March 2024

CurrENT response to ENTSO-E Consultation on the Offshore Network Development Plans

CURRENT
Enabling Network Technology throughout Europe

Offshore Network Development Plan ENTSO-E consultation response

Holistic Approach Needed

Given this is the first iteration of the ONDP, the time and effort in creating the methodology and modelling process must be commended. However, this first iteration of the ONDP has limited use as a planning tool for governments, developers and TSOs, because vital aspects such as onshore grids, demand and non-offshore renewable electricity are not integrated in the model. ENTSO-E should therefore be careful in portraying the ONDPs as an accurate plan until the ONDP is fully integrated into the TYNDP framework.

The ONDPs seek to create an optimal offshore transmission system and yet they omit the onshore system which accounts for more than 80% of Europe's 2050 electricity generation and does not consider what happens to the offshore power once it lands on the beaches of Europe, integrates with the onshore grid and is ultimately delivered to customers. According to ENTSO-E the 2050 figures for offshore wind, onshore wind and solar are 496GW, 859GW and 1,936GW, respectively.

This iteration of the ONDPs reflect the infrastructure needed to deliver the power from the offshore renewable energy capacities announced by EU Member States, UK and Norway in January 2023 to the shorelines of Europe without due consideration of:

- what onshore reinforcements would be needed to handle that energy as well as onshore electricity production;
- how such a system can provide secure, sustainable and affordable energy;
- identification of technology gaps, beyond DC breakers, where innovation is needed to deliver on EU energy independence and climate goals.

Dividing the regions into 5 seas basins somewhat undermines an optimal modelling approach. To fully optimise Europe's energy system, a more holistic approach must be adopted in the future.

We recognise that the ONDPs will gradually be integrated with the 2024 TYNDP and aims at a fully holistic approach by TYNDP 2026. However, it's important to note that the ONDPs are currently framed as a plan for developers and OEMs and should be utilised with caution.

Hybrid Off-shore Assets

The ONDPs propose that by 2050 just 14% of offshore generating capacity will be connected to hybrid infrastructure, and just 15% in the North Sea. The security of supply and economic benefits of a meshed offshore grid has now been widely accepted. The EU Action Plan for Grids states that '*Offshore networks will be composed of radial and hybrid transmission projects evolving towards a future meshed*

grid' and the IEA's report on Electricity Grids and Secure Energy Transitions stated that "*Meshed offshore grids are expected to play a critical role in European energy systems in the next 10 to 20 years."* The Declaration of Energy Ministers at the Ostend North Seas Energy Summit stated a commitment to develop plans to develop a '*meshed offshore grid*'.

Only 14% of the renewable energy capacity will be connected via dual purpose or hybrid infrastructure, according to the ONDP. This surprisingly low degree of meshing is undoubtedly the result of the methodology of identifying so-called "candidate links" for hybrid connections.

The criteria to identify these are based on i) proximity to generation and ii) whether two TSOs have already expressed an interest. Based on these two criteria the ONDP report even concludes that "*The future European offshore transmission system will not be fully "meshed*". ENTSO-E should refrain from making statements with such confidence on the future degree of meshing until more solid modeling to determine dual purpose and meshed connections has been applied to the scenarios.

This approach is not designed to identify hybrid projects out to 2050 which would optimise the offshore network. This is evident from the ONDP including more existing and planned hybrid projects by 2050 than there are new projects identified by the model. The approach and criteria for determining an optimal degree of meshing must evolve in future iterations.

Stakeholder engagement

CurrENT very much welcomes the various stakeholder workshops and consultations organized by ENTSO-E, and the ability to ask questions to those involved in putting together the next ONDP. However, CurrENT is under the impression that much of the feedback submitted by CurrENT is insufficiently considered, and not incorporated into final documents, without proper argumentation. We would welcome further discussion around our concerns, while also understanding that some things will only be included in the 2026 edition.

Cost and innovation assumptions

The ONDP would benefit from updated cost assumptions. The AC cable cost seem low compared to ACER's cost catalogue and so does the assumed HVDC converter cost. Cable and converter cost are generally expected to continue to increase, partly as a result of increasing copper prices and supply bottlenecks. This should be better reflected in future iterations.

There is a limited focus on technology and innovation in the ONDPs. Innovation in critical areas such as transmission is not considered. The only real consideration of innovation is in DC Circuit Breakers where two scenarios were evaluated with and without DC Circuit Breakers. DC Circuit Breakers are already at TRL9 in China and approximately TRL7 in Europe. Evaluating whether or not DC circuit

breakers will be utilised is useful but distorts the result when used in isolation. There are possible alternative grid designs limiting the need for DC breakers and high-capacity technologies such as superconducting subsea cables available within the 2050 timeframe.

There are various other game changing innovations that were not considered which could have a profound impact on Europe's energy system. There is a technology gap in grids and while this is not the direct scope of the ONDPs it would have been useful to address the challenges and innovations, for example by updating and including assessments of technologies from ENTSO-E's own Technopedia.

The ONDP assumes 2 GW cable sizes. In other words, it is assumed that transmission cable technology will not develop over the coming years from current state of the art. New innovative cable technologies with higher capacities are needed if we are to reach our 2050 climate and renewable energy targets.