OFFSHORE NETWORK DEVELOPMENT PLANS 2026 – GUIDANCE DOCUMENT

For publication -25 July 2024

From: TYNDP StG

Disclaimer

This paper does not present any ENTSO-E or member-TSO position, is not part of the next TYNDP or ONDP itself and should be seen as guidance related to data collection developed jointly with the European Commission, to provide to TEN-E corridors and high-level groups for the cooperation of Member States.

EXECUTIVE SUMMARY

The TEN-E regulation 2022/869 requires Member States, the European Commission and TSOs to collaborate on the development of Offshore Network Development Plans. In this framework, ENTSO-E and the European Commission have jointly elaborated the second edition of this brief guidance document, aiming to support the Member States to deliver the input information needed by ENTSO-E for the infrastructure planning task.

For each sea basin, the information needed includes:

- Offshore RES capacities; in the relevant time horizons (2030, 2040, 2050), including hydrogen produced from offshore renewable energy, where available.
- Locations dedicated to host this offshore renewable generation and transmission infrastructure.
- Locations dedicated to produce hydrogen from offshore RES, where available.
- Any updates regarding areas of the sea of Member States' Maritime Spatial Plans (MSPs) in [km^2] that are designated for offshore RES development and specific generation targets in those areas [MW]. Where not available, Member States should at least include environmentally protected areas.

1. INTRODUCTION

On 3 June 2022, a revised version of the Trans-European Networks for Energy Regulation (TEN-E) has been published in the Official Journal and entered into force on 23 June.

Articles 14 and 15 of the TEN-E Regulation (EU) 2022/869[1] set out the legal framework for ENTSO-E's legal mandate related to the development of offshore systems. ENTSO-E, with the involvement of the relevant TSOs, the national regulatory authorities, the Member States and the Commission, had to develop the first sea-basin (SB) related offshore network development plans (SB-ONDPs) by 24/01/2024[2], based on the goals developed by EU Member States' governments and as included in the in the first joint non-binding agreements[3], which Member States had to conclude by 24/01/2023, taking into account environmental protection and other uses of the sea. The first edition of the ONDP was published on time in January 2024 (link).

Preparing the next edition of the ONDP, EU Member States have to deliver the updated non-binding agreements by 24/12/2024, in line with the latest updated NECPs. Based on the non-

[1] *https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R0869&from=EN*
[2] *Art. 14 (2) TEN-E regulation EU 2022/869 (link)*
[3] *Art. 14 (1) TEN-E regulation EU 2022/869 (link)*

binding agreements ENTSO-E is mandated to develop the next ONDP, which will be developed as integrated part of the TYNDP 2026.

The **objective** of this document is to **describe the input information that ENTSO-E needs from Member States** to develop quality Offshore Network Development Plans.

As specified in EU 2022/869, Art. 14(1), *"[...] the Member States […] shall conclude a non-binding agreement to cooperate on goals for offshore renewable generation to be deployed within each sea basin by 2050, with intermediate steps in 2030 and 2040, in line with their national energy and climate plans, and the offshore renewable potential of each sea basin. That non-binding agreement shall be made in writing as regards each sea basin linked to the territory of the Member States […]"*,

As foreseen in the TEN-E Regulation Article 14(2), ENTSO-E shall publish SB-ONDPs *"[…] as a separate report which is part of the Union-wide ten-year network development plan, high-level strategic integrated offshore network development plans, for each sea basin, in line with the priority offshore grid corridors […], taking into account environmental protection and other uses of the sea."*[4]. These strategic plans shall be updated every two years and provide:

- *"A high-level outlook on offshore generation capacities potential and*
- *resulting offshore grid needs, including potential needs for*
  - *interconnectors, hybrid*[5] *projects, radial connections, reinforcements and*
  - *hydrogen infrastructure."* [6].

The legal requirements call for an efficient collaboration between Member States, the national regulatory authorities, the European Commission (EC) and ENTSO-E. The TEN-E Regulation defines five priority offshore grid corridors in its Annex I, see also table below.

Table 1 – Priority offshore grid corridors as per the new TEN-E

Priority Offshore Grid Corridors	MSs concerned	Waters
1. Northern Seas Offshore Grid (NSOG)	BE, DK, FR, DE, IE, LU, NL, SE	North Sea, the Irish Sea, the Celtic Sea, the English Channel and neighbouring waters
2. Baltic energy Interconnection Plan (BEMIP) offshore	DK, EE, FI, DE, LT, LV, PL, SE	Baltic Sea and neighbouring waters
3. Atlantic offshore grid:	FR, IE, PT, ES	North Atlantic Ocean waters
4. South & West offshore Grid	FR, GR, IT, MT, PT, ES	the Mediterranean Sea (including Cadiz Gulf), [ ] and neighbouring waters
5. South & East offshore Grid	BG, HR, GR, IT, CY, RO, SI	Mediterranean Sea, Black Sea and neighbouring waters

[4] *Art. 14(2) TEN-E Regulation EU 2022/869 (link)*
[5] *In ENTSO-E offshore position papers distinction is made between several types of offshore hybrid projects: namely i) "dual purpose" offshore hybrid projects = combining functionalities of offshore RES connection-to shore and interconnection of countries or bidding zones; and ii) "multi-purpose" offshore hybrid projects – additionally crossing energy sectors.*
[6] *TEN-E regulation, Art. 14 (2), (link)*

Beyond the Member States mentioned in the above table reflecting the TEN-E priority offshore corridors, Norway and Great Britain have plans related to offshore RES development. Norway is participating in the North Sea Energy Cooperation (NSEC) High-Level Group, whereas the UK has concluded a Memorandum of Understanding with NSEC on offshore renewable energy cooperation[7]. Related information is important for the Northern Seas Offshore Grid priority corridor and will be considered where available.

[7] *https://energy.ec.europa.eu/document/download/312b9124-b1c6-4d52-9100-eca00560f601_en?filename=NSEC%20UK%20MoU%20signed.pdf*

1. OFFSHORE RENEWABLES: CAPACITIES, LOCATIONAL INFORMATION AND FURTHER OFFSHORE DEVELOPMENT

Offshore renewable capacities should as much as possible be separated per generation type (e.g. offshore wind, tidal, wave, PV, etc.) and technology (e.g. floating, bottom-fixed) per sea basins for the 2030-, 2040- and 2050- time horizons. Where offshore renewable capacity is not planned to be connected to the electricity network, e. g. when there are concrete ambitions to produce hydrogen from offshore RES - either directly offshore or at the landing zone,), this needs to be reported separately, since it will affect the infrastructure needs.

Locational information is requested as well, to facilitate consideration of line lengths.

Member States are asked to deliver (in prioritized order):

A. their offshore RES capacity targets [MW] per time horizon (2030-2040-2050) split into smaller clusters (e.g. 2 GW/ cluster) and their location [GPS data].
    - This information helps ENTSO-E better locating the offshore generation in the planning models and ease the link to Member States' Maritime Spatial Plans (MSP) data.
    - The values provided should be in coherence with the latest updated NECPs, as they are also a relevant input of the ENTSO-E planning exercises.
B. areas of the sea of Member States' MSPs in [km^2] that are designated for offshore RES development.
    - This information helps ENTSO-E assess the density of generation capacities (in case data under point E below are not available) and post-process the spatial impact of offshore transmission infrastructure.
C. The share of offshore RES capacity which is not planned to be electricity-grid-connected and its location [MW, location [GPS data]].
    - This information helps ENTSO-E model the electricity and H2 infrastructure, by connecting the correct amount of generation infrastructure to each transmission system.

D. expected energy density [GWh/km^2] or

E. capacity densities [MW /km^2] in the specific areas of their Exclusive Economic Zone (EEZ) where offshore renewable production is expected, where available.

- Allows ENTSO-E to validate and eventually adapt the offshore energy generation profiles

Where available, they are also asked to provide:

F. Identified potential routes for offshore transmission infrastructure; in case not available, then see G

- This helps ENTSO-E assess the spatial impact of offshore transmission infrastructure and the quantification of the total need for routes in the maritime areas.

G. Indication of any rules for multi-use (meaning different sectors sharing the same maritime area) purposes for maritime areas

- This information helps ENTSO-E's assessment of spatial needs, in case there are areas where there is high density of energy infrastructure.

Information on the location of offshore RES in the EEZs and eventually also space available for transmission infrastructure (both cables and offshore substations) is information Member States are asked to deliver. This locational information is an important input for ENTSO-E's work, as cable and/or pipeline lengths will be longer than a direct line between offshore generation and onshore connection point. ENTSO-E will use the information as provided by the Member States according to the TEN-E regulation to develop the ONDPs. In case there is a lack of information on targets from Member States, assumptions might be necessary.

Beyond the above information, focusing on offshore RES generation capacities, Member States are invited to voluntarily provide information on their hydrogen ambitions which are related to offshore RES generation, i.e.

H. Does your country have any plans for offshore electrolysis? (If yes, which capacity or energy is discussed?)

I. Does your country have any plans for onshore electrolysis in landing zones[8] based on offshore RES (If yes, which capacity or energy is discussed?).

J. Does your country have any specific plans for H^2 infrastructure between

   1. your offshore-RES- based-electrolysis and your landing zone
   2. your landing zone and demand center(s) onshore?
   3. your landing zone electrolysis and your demand center(s) onshore?

K. Please provide related locational information for offshore RES (electrolysis); landing zone(s); landing zone(s) electrolysis and demand center(s) (Town or GPS data).

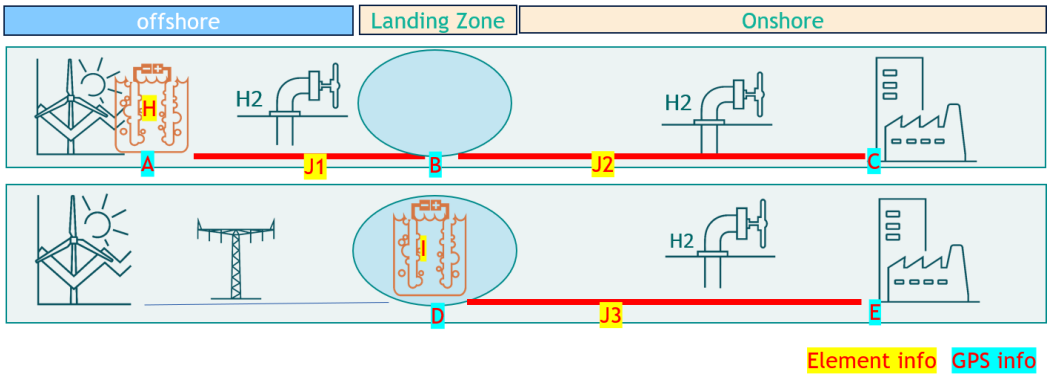

Figure 1 Illustration of Hydrogen related configurations and data requests

Member states are responsible for maritime spatial planning (MSP) and could explore increasing further MSP coordination in sea basins, as is already taking place in some high-level groups, such as NSEC and BEMIP. Beyond usage related to energy production and transportation, multiple further usages of the sea-basins are shown on the EC's MSP homepage[9].

The practical planning exercise will be executed by the ENTSO-E together with the ENTSO-E Regions involving the TEN-E priority offshore grid corridors including Member States and the European Commission. National TSOs collaborate in ENTSO-E Regions. Consistency across European Regions

[8] *A 'landing zone' could e.g. be a bigger geographical area, where the offshore energy infrastructure is connected to the onshore energy system. For the ONDP calculations you could simplify that area by putting an artificial, non-binding 'needle' on a map. This 'needle' would be used to assess the infrastructure length for high-level communication purposes. You could define multiple landing zones.*

[9] *See link: The European Maritime Spatial Planning Platform | (europa.eu)*

is ensured via the joint guidelines of this document being shared across all offshore corridors and application of the same planning methodology within ENTSO-E.

2. TABLES OF REQUESTED DATA

Below, the information requested is summarized. In general, capacities and locations of offshore generation per generation type (offshore wind, tidal, wave, PV) and technology (fixed-bottom, floating), per sea basin and time horizon (2030, 2040, 2050) is needed, also distinguished by grid-connected or non-grid connected offshore RES. In case a Member State is adjacent to several sea basins, the information needs to be submitted for each sea basin separately.

One table per time horizon and sea basin should be filled. Below table only includes mandatory information. Beyond that, additional information as described in Chapter 1 can be provided voluntarily.

The ambitions as indicated in the joint countries' agreement should optimally be provided in multiple clusters of smaller resolution (e. g. 2 GW clusters), together with related locational information per cluster. The total capacity per sea basin shall be equal to the joint countries' sea basin agreement.

A separate table shall be provided for each time horizon (2030, 2040, 2050) and each offshore corridor as listed in table 1

	A	A	A		C	B / E	D	E
Country and sea basin[10]	Offshore RES Capacity Cluster (MW)	GPS coordinates or a map	Type (wind/wave/ Tidal/PV)	Technology (bottom-fixed / Floating) (BF / FLO)	el-Grid Connection (Y/N)	Sea Area designated for offshore RES [km^2] …	expected energy density in those areas [GWh/ km^2]]	or expected capacity density in that area [MW/ km^2]

[10] *In case a country has several sea basins, the information should be provided for each sea basin separately.*

Below table asks for hydrogen related information

	H	I	J 1	J2	J3	K	K	K
Country and sea basin[11]	Electrolysis, in offshore RES locations expectedincluding expected volumes	Electrolysis in onshore landing zones incl. expected volumes	Type and size of Infrastructure anticipated from offshore point electrolysis point A [GPS] to landing zone point B [GPW]	Type and size of Infrastructure anticipated from landing zone point B [GPS] to demand centre point C [GPS]	Type and size of Infrastructure anticipated from landing zone electrolysis point D [GPS] to demand centre point E [city name or GPS]	Location H location offshore electrolysis [GPS or map]	Location I location landing zone electrolysis [GPS or map]	Location J2, point B or D Location demand center [city name or GPS]

3. USAGE OF THE REQUESTED DATA

The first edition of the ONDP has been published in January 2024 (link), building on the data collection from autumn 2022. Figure 1 illustrates the main results of that ONDP, thereby also highlighting the high-level information that is put together based on EU Member States (MSs)' input.

[11] *In case a country has several sea basins, the information should be provided for each sea basin separately.*

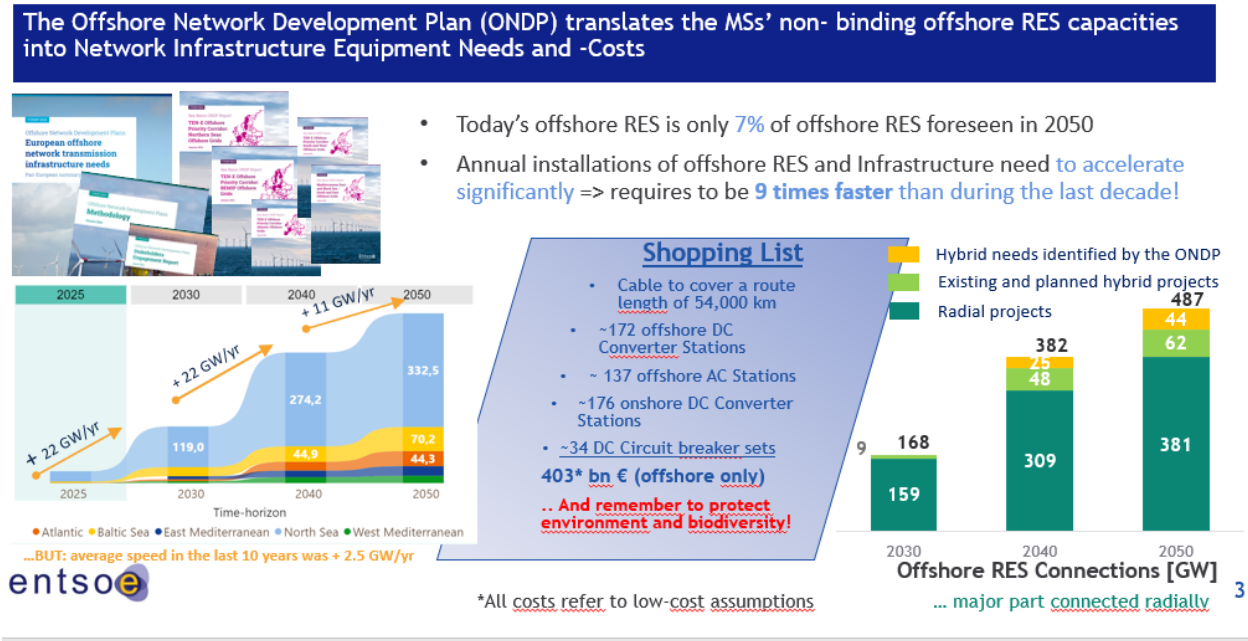

Figure 2 Illustration of the high level information extracted from the recent ONDP 2024.

Member States' input data are used to model the energy system in order to produce

a) High-level maps of main corridors across the sea basins

b) Outlook on the speed needed to reach the targets (per sea basin and at pan-EU level)

c) Shares of offshore RES GW to be connected radially and via offshore hybrid projects, and related statistics (lengths, size etc. per sea basin / pan-EU)

d) An overview of infrastructure assets that need to be provided by industry and installed by TSOs to reach the offshore RES ambitions (per sea basin, pan-EU).

e) An estimate of the investment volumes needed to reach the offshore RES ambitions.

The ONDPs do not identify concrete infrastructure projects, this remains the task of project promoters, but strategic transmission corridors offering an outlook on the potential investment framework generated by the integration of Member States' offshore RE targets.