

Floating Offshore Wind Community Conceptual Map

Mission of the Community: The Floating Offshore Wind Community is a high-level multi-stakeholder initiative with the aim of raising public and political awareness on the benefits and industrial spillovers of floating offshore wind farms and guiding strategic directions for overcoming existing challenges

The wind power, especially offshore, represents a complementary source able to contribute to the phase-out of fossils and achieve the energy policy targets by 2030 and 2050

- Italy experienced a **significant increase in renewables installed capacity in 2022**, but there is a **need to further accelerate to reach 2030 targets, in particular for wind** (annual deployment must increase by **4 times**, vs 3 times for photovoltaics)
- Compared to European peers, **Italy lags behind** in terms of increased installed capacity, both for photovoltaics and wind power: between 2015 and 2022 **+33%** in photovoltaics (vs **+287%** in Spain) and **+29%** in wind (vs **+105%** in France)

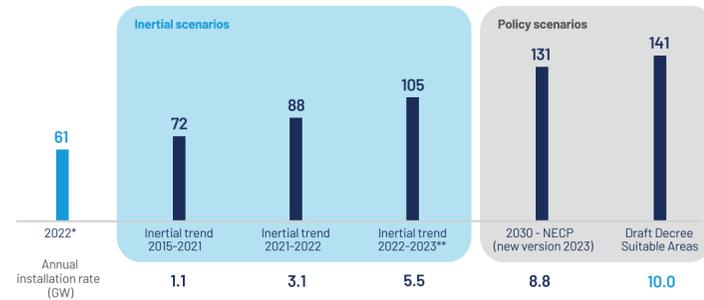


Figure 1. Historical and inertial trend of installed renewable energy capacity in Italy and comparison with policy objectives (GW), 2022-2030. Source: The European House - Ambrosetti elaboration on Terna and NECP data, 2023. N.B. NECP = National Energy and Climate Plan. (*) Excluding pumped hydro storage. (**) In the first 6 months of 2023, renewable capacity in operation increased by +2,322 MW (vs +1,012 MW in the first 6 months of 2022, +130%).

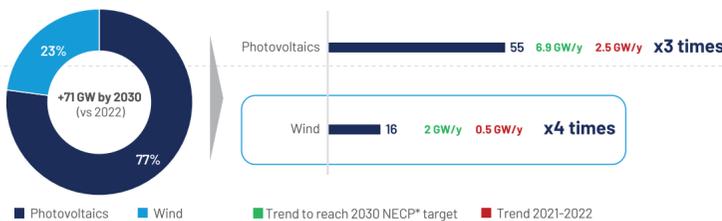


Figure 2. Contribution of the photovoltaics and wind to the achievement of RES target in 2030 (left chart, % values), 2022-2030, and changes in the installed renewables capacity in Italy by technology (right chart, GW), 2022-2030. Source: The European House - Ambrosetti elaboration on Terna and NECP data, 2023. (*) NECP = National Energy and Climate Plan.



Figure 3. The electricity generation park in Italy: comparison between the current state and the Decarbonization Scenario of the Italian long-term strategy (TWh), 2022 and 2050. Source: The European House - Ambrosetti elaboration on Italian long-term strategy, RSE and Terna data, 2023.

- In this context, **offshore wind** - given its significant **average size of installation** - can **close the gap** and **increase the renewable energy sources' annual deployment** necessary to reach decarbonization goals. However, offshore wind projects need longer development time, including the supply chain and construction site organization activities. This mean that **most of the contribution to the energy transition will occur after 2030**. Therefore, **long-term horizon till 2050** and **relevant planning**, as well as acceleration of authorization procedures is needed, in order to give a **stable regulatory framework** to investors
- By 2050**, according to the Italian Long-Term Strategy, **offshore wind production capacity will reach up to 60 TWh**. Assuming a capacity factor of **35%** (3,066 hours/year), the offshore wind capacity needed by 2050 in Italy will be **~20 GW**, necessary to fully decarbonize the Country

Mission of the Community:

At the global level there is a rising competition in the offshore wind, with Italy lagging behind

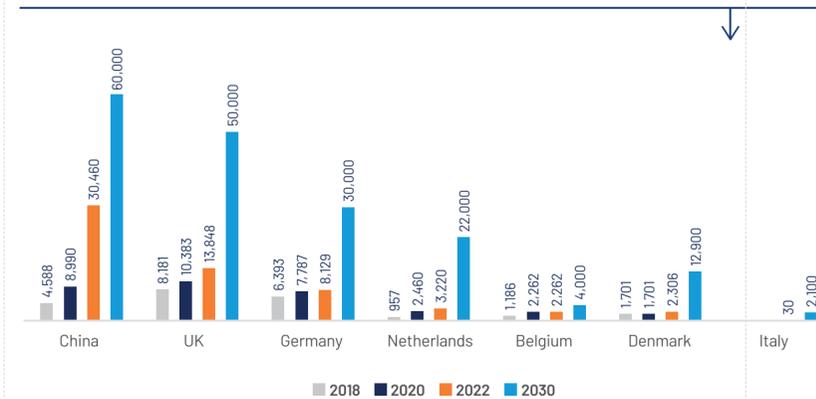


Figure 4. Offshore wind energy installed capacity and 2030 targets in selected Countries (MW), 2018, 2020, 2022 and 2030. Source: The European House - Ambrosetti elaboration on IRENA data and various sources, 2023.

- Energy firms and governments are expanding their global offshore wind portfolios, with **China being the market leader** (more than doubling the offshore wind capacity of the 2nd largest market, the UK)
- Germany has European Union's highest installed offshore wind capacity, with more than 8 GW installed**
- The offshore wind installed capacity in Italy is **30 MW (0,2% vs UK and 0,4% vs Germany)**. **Italy lags far behind also in terms of 2030 offshore wind targets: 4,2% vs UK, and 7% vs Germany**
- This situation is driven also by the **morphological characteristics of Italy (marine area with deep waters)**, that do not make it appropriate to develop the traditional fixed-bottom offshore (limited to water depths up to 50-60 metres)

At the Italian level the draft of the new National Energy and Climate Plan **bets massively on onshore technologies (98% of the renewables target by 2030)**, with a residual role for offshore

Floating offshore wind can unlock the Italian offshore wind potential: we are just getting started

- 99%** of the offshore wind capacity in EU-27 is represented by **fixed-bottom offshore technology**
- The development of the floating offshore wind technology can unlock potential in marine areas with deep waters**, where the **wind force is stronger** and the **environmental impacts lower**
- According to the Global Wind Energy Council, **Italy is the 3rd potential floating wind market in the world**

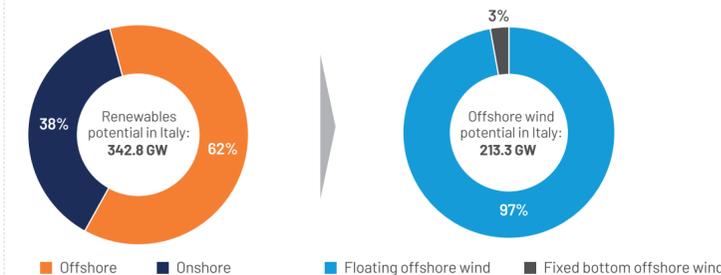


Figure 5. Renewables potential in Italy by typology (left chart, % values) and offshore wind potential in Italy by technology (right chart, % values). Source: The European House - Ambrosetti elaboration on Marine Offshore Renewable Energy Lab (MOREnergy Lab) and Politecnico di Torino, GWEC and NECP data and "Verso l'autonomia energetica italiana: acqua, vento, sole, rifiuti le nostre materie prime" by The European House - Ambrosetti and A2A, 2023.

- Offshore wind grid connection requests** in Italy increased **x19 times** between 2020 and 2023
- Out of the 100 GW of offshore wind connection requests, **14.4 GW (14% of the total, 17 plants)** have already **submitted both the EIA and the seabed concession (average size 850 MW)**

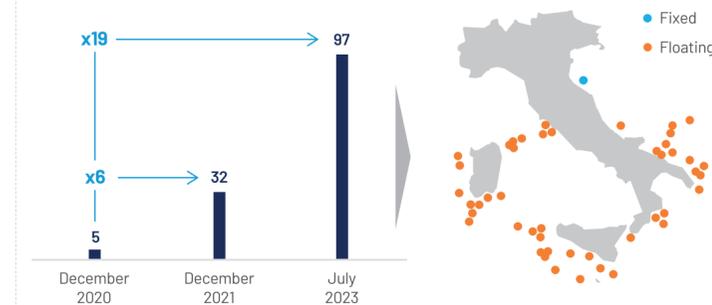


Figure 6. Submitted offshore wind grid connection requests in Italy (left chart, GW), December 2020, December 2021, July 2023, and offshore wind grid connection requests - plants with submitted seabed concession and/or EIA (right chart), 2023. Source: The European House - Ambrosetti elaboration on Terna data, 2023.

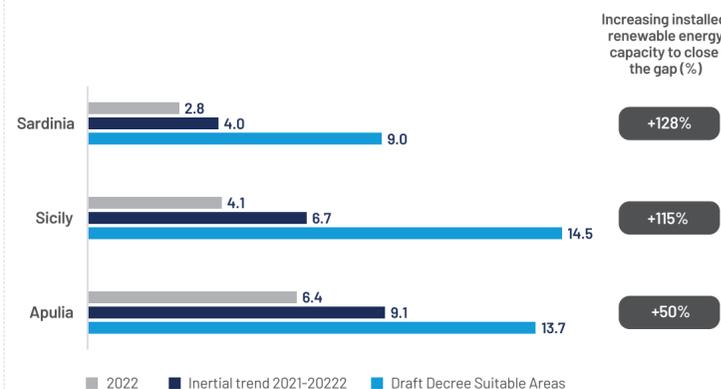


Figure 7. Historical and inertial trend of installed renewable energy capacity and comparison with policy objectives in the top-3 Italian Regions for floating offshore wind potential (GW), 2022 and 2030. Source: The European House - Ambrosetti elaboration on Terna and Draft Decree on Suitable Areas data, 2023.

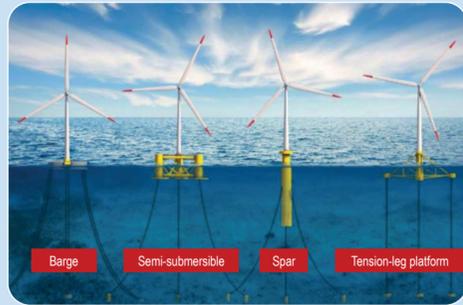
- Sardinia, Sicily and Apulia**, based on the 2021-2022 inertial trend, **will be lagging far behind the 2030 targets**. In particular, **Sardinia and Sicily are the Regions with the largest gap to close** (need to increase, respectively, by **+128%** and **+115%**, vs average **+60%** in Italy)
- These Regions have the highest floating offshore wind potential in Italy** and therefore can leverage on this technology
- However, from 2023 to 2030 according to the recent **Draft Decree Suitable Areas**, the newly installed offshore wind capacity will be counted up to a **maximum of 40%**, hence limiting the willingness to invest

Conceptual Map
COMMUNITY
Floating Offshore Wind

FLOATING OFFSHORE WIND PROJECTS WILL CREATE SIGNIFICANT DEVELOPMENT OPPORTUNITIES

Floating offshore wind turbines present key distinctive characteristics compared to traditional wind technology: **1) floating platforms, 2) shipbuilding, 3) port infrastructure**

1. FLOATING PLATFORMS



Just like in offshore Oil&Gas and fixed bottom offshore wind, **steel might be expected as dominant material for floating platform**
Italy is the **2nd largest steel producer in EU-27**



Figure 8. Top 10 EU Countries of crude steel production (million metric tons), 2022. Source: The European House – Ambrosetti elaboration on Eurofer data, 2023.

The Italian steel production plants can also leverage **on the lowest CO₂ emission intensity among the major economies (0.81 ton of CO₂ per ton of steel produced vs 1.99 in China)**

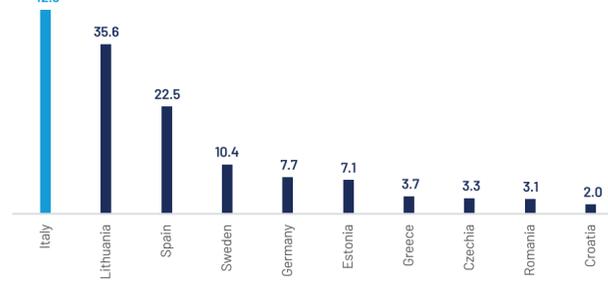


Figure 9. Top 10 Countries for production value of floating platforms in EU (million Euros), 2021. Source: The European House – Ambrosetti elaboration on ProdCom data, 2023.

To deploy floating offshore wind farms in Italy it is necessary to face some open questions



Regulatory framework

- Floating offshore wind target:** Italy has the **largest area of territorial waters in EU-27, but offshore wind target is the lowest** compared to other EU-27 Countries. It is necessary to identify a more ambitious target of, at least, **20 GW by 2050**
- Maritime Spatial Planning:** Italy lacks of a **strategic Maritime Spatial Planning (MSP)**, necessary to reconcile the different activities. Consistently with the goal of, at least, 20 GW by 2050, Marine Spatial Planning should **identify areas**, especially in the seas of **Sicily, Sardinia and Apulia**, that, for number and size, **will enable these developments**
- Permitting regime:** offshore wind projects need **longer development time**, including the supply chain and construction site organization activities. To shorten the permitting time, **stakeholder consultations and compensatory measures will be crucial**

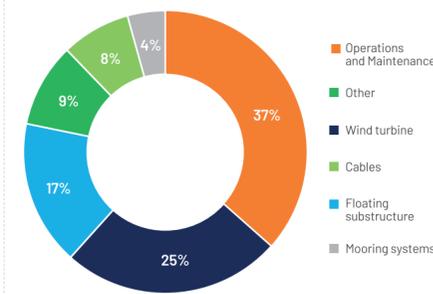
2. SHIPBUILDING



Within Europe, **Italy ranks 1st in the production of ships and vessels**, crucial especially during the **operations and maintenance phase**



Figure 10. Top 10 Countries by value of ships and vessels production in EU (billion Euros), 2021. Source: The European House – Ambrosetti elaboration on ProdCom data, 2023.



Specific support vessels are required to install, operate and maintain the floating turbines.
The ability to introduce innovation (drones, unmanned vehicles, etc.) will be crucial to reduce energy costs – it is estimated that **this stage is the most expensive of the life of a floating wind farm, weighing for 37% of total costs**

Figure 11. Total lifetime cost of a floating offshore wind farm by category (% values), 2023. Source: The European House – Ambrosetti elaboration on BVG Associates data, 2023.

3. PORTS



Ports are a key lever: unlike **bottom-fixed offshore wind** where the assembly and installation of turbines **happen at sea**, for **floating wind turbines most of these activities take place around ports.**
Ports are also essential for **installation and operations support**



Figure 12. The essential role of ports for the floating offshore wind technology (illustrative). Source: The European House – Ambrosetti elaboration, 2023.

- Even if there are **large and deep ports in proximity to potential offshore wind sites**, in Italy there is **no single port that currently meets all the requirements** necessary to deliver a floating offshore wind project
- To **upgrade/adapt** an existing port to meet all the requirements necessary to develop floating offshore wind farms, **hundreds of millions of Euros** are needed
- Developing Italian ports has **great economic value** (every Euro invested in port-related activities generates **2.8 Euros** for the national economy) and brings **development opportunities** (if proper adjustments are made, Southern Italy can become a **strategic hub in the Mediterranean** for offshore wind)



Incentive mechanism

- Investment cost:** the deployment of floating offshore wind is hindered by **CAPEX and OPEX costs**, even though in the medium-long term the cost competitiveness of floating offshore wind will be **more advantageous than that of fossil fuel sources** (the carbon price is expected to exceed 100 Euros per metric ton of CO₂ after 2026 and, as happened with other renewable energy sources, the **economies of scale** and **industrialization** that will result from project implementation will lead to a **major reduction in the Levelized Cost of Electricity**). To further incentivize this technology in the short-term, it is necessary to have an **economic incentive scheme**. However, the measure that contains incentives for less competitive renewable sources, such as floating offshore wind, **has not yet been approved in Italy** (a draft version of the subsidy scheme "FER 2" was published in August 2022). Moreover, the measure should consider **bigger volume and indexation of the Contracts for Differences price**, as a normal practice in the more developed offshore markets



Physical constraints

- Power grid capacity:** future deployment of floating offshore wind will depend on the **capability of the grid to transport electricity from South to North** (first center of electricity consumption in Italy, 50% of the total).
 - Sardinia: **20 GW** of connection requests for offshore wind vs **3.5 GW** of grid capacity in exports by 2030
 - Sicily: **25 GW** of connection requests for offshore wind vs **6 GW** of grid capacity in exports by 2030
 - Apulia: **29 GW** of connection requests for offshore wind vs **14 GW** of grid capacity in exports by 2030

Italy has a great technical, economic and employment potential in floating offshore wind and can therefore have a role of industrial leadership

Technical potential

Taking into consideration the main **technical limitations** (wind speed, bathymetry, distance from the coast, maritime traffic, protected areas, military zones, Exclusive Economic Zones), **the potential of floating offshore wind in Italy is:**

Capacity 207.3 GW
(x3.4 renewables installed capacity in 2022)

Generation 540.8 TWh/a
(x1.7 electricity demand in 2022)

Source: The European House – Ambrosetti elaboration on Marine Offshore Renewable Energy Lab (MOREnergy Lab) and Politecnico di Torino, 2023.



Economic potential

Floating offshore wind energy production activates **5 key sectors** of the Italian economy: **construction materials, metal products, advanced mechanics, ships and vessels, electrical equipment**

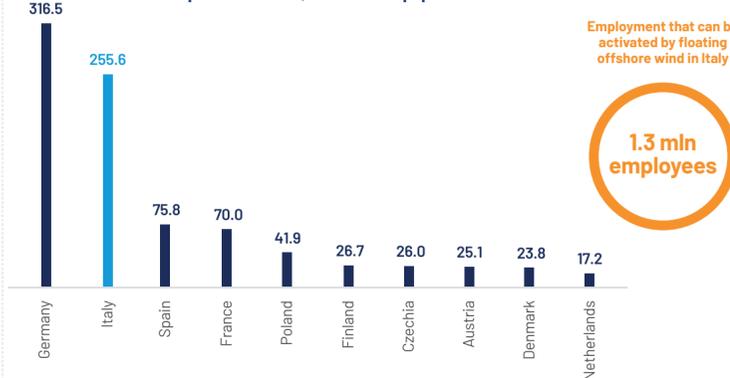


Figure 13. Top 10 Countries by value of sectors activated by floating offshore wind energy in Europe (billion Euros). Source: The European House – Ambrosetti elaboration on ProdCom data, 2023.

Employment that can be activated by floating offshore wind in Italy
1.3 mln employees

The virtuous role of the industrial system in the decarbonization pathway

The contribution of Acciaierie d'Italia

- DECARBONIZATION COMMITMENT:** The increase in energy consumption associated with the electrification of production processes will require the availability of new renewable energy sources in order to support the transition of the Taranto plant towards a progressive decarbonisation. In this sense, Acciaierie d'Italia has already embarked on a transition pathway towards the use of renewable energy sources, aimed at guaranteeing the sustainability of the electrification of processes
- RENEWABLE ENERGY DEVELOPMENT:** Through investments in the photovoltaic and wind energy sectors, and in line with the European Directives in the REpowerEU area, Acciaierie d'Italia intends to promote and support the development of large-scale power plants, which will be key to accelerate the energy transition and progressive independence from fossil fuels. Specifically, Acciaierie d'Italia aims to encourage the development of large floating offshore wind farms within the Mediterranean Sea. Offshore wind energy will contribute to reducing the carbon footprint of steelmaking by decreasing CO₂ and emission factors associated with it, therefore creating a virtuous circle
- TECHNOLOGY MANUFACTURING:** The Taranto steelworks is currently providing structural steel plates for onshore wind farms; substantial investments aimed at upgrading the production line dedicated to high-strength, thick plates for floating offshore platforms and large infrastructure have been planned. For this reason, the contribution of structural steel components supplied by the Taranto plant will be crucial for the development of floating offshore platforms. Through the Taranto plant, Acciaierie d'Italia aims to play a critical role for the production of sustainable steel for floating offshore platforms, taking advantage of both the ongoing decarbonization projects and its strategic, central position within the Mediterranean Sea
- KNOW-HOW PROVIDER:** Acciaierie d'Italia also intends to involve and utilise the technical skills held by related businesses within the industry, with the overarching aim to promote the development of the supply chain for the production of components to be used for marine wind technology

A final consideration: Oil&Gas experience could help accelerate first generation of floating wind turbines in Italy, in a context in which **Italy has the highest number of offshore Oil&Gas installations in the Mediterranean**