

Becoming a mature offshore wind market

Creating the possibility for low auction bid prices

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Early industry in the UK

Good offshore wind resource made UK home to early demonstrations and small scale offshore wind farms

Offshore wind a part of decarbonisation agenda

Learning: energy is a major part of decarbonisation – get policy makers working together

- In the early 2000s, small offshore wind farms were being constructed in UK waters. No large-scale programme, but an understanding that this technology could be big and the UK was well positioned, geographically, to exploit it.
- Most of these projects developed by UK-based utilities or independent project developers.
- At the time, UK Government had energy and decarbonisation managed together in DECC (Department for Energy and Climate Change).
- UK government also passed climate change legislation that created (and requires the ongoing use of) an independent Committee on Climate Change (CCC) to recommend carbon budgets to government (in 5 year increments to hit net zero in 2050). First was in 2008.
- DECC and CCC saw the UK's natural offshore wind resources as a great way to increase renewable energy supply.
- DECC enabled capital grants and ROCs for offshore wind



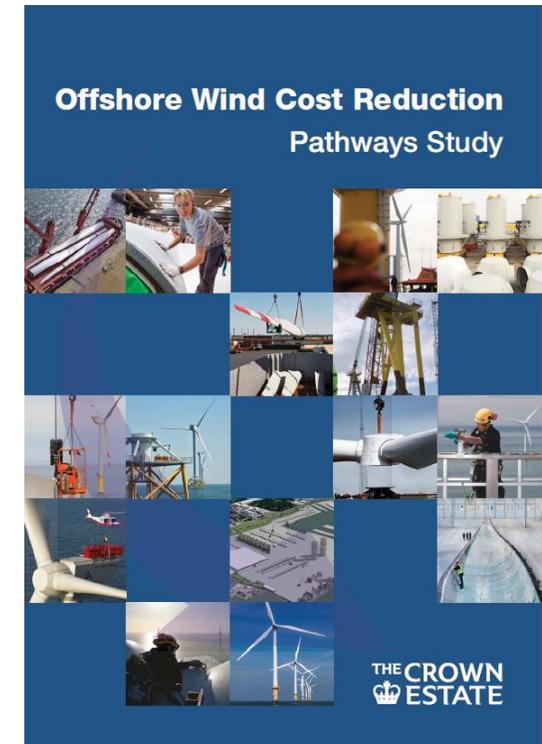
Cost reduction a major message

Government, stakeholders and industry share a cost reduction action plan

DECC, CCC, TCE want a lot from offshore wind. Industry sees opportunity.

Learning: when you make a plan – stick to it

- The main stakeholder for DECC and CCC in approx. 2010 was TCE (The Crown Estate) which owns the UK seabed.
 - Wanted competitive industry that: secures energy supplies, creates jobs, attracts investment, achieves renewables targets, low cost to consumers
- TCE Offshore wind cost reduction pathways (2012) [BVGA did the technology report]
 - Resulted in DECC Cost Reduction Taskforce to apply The Crown Estate's evidence, findings and conclusions to their thinking and in the formulation of an action plan and support mechanisms reflected in 2013 Offshore Wind Industry Strategy (BIS)
- Government and TCE looking for low cost, large scale for decarbonisation (i.e. not about local content, GVA or jobs)
 - Industry can get behind this – profit-driven. UK utilities and finance in combination with Belgian-Netherlands marine contractors, Danish-German-French turbine manufactures.
 - In exchange for cost reduction, government clear on plans for offshore wind volume and price. Helps industry plan investment.



Actions from cost reduction narrative

What did the industry do?

Learning: reducing risk is a cheap way to reduce LCOE

Higher wind speed sites

- The first sites were relatively close to shore.
- They produced more energy than equivalent onshore sites, but had lower winds speeds than sites further offshore.
- Rule of thumb: 1m/s increase in wind speed leads to 12% increase in energy production (so reducing LCOE).

Reduce operational costs (increase reliability)

- For offshore wind, most operations need a vessel to go offshore. This is not a small cost, so reducing how often the turbine needs attention is good.
- More reliable turbines and better maintenance approaches reduce LCOE.

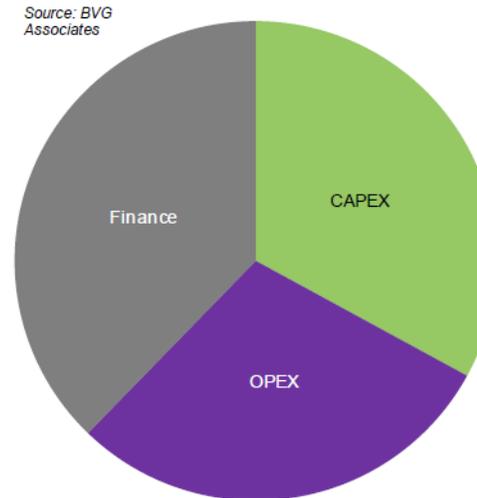
Increase turbine rating

- Increasing the turbine rating results in economies of scale in the other farm costs – fewer foundations, less array cable, fewer inspections and repairs.

Reduce risk for investors: utilities, banks, institutional investors

- Reducing the cost of finance reduces LCOE without significant changes in CAPEX or OPEX.
- It is not necessarily easy to do, but it does have a large effect
- **Make the process easy – reduce delays**
- **Give confidence in future revenue**
- **Give confidence in future costs**

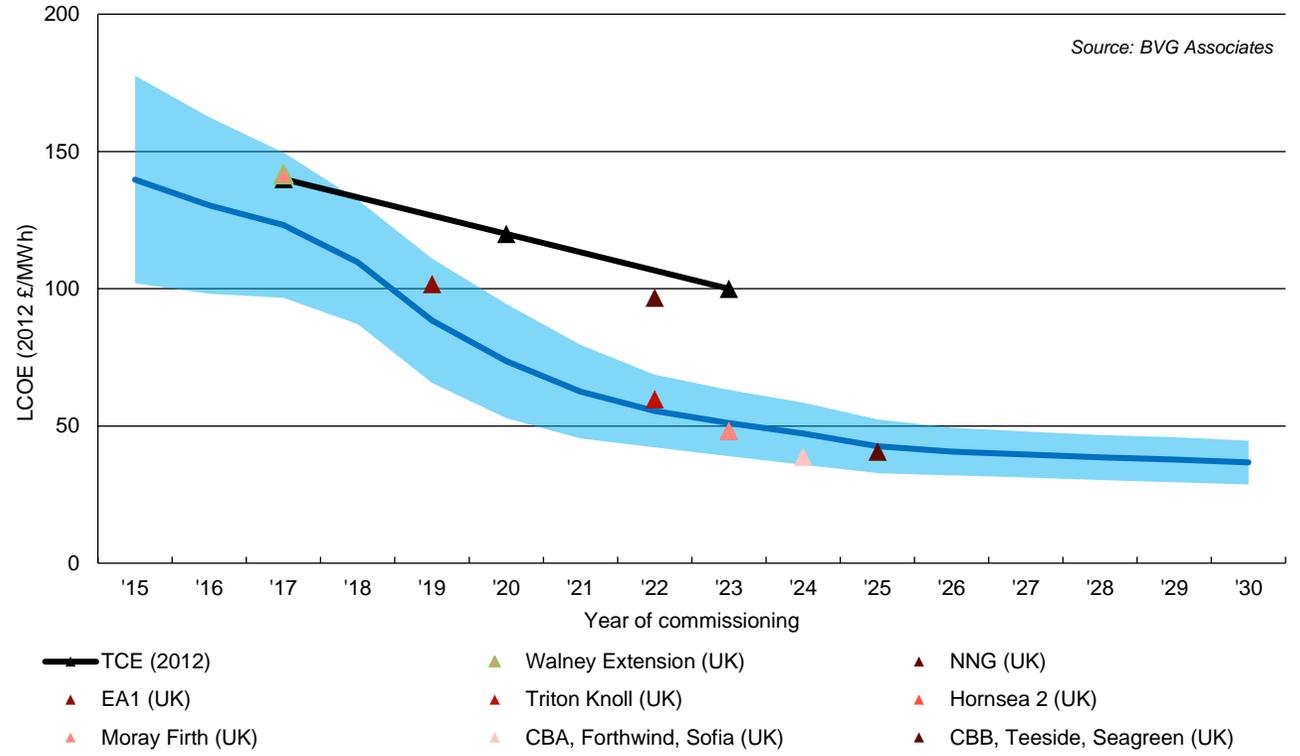
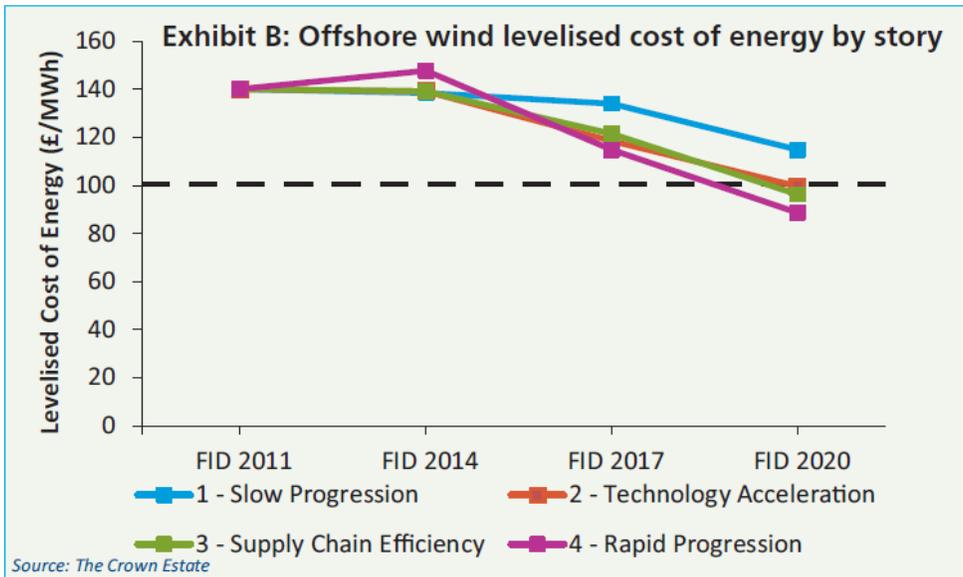
Mid 2010s view on offshore wind cost: Reducing cost of finance shrinks the pie.



Planned and achieved LCOE trajectories

Projecting likely future cost reduction

Comparing TCE's 2012 projection with LCOE for offshore wind projects in the UK



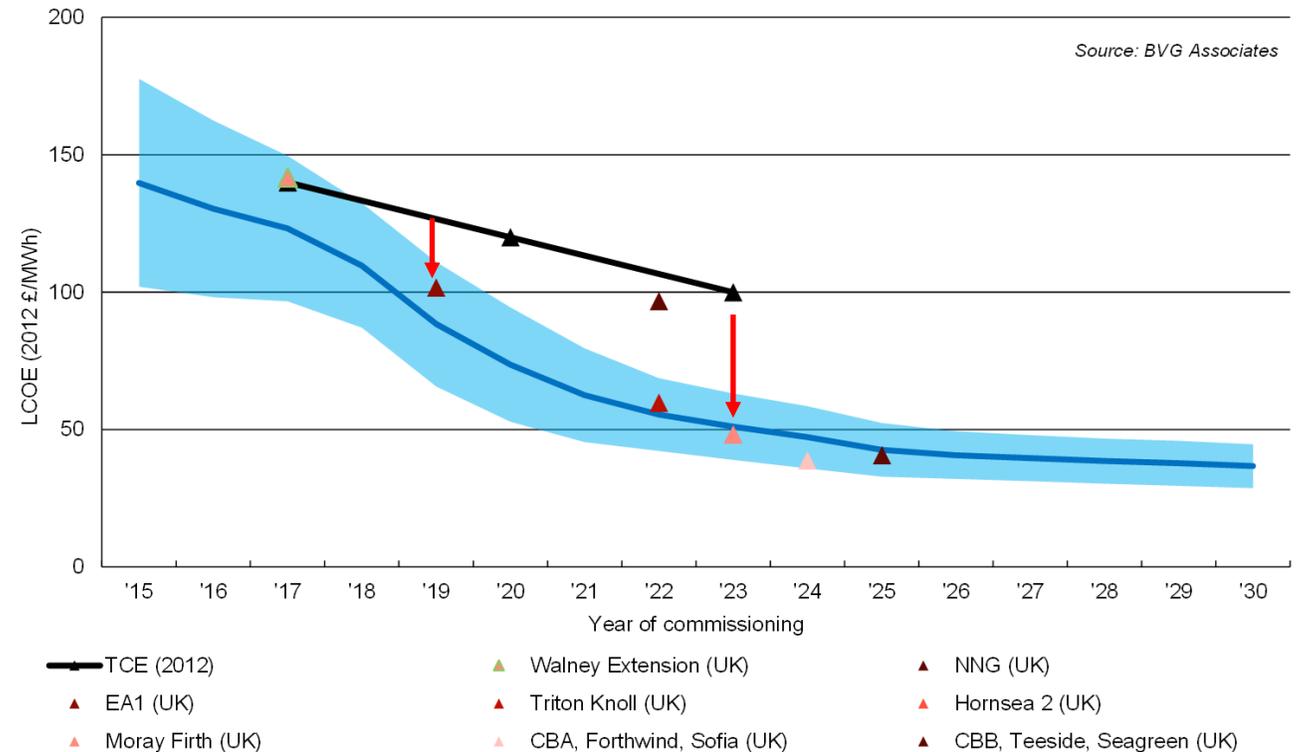
The impact of CfD (contract for difference)

Auctions have competition. Revenue certainty is worthwhile

UK CfD provides a guaranteed price for 15 years – but you pay back earnings over this price

Learning: auctions produce low LCOE and lots of volume

- (Strike price is not the same as LCOE – only 15 years)
- First round of CfDs in 2015: commissioning 2018-2022
- EA1 (£119/MWh), NNG (£114/MWh)
- Second round of CfDs in 2017: commissioning 2022-2023
- Triton Knoll (£75/MWh), Moray (£57.5/MWh)
- The 2015 auction produced prices lower than many were expecting.
- Crucially for UK prices, in 2016 the Netherlands held an auction for Borssele 1&2.
- The industry really changed from 2015 to 2017 – large players go for low cost by getting economies of scale (large turbines, large farms).



Where is the UK industry as of March 2021?

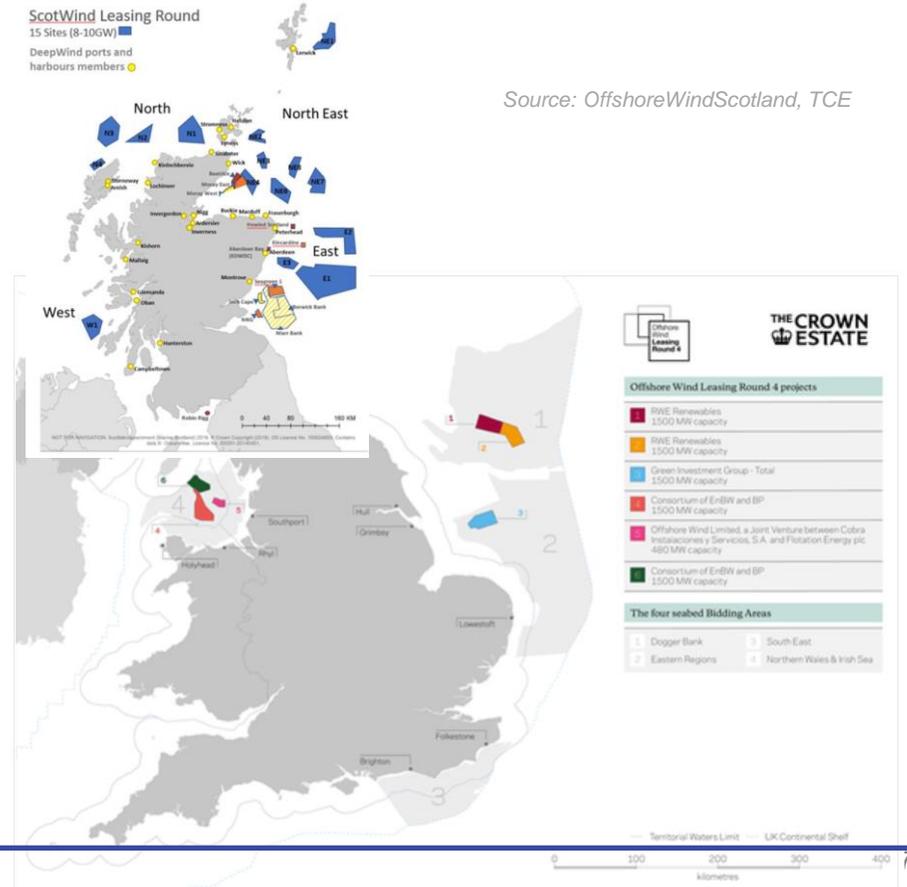
Mainstay of UK electricity supply

High installed capacity, looking to 2030 and 2050

Learning: geography is important (although not necessarily the most important factor)

Learning: auctions only change behaviour on what they measure (no jobs measure => no extra jobs)

- UK has 10GW of offshore wind installed
- UK is part of a North Sea market with 20GW+ installed
- By 2030, UK plans to have 40GW of offshore wind installed.
- UK industry has an offshore wind sector deal, with 2030 targets.
- New sites leased in England, Wales and Northern Ireland.
- New sites will be leased in Scotland.
- UK industry under pressure to up local content, but no change in market mechanism.
- Different priorities in Scottish and Westminster parliaments for development of floating offshore wind – looking to learn for experience with bottom-fixed offshore wind.



Summary

What the Baltics can learn from the UK's offshore wind experience

Learning

- Energy is a major part of decarbonisation – get policy makers working together
- When you make a plan – stick to it
- Reducing risk is a cheap way to reduce LCOE
- Auctions produce low LCOE and lots of volume
- Auctions only change behaviour on what they measure (no jobs measure => no extra jobs)
- Geography is important (although not necessarily the most important factor)

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