

How can we bring offshore wind online in the Baltics by 2030?

17.01.2023 Alana Kühne, VP New Markets in Region Europe at Ørsted



Ørsted develops energy systems that are green, independent and economically viable





- Global leader in offshore wind
- Develop, construct, operate and own offshore wind farms
- Ambition to reach ~30 GW installed capacity by 2030

11.1 GW

3.5

3



Onshore renewables

- Strong presence in the United States and Europe
- Develop, operate and own onshore wind, solar PV and storage projects
- Ambition to reach ~17.5 GW installed capacity by 2030





- Presence in Europe, including bioenergy plants, legacy gas activities and patented waste-to-energy technology
- Own and operate bioenergy and waste-to-energy plants, and optimise gas portfolio¹





- Emerging platform with 10 pipeline projects (+3 GW) mainly in Europe
- Develop, construct, own and operate hydrogen facilities
- Ambition to become a global leader in renewable hydrogen and green fuels by 2030

Capacity Installed and 🛛 🔄 Capacity Under Construction

We neither enter into new long-term gas sourcing contracts nor prolong expiring contracts, our focus is on maximising the value of our legacy natural gas portfolio Source: Ørsted Interim Financial and ESC Report Q1 2022

We aim to maintain our sustainability leadership





Carbon neutral business

Carbon neutral footprint





No later than 2030, all projects commissioned must have net positive biodiversity impact

Ban on landfilling of wind turbine blades

Over the past decade, scale and continuous innovation have driven down the cost of offshore wind



Today, offshore wind is fully cost-competitive with fossil fuels

Levelised Cost of Electricity (LCoE)^{1,2}

EUR/MWh, 2012 and 2022, Northwestern Europe



1. The chart illustrates the total span of low and mid scenarios (i.e., lowest national LCOE found in low scenario, highest national LCOE found in mid-scenario) for projects with FID today and construction beginning tomorrow. Same hurdle IRR used in low and mid scenarios. Nuclear: UK. Coal: DE. Natural gas: UK. Solar PV: DE, UK. ON wind: DE, UK. OF wind: DK, NL, UK. DE OF wind mid scenario omitted as cost of 104 EUR per MWh deemed unrepresentative. OF wind 2012: generic offshore wind, Northwest Europe, FID 2012.

Source: Bloomberg New Energy Finance – 1H 2022 LCOE Update.

6

2. CCGT and Coal LCOEs in the low and mid scenarios are calculated with BNEF's benchmark fossil fuel and carbon prices. The LCOE span could be much wider if different price scenarios were applied. Nuclear new builds in Europe has been very limited the past decades and there is a high uncertainty in construction costs that is not reflected in the nuclear LCOE span.

Offshore wind offers a scale that could fulfil the Baltics States' energy needs efficiently



By 2030, all electricity consumed in Estonia will be generated from renewable energy sources.

"Current high electricity prices are clearly a result of a lack of sufficient generating capacity. High fossil fuel prices and a shortage of generating capacity have put all consumers in a difficult situation and the problem needs an effective solution ... What is also important here is that the **state sends an unambiguous signal to encourage investment** – by 2030, all the electricity we consume must be green energy."

> Riina Sikkut Minister of Economic Affairs & Infrastructure August, 2022

Without offshore wind, we expect that only approximately two thirds of Estonia's target will be achieved:



Partnership vision to deliver the first large-scale offshore wind farm in the Gulf of Riga in the Baltic Sea, before 2030

Enefit 🖉

Enefit, leading utility and the largest wind energy company in the Baltics, brings a strong local presence, experience, and development background.

Orsted

Ørsted, the global leader in offshore wind, brings a proven offshore wind track record and long-standing expertise.

Together:

Offshore wind offers a clear green path forward for the decarbonisation of the Baltic countries.

Our partnership is strongly committed to supporting governments across the Baltic countries in realising their plans for reducing carbon emissions.

How this can be done? ... Liivi Offshore Wind Farm

Facts & Figures

~1000 MW

183 km²

10 km from Kihnu island

16 km from Häädemeeste

35 km from Pärnu Beach

EIA process ongoing



What does the development of an offshore wind farm involve?

Enefit 🔗

Enefit 🔗



- Site identification
- Wind, ice, wave, and bird studies
- Maritime spatial planning
- Building permit initiation
- Environmental Impact Assessment (EIA) studies
- EIA reporting
- Superficies license
- Front-End Engineering Design (FEED) and seabed studies
- Major contract procurement
- Financial Investment Decision (FID)
- Construction
- Operation and maintenance

What is needed for investors to further support future offshore wind investment in Estonia?

Excellent progress has been made to date:



Clear targets encourage investment



Maritime Spatial Plan has been shared with developers



Regulatory frameworks for offshore wind to be decided

'No-regret' next steps for an optimal offshore wind framework:

Clear framework for site identification and н. development going forward (central/decentral) Use a one-stop-shop for all authority Site specificity interactions to align maritime spatial planning and grid planning as well as to bring about consensus among stakeholders on sea use (consider single-use/co-use). Determine the best **onshore arid connection** points and identify need for additional grid buildout/reinforcement Scope Involve **developers in transmission design** to enable optimisation. Large-scale projects reduce LCoE and cost to . consumers Revenue Two-way CfDs enable risk sharing to minimise stabilisation cost to consumers, and provide stability to investors

Two-way contracts for difference (CfDs) are the most efficient mechanism for minimising cost to consumers

What is a two-way CfD?

- A revenue stabilisation mechanism awarded to renewable energy projects through a competitive auction
- Two-way CfDs provide a fixed price per MWh, i.e. a firm revenue stream and a stable power price to consumers
- Duration is typically 15-20 years

Illustrative mechanics of two-way CfDs:

Government income when power price is

above strike price¹

Key benefits of two-way CfDs:

- Price determined in competitive, transparent auctions
- Stabilising effect on overall power price level
- Strong legal framework helps developer secure financing
- Low capital costs reduce project cost and lead to lowest possible bids

The impact of cost of capital on offshore wind LCoE:

Investment and operating expenses Capital costs



Weighted Average Cost of Capital (WACC)

1 Data from BEIS on how large the green area is estimated to be in 2026 is available online here. (0.31 Bn £ to UK consumers in back-payments in 2026)

electricity, bid by the

developer, which reflects

the investment cost of a

renewable energy project

Market price

Strike price A fixed price for

expenditure when

power price is below

strike price



How have countries in Northwestern Europe matured their offshore wind markets over time?

Commercial

Government Revenue Stabilisation: Key figures from CfD mechanisms in Denmark and the UK, which have provided significant volume and lowered prices over time.



Merchant Bids: What conditions have allowed developers to bid for offshore wind projects in Denmark, Germany, and the Netherlands without revenue stabilisation?



Synergies with existing projects, supply chain, etc.

Limited scope (transmission provided by the state)

High power price forecasts

Deep markets for Corporate Power Purchase Agreements

Offshore wind is key to the green future of the Baltics



Offshore wind can help the Baltic States meet their own renewable energy needs – addressing both climate change and security concerns.



Over time, offshore wind could also become an export opportunity.



Hybrids, interconnectors, and pipelines will be key to this, and fortunately many such projects are moving ahead.

Projects of Common Interest in energy infrastructure in the Nordic and Baltic Sea region:

Updated by the European Commission in December 2022

Completed Projects of Common Interest:

- Electricity line
- Gas pipeline
- Kickstarted and related Projects of Common Interest:
- Electricity line
- Gas pipeline
- Baltic synchronisation

Let's create a world that runs entirely on green energy