THE ROLE OF ENERGY COMPANIES IN THE ENERGY TRANSITION

October 2016

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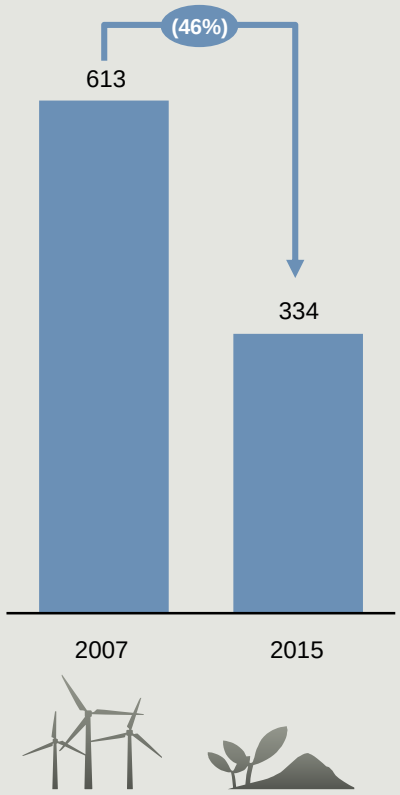
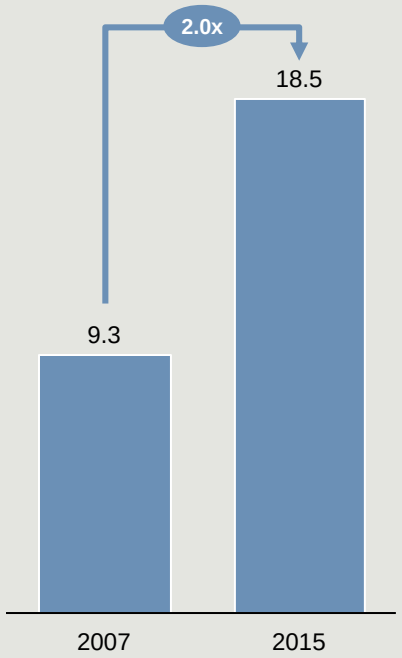
Head of European affairs
DONG Energy

We are a part of the green energy transformation

CO_2 emissions halved
g/kWh



Operating profit (EBITDA) doubled
DKK Bn



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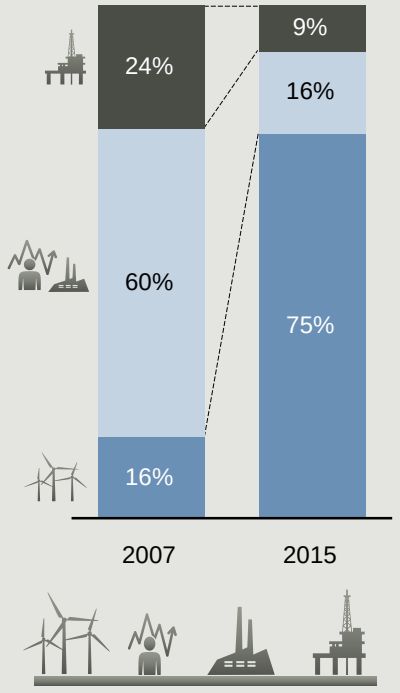
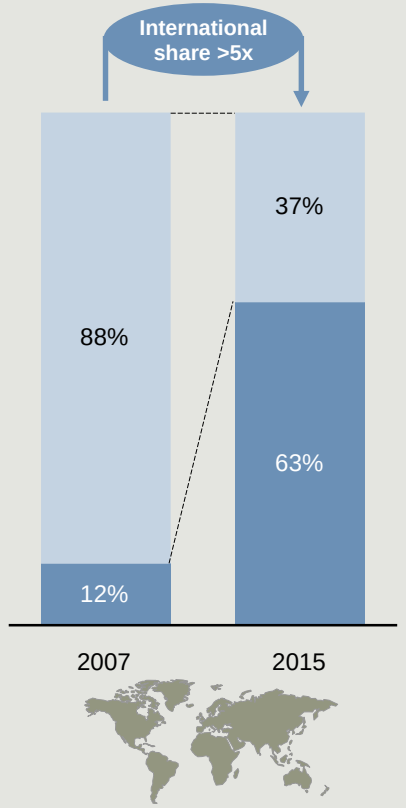
Business transformed
Share of capital employed[1]
%



International expansion
Share of operating profit (EBITDA)
%



1. Excluding unallocated capital employed on DONG Energy group level

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DONG Energy Wind Power overview

DONG Energy Wind Power asset portfolio, build-out plan and pipeline options

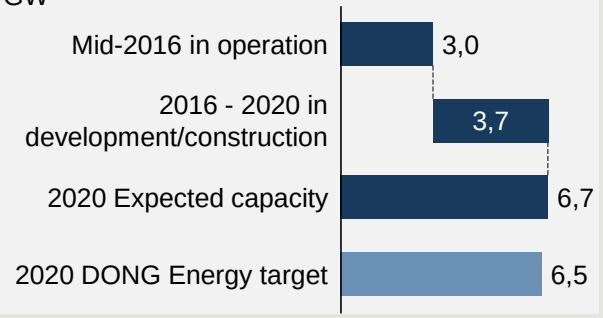
2016-2025

DONG Energy Wind Power at a glance

- The largest offshore wind portfolio globally in attractive offshore wind markets
- Differentiated competitive position resulting from integrated business model
- At the forefront of reducing cost of electricity from offshore wind
- Solid track-record in delivering large and complex projects
- Robust and highly visible 3.7 GW build-out plan leading to 6.7 GW installed capacity in total by 2020
- Numerous and attractive pipeline options post-2020 with 8.1 GW of secured project rights

Wind farm capacity

GW

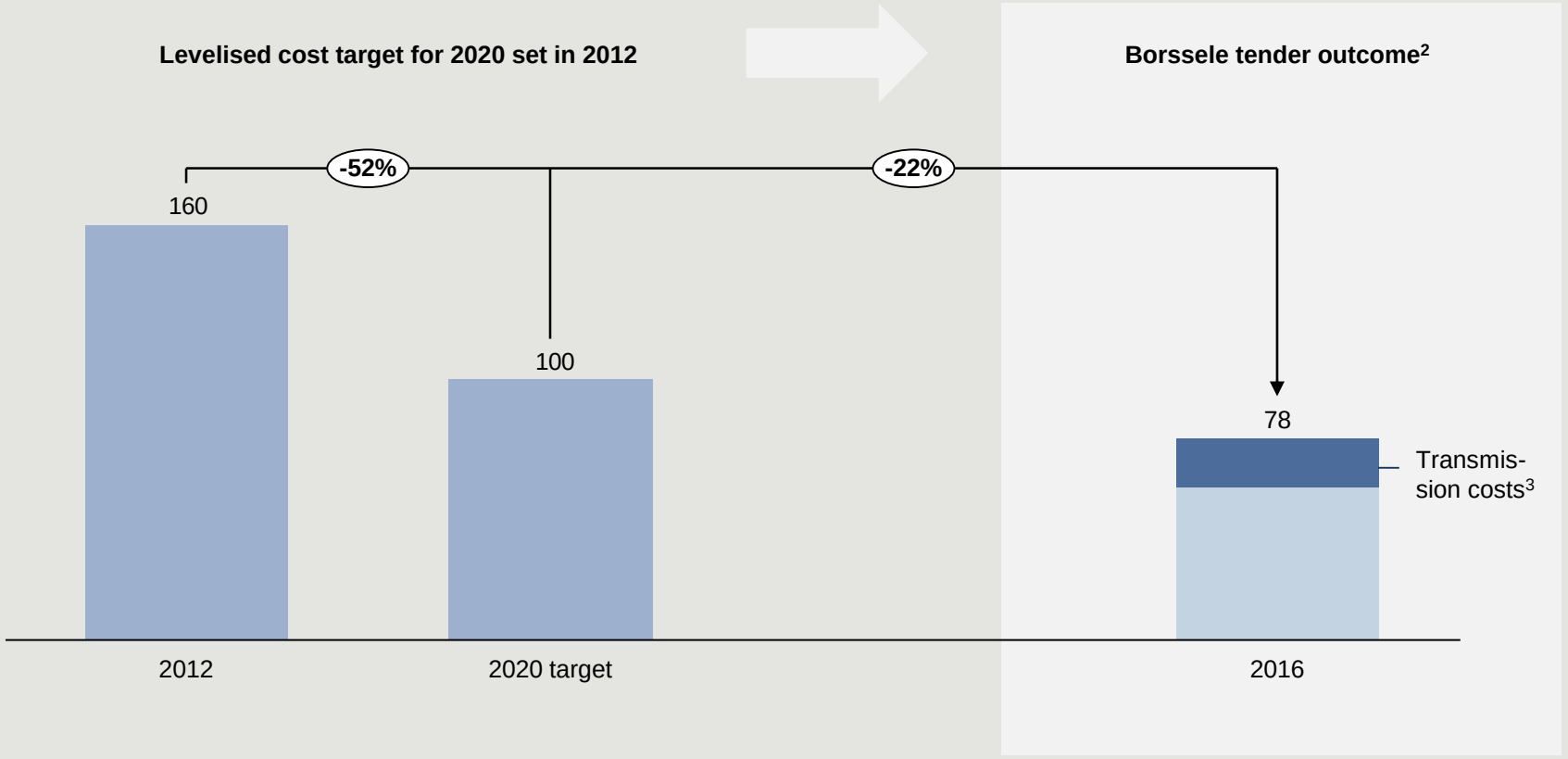


Source: Bloomberg New Energy Finance (BNEF)

1. Excluding small-scale demo sites
2. Wind farms where DONG Energy provides operations and maintenance

2020 cost target reached 3 years ahead of schedule: Borssele tender cuts 22% of 2020 target and 52% of the 2012 starting point

Costs of offshore wind
Year of final investment decision, EUR/MWh, 2012 / 2016 prices[1]

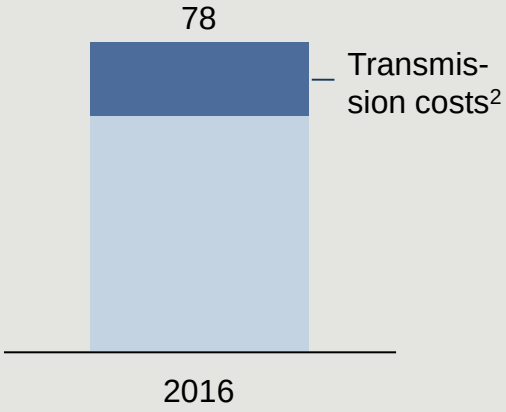


1: Target originally communicated in 2012 prices (corresponds to 165 and 103 EUR/MWh in 2016-prices, respectively.
2: Average price for the electricity over the lifetime of the plant used as proxy for the levelised costs of electricity. It consists of a subsidy element for the first 15 years and a market income for the remaining 10 years. Discount rate of 3,5% used to reflect society's discount rate. Market income based on PBL Dutch National Energy Outlook (NEV) 2015. Strike price 72,70 EUR/MWh & contract length 15 years.
3: Adjustment of costs to account for the fact that the 2012 target was set for a UK project which primarily incl. costs of transmission and extra development costs.

Borssele 1&2 sets a new low cost level – but regulation, supply chain conditions and site impact coming bids for OWE

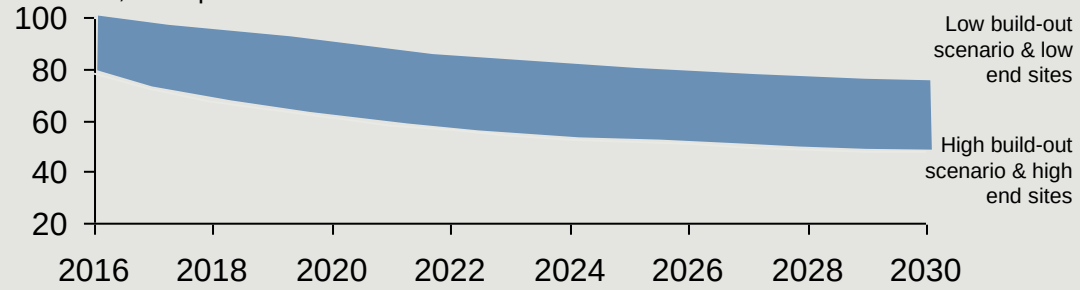
Costs of offshore wind
Year of final investment decision
EUR/MWh, 2016 prices

Borssele tender outcome[1]



Price level for coming bid

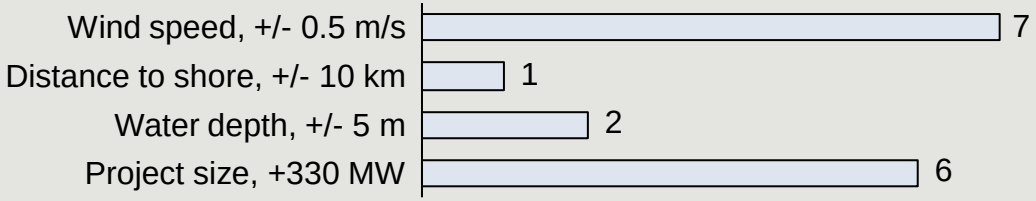
Expected levelised costs at final investment decision[1,3]
EUR/MWh, 2016 prices



Regulation
- Different length of subsidy period
- Flexibility for the developer to optimize all possible levers

Supply chain conditions
- Competition within the supply chain
- Commodity prices, especially steel

Site specific impact on cost,
EUR/MWh



1: Average price for the electricity over the lifetime of the plant used as proxy for the levelised costs of electricity. It consists of a subsidy element for the first 15 years and a market income for the remaining 10 years. Discount rate of 3,5% used to reflect society's discount rate. Market income based on PBL Dutch National Energy Outlook (NEV) 2015. Strike price 72,70 EUR/MWh & contract length 15 years.
2: Adjustment of costs to account for the fact that the 2012 target was set for a UK project which primarily incl. costs of transmission and extra development costs.
3: Learning rate of 14%, Market volume based on Bloomberg New Energy Finance forecast (world w/o China. In the low build-out scenario 46 GW, the annual build-out is assumed to be 50% lower than projected by BNEF. In the high build-out 115 GW, a 50% higher build-out than the base case is assumed).

September 6, 2016

Dramatic deforestation highlights EU 'folly' on biofuels

By Nico Muzi, Director of Communications, Transport & Environment

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Source:
Economist

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How can NTNU place itself?

Important to understand the political context

- why is this question important?
- what is the background?
- How will the results be used?

Pay close attention to Terms of reference – no problem (rather a good idea) to make contact to commission to get clarifications.

Learn from previous projects (examples from ENER collected here: http://ec.europa.eu/energy/en/studies)

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