# Shaping Our Offshore Path

## OPTIMISED PLANNING FOR OFFSHORE ENERGY DEVELOPMENT

To meet the **EU's climate and energy targets**, renewable energy deployment, both on land and at sea, must accelerate.

By 2050, EU Member States aim for 354 GW of offshore wind capacity, making offshore renewables **the third-largest energy source** in the EU.[1] Efficient integration of offshore-generated energy will require extensive wind farms and grid infrastructure in European sea basins.

[1] ENTSO-E. (2024). Offshore Network Development Plans: European offshore network transmission infrastructure needs. Web.

## Challenges of Offshore Energy

European seas are already **heavily affected** by different uses and demands such as:

~ Commercial and recreational fisheries
~ Aquaculture
~ Tourism
~ Shipping
~ Military operations
~ Extraction of oil, gas, and minerals

Over time, these activities have devastated marine ecosystems and heavily exploited offshore resources – including space.

The introduction of offshore wind, other renewable energy technologies (e.g., solar, wave) and grid infrastructure could intensify these pressures, adding further strain on ecosystems and increasing competition for resources among different sea uses.

## FINDING SOLUTIONS

Achieving the scale-up of offshore renewables and grids requires **understanding of infrastructure needs** and **designing systems to use resources efficiently**.

Holistic, optimised **infrastructure planning** is essential to address marine environmental and social contexts, reduce conflicts, and promote collaboration across sectors.

## OFFSHORE NETWORK DEVELOPMENT PLAN

In 2024, the European Network of Transmission System Operators for Electricity (ENTSO-E), published the first of its kind **Offshore Network Development Plan** (ONDP), that is a part of the Ten-Year Network Development Plan (TYNDP) – the European electricity infrastructure planning tool.

ONDP assesses equipment needs and costs for offshore transmission infrastructure in 2040 and 2050 to **unlock Europe's offshore renewable energy potential**. It provides a vision for the future pan-European offshore network, covering the EU27, Norway, and the UK.

More information can be found on the ENTSO-E website here.

# Approaches to Offshore Energy Modelling

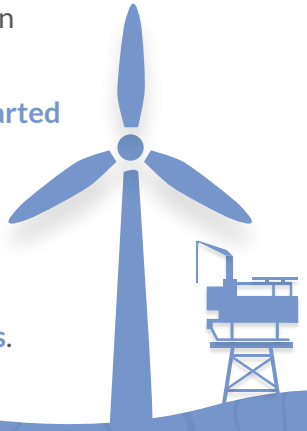
**Developing offshore wind farms** currently takes between **3-9 years**, often influenced by delays in permitting, auctioning, and financing.

Ideally, these factors, along with local port readiness and regional and EU supply chain preparedness, should be **incorporated into planning and modelling**.

This makes offshore energy planning and modelling **expanding into previously uncharted areas**, including the unknown number of connections and technical configurations.

Iterative steps during modelling and planning can help to standarise and accelerate the **offshore infrastructure deployment**.

High level coordination enabling open exchanges with various stakeholders can help to address their **specific needs and objectives** and **align on modelling methodologies**.



# Addressing Spatial Challenges of Offshore Energy Infrastructure

**Maritime Spatial Plans** (MSPs), which EU Member States must develop, define the possible **uses of marine space through a holistic approach** that:

**~ focuses on preserving and restoring marine ecosystems**

**~ maintains ecosystem services** **~ supports economic and social objectives.**

This facilitates cross-border collaboration, data exchange, transparency, and **enhances the coexistence of offshore energy with nature and other activities**.

Visualisation tools, such as **Geographic Information Systems (GIS)** or interactive maps, can aid the MSP process in **identifying suitable locations for offshore infrastructure projects**.

**~ They can be combined with open-source modelling** **~ They can assess environmental impacts**

**~ They can integrate stakeholders' knowledge & needs and foster stronger cooperation**

## THE WAY FORWARD

**1.** Enhance coordination in modeling: use **sector-coupled models** to **optimise investment and operational costs** across offshore and onshore sectors.

**2.** Expand **further collaboration** with national MSP authorities and other stakeholders within the sea basin and civil society.

**3.** Standardise definitions and methodologies to **improve data sharing, consistency and model accuracy** across Europe.

**4.** Ensure local socio-economic and environmental benefits are maximised through **bottom-up spatial planning**.

Renewables Grid Initiative

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