

Assessing Cost Reduction Potentials of Offshore Wind Energy in Germany until 2023

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German Offshore Wind Energy Foundation

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Renewable Energy and Energy Efficiency



German Offshore Wind Energy Foundation

- Founded in 2005 as an independent, non-partisan institution to support the development of offshore wind energy
- Platform for offshore wind (and maritime) industry, policy and research-oriented stakeholders
- Board of Trustees with key offshore wind stakeholders (e.g. developers, manufacturers & suppliers, banks, government authorities, trade associations, etc.)
- Public relations, public acceptance activities
- Policy initiatives & studies, moderator



Agenda

1. Current Political Debate and State of the Industry
2. Cost Reduction Potential Study
3. The Crown Estate's Pathways Study
4. Scope of Recommendations / Study in Context

Current Political Debate on RES in Germany

Intensified Discussion about cost of RE support - 2 years after Fukushima

Loosing sight of the bigger picture (security of supply and sustainability)?

Major policy changes after Fed. Elections? (market design, future of EEG)



Current State of the Industry

First wave of offshore wind projects under construction BUT delays have increased costs

Difficulties due to changes in grid regime and political uncertainty

Key stakeholders underline importance of stable & continuous development



Energy Economical Role and Cost Reduction Potentials of Offshore Wind Energy in Germany

- **Study on Energy Economical Role** (by Fraunhofer IWES)
Key Objectives: Explain and specify the impact/characteristics offshore wind power generation has for the overall energy system and demonstrate its contribution to the future German (and EU) energy supply system based on increasing RES levels.



- **Goals Cost Reduction Study** (by Prognos AG & Fichtner Group):
Key Objectives: Industry's joint view of prospects/prerequisites for reducing offshore wind levelised cost of energy (LCOE)
 - Recommendations for industry and for further development of regulatory and market framework



- Both studies are closely coordinated with steering committee of representatives from partner corporations and associations
- Results will be expected in summer 2013

Our Partners



initiator/moderator

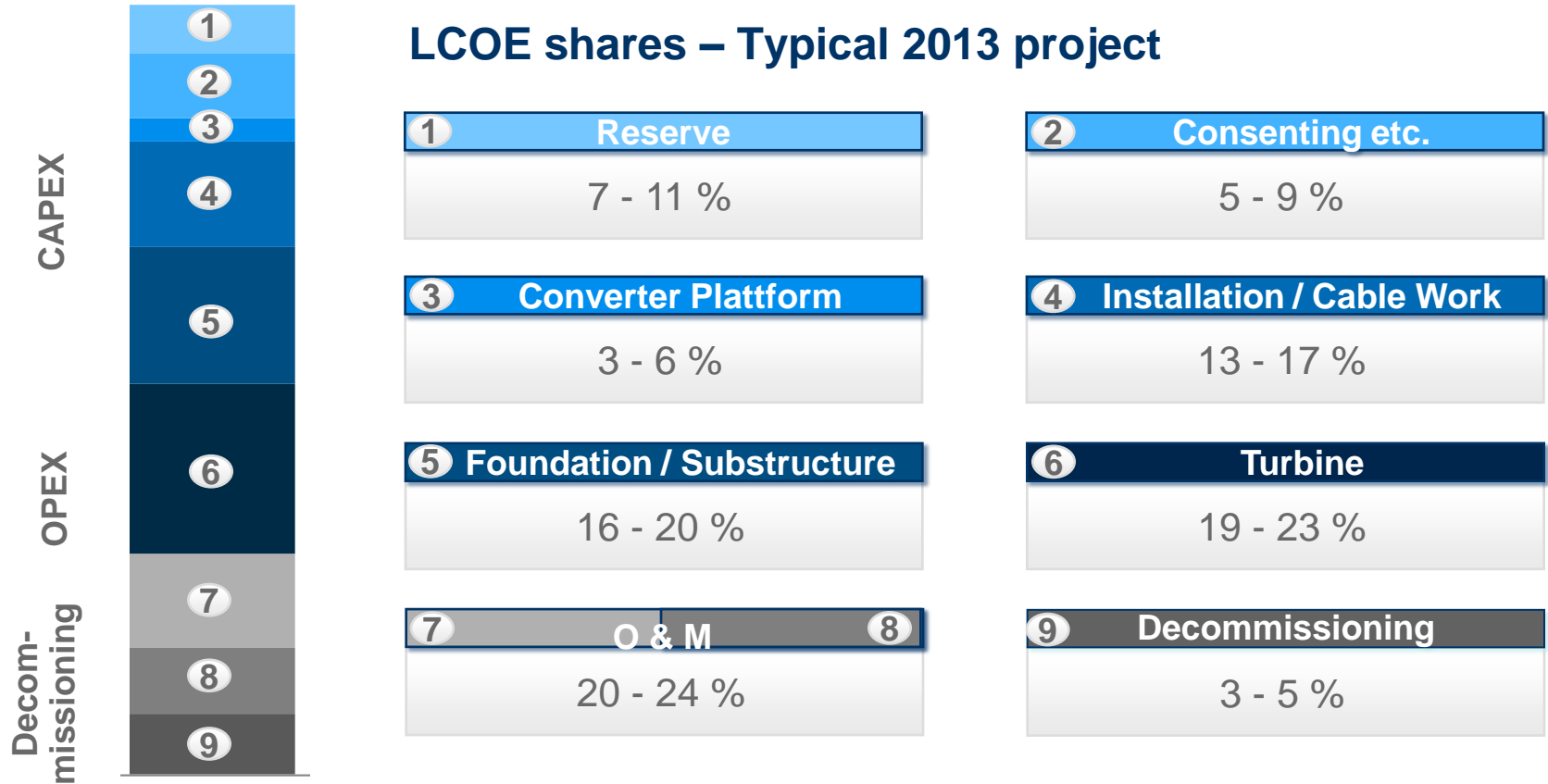


Cost Reduction Study - Set-Up

- Offshore wind cost reduction potentials in Germany until 2023
- Which prerequisites have to be met to reduce offshore wind LCOEs in Germany over the next ten years? Which scope of LCOE reduction is possible? Which are the key levers to drive down costs?
- Two scenarios, three sites, four dates (IBN 2013, 2017, 2020, 2023)
- Consideration of specific geographical, regulatory and industrial framework conditions in Germany
- Approach compatible with Crown Estate's 2012 "Offshore Wind Cost Reduction Pathways Study" to ensure international comparability

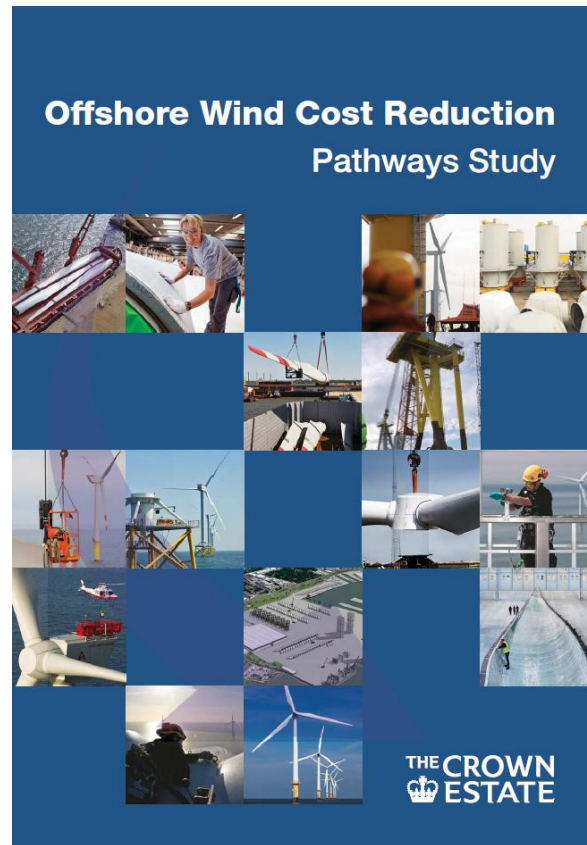


Major LCOE components of a German OWF

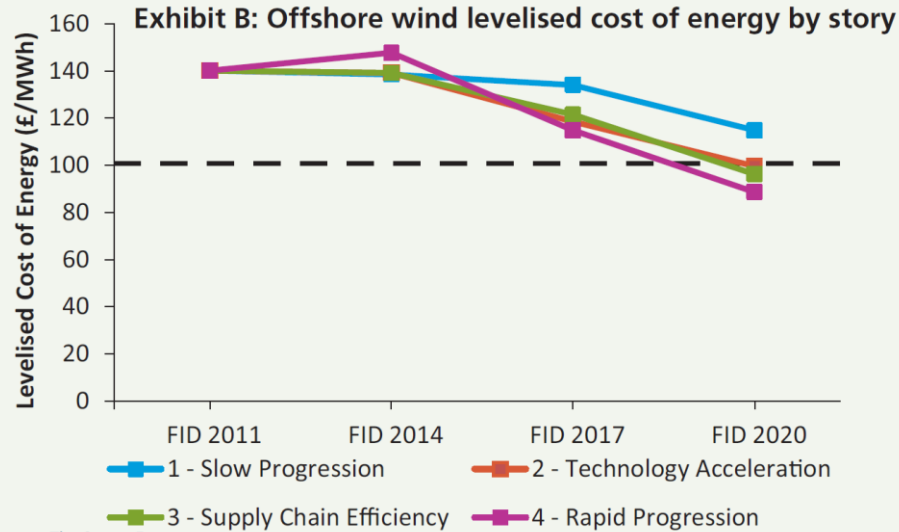


The Crown Estate's Pathways Study

- Study presented in 06/2012
- Input for Dept. of Energy & Climate Change CR Task Force
- In three out of four scenarios, LCOE of £100 per MWh or less can be achieved by FID 2020 (from £140/MWh for FID 2011)
- LCOE, incl. grid connection cost



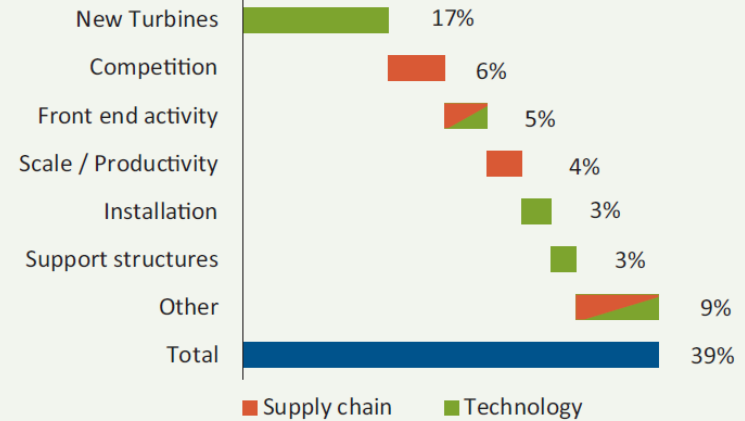
Results UK Pathways Study



Source: The Crown Estate

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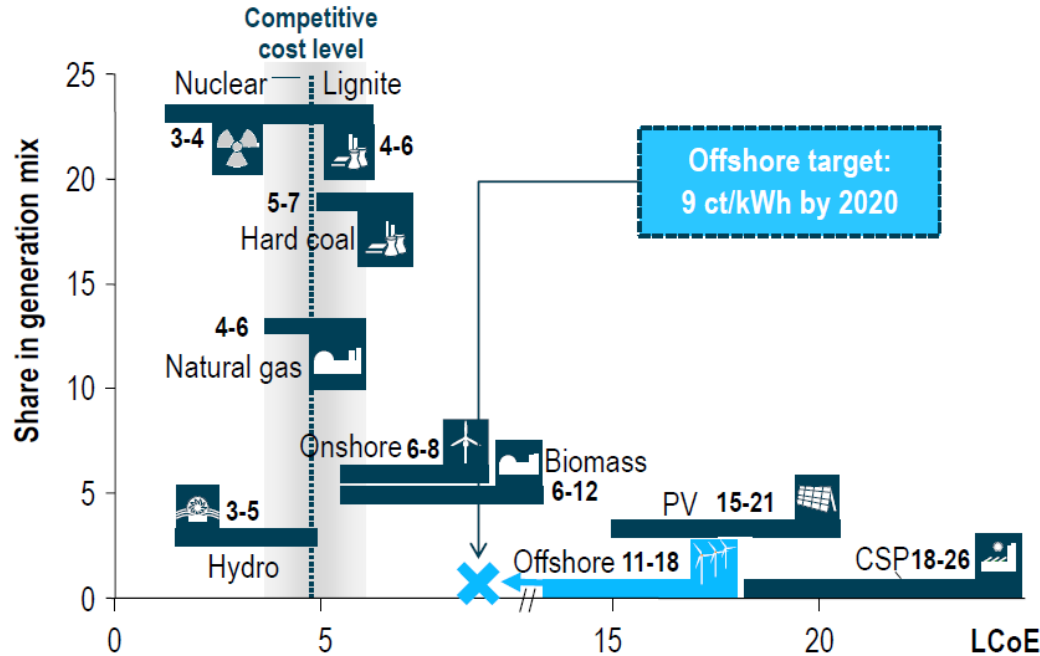
Exhibit C: Offshore wind power cost reduction opportunities from technology and supply chain
% reduction in levelised cost of energy FID 2011 to FID 2020



	LCOE (£/MWh)	CAPEX (£m/MW)	OPEX (£000s/MW p.a.)	Net Capacity Factor	WACC (pre-tax, real, %)
FID 2011	140-144	2.6 - 2.9	95-98	40-42%	9.20%
FID 2020 – R1/2	94 (range 81 -113)	2.1 (range 1.9 – 2.6)	79 (range 65-88)	46% (range 42% - 51%)	7.90% (7.8% – 8.5%)
FID 2020 - R3	97 (range 93 -124)	2.2 (range 2.0 – 2.6)	80	50% (range 46% - 52%)	8.40% (8.3% – 8.6%)

Roland Berger Study – Offshore Wind Toward 2020

LCoE 2012 European generation mix [EUR ct/kWh]



Note: Competitive cost level as a non-weighted average of non-renewable energy sources is 4.9 ct/kWh

RECENT STATEMENTS

"A cost reduction of 20-30% in offshore by 2017 is realistic"
(DONG Energy)

"Our LCoE target for all wind energy is 5-9 EUR ct/kWh in the medium term"
(Siemens Wind Power)

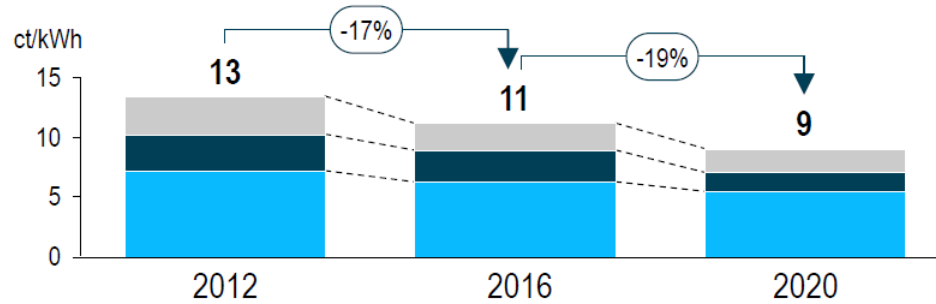
"Our target: 40% reduction of offshore CAPEX by 2015"
(E.ON Climate & Renewables)

LCoE REDUCTION

Roland Berger Study – Offshore Wind Toward 2020

LCoE forecast

LCoE ¹⁾
offshore



Prerequisites

WTG SIZE	2012	2016	2020
Average rated power of newly installed WTG:	3 MW	6 MW	8 MW
FOUNDATION	Currently available foundation types	Initial savings from improved foundation concepts	Serial production effects for selected foundation types
O&M	Limited experience with far-shore O&M	Far-shore experience leads to reduced O&M costs	Mature O&M concepts with minimized cost structures

■ Project development/other ■ OPEX: O&M, insurance, management ■ CAPEX: WTG, foundation, installation, electrics

1) Idealized LCoE model calculation for newly installed WTGs on global average

COMMENTS

- > Cost level of 9 ct/kWh should be reached for new additions in 2020
- > Offshore will not match the competitive cost levels of conventional energy by 2020
- > Offshore is on the pathway to cost competitiveness, but further time-consuming efforts are required
- > Political support and a joint industry effort will be essential for offshore to meet the prerequisites and reach the targets

Roland Berger Study – Offshore Wind Toward 2020

Offshore – Conclusion

MARKET STABILITY

Offshore is a policy-driven market and depends on public support schemes

- ➔ Ensure reliability of regulation and stability of political support

LCoE COMPETITIVENESS

Offshore needs to become independent of public support mechanisms (e.g. Renewable Energy Act) to maintain political support

- ➔ Reduce LCoE to 11 ct/kWh by 2016 and 9 ct/kWh by 2020

TECHNOLOGY

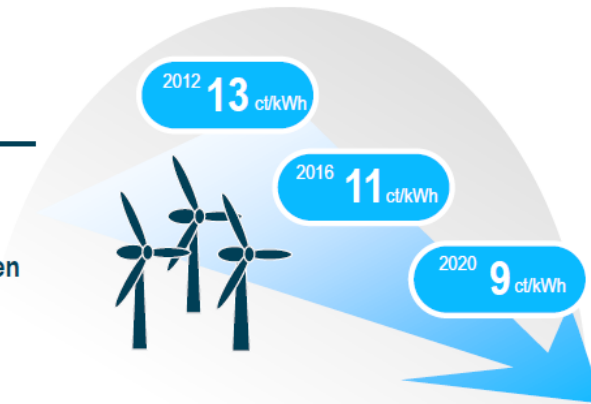
Offshore is still at an early stage and combines technologies from different industries – optimized integration possible

- ➔ Maintain Europe's technology leadership and boost innovation

OEM COMPETITION

New players are entering the market and competition will increase significantly

- ➔ Achieve cost competitiveness driven by product excellence



RISK-RETURN RATIO

Achievable margins do not yet compensate for potential risks

- ➔ Improve risk-return ratio and develop new investment models

Scope of Recommendations / Study in Context



- Studies and corporate initiatives towards cost reduction
- SOW German Study to provide broad-based industry view:
 - Comprehensive overview for industry and stakeholder discussions and potential joint initiatives
 - Basis for well-founded policy recommendations
 - Foundation for international exchange (particularly UK)

THANK YOU!

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www.offshore-windenergie.net