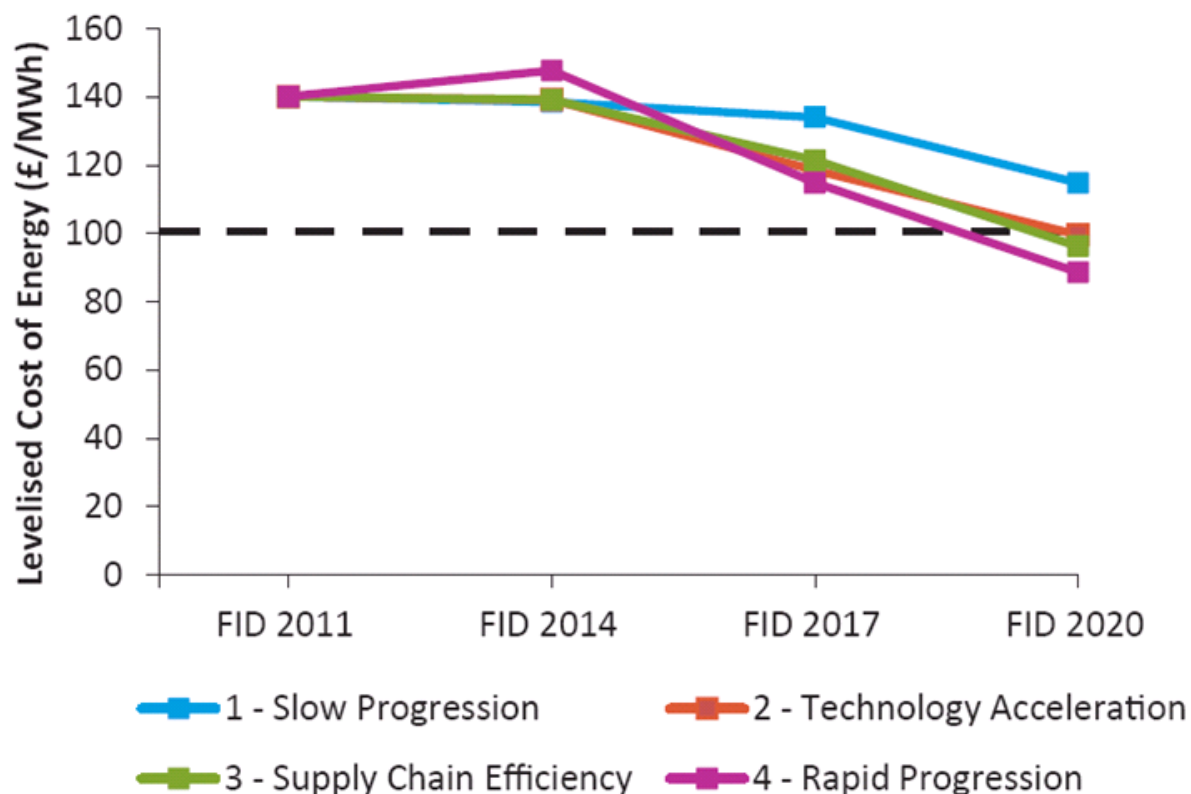


Overall costs of finance could reduce by around 1% by 2020



Note: WACC = Weighted average cost of capital, expressed in post-tax nominal terms

Reducing the cost of offshore wind to £100/MWh by 2020 is achievable, making offshore wind cost-competitive with other low carbon technologies.



Immediate action and commitment from government and industry is required to achieve cost reduction

Robust policy framework signalling demand for offshore wind

- Clarity on ROC bandings
- Clarity on Levy Control Framework post 2015
- Smooth implementation of EMR and visibility of CfDs
- Predictable flow of projects from consenting system, plus planning envelope flexibility
- OFTO regime
- Renewables Roadmap update

Ramping up the supply chain (inc. technology development)

- Availability of test and demo sites
- Developers signalling demand to supply chain (including through frameworks)
- Investment in manufacturing sites
- Collaborative working (horizontal and vertical collaboration)
- Skills development
- Government RD&D support

Attracting new finance and insurance players to the sector

- Engagement with potential new investors (debt & equity) and insurers
- Engagement with credit agencies to reach agreement on bankable structures
- Support from Multi-lateral agencies (including GIB)
- More clarity on risks and risk allocation

Taskforce recommendations and follow on actions

29 recommendations in total

Established OW Programme Board

TCE Consultation on further demo sites ongoing

Establish Standardisation body (through OWPB)

Investigate Alliancing approach

Resourcing of statutory advisers

R&D - 'offshore wind catapult'