Institute for Energy Economics and Financial Analysis

Briefing Note

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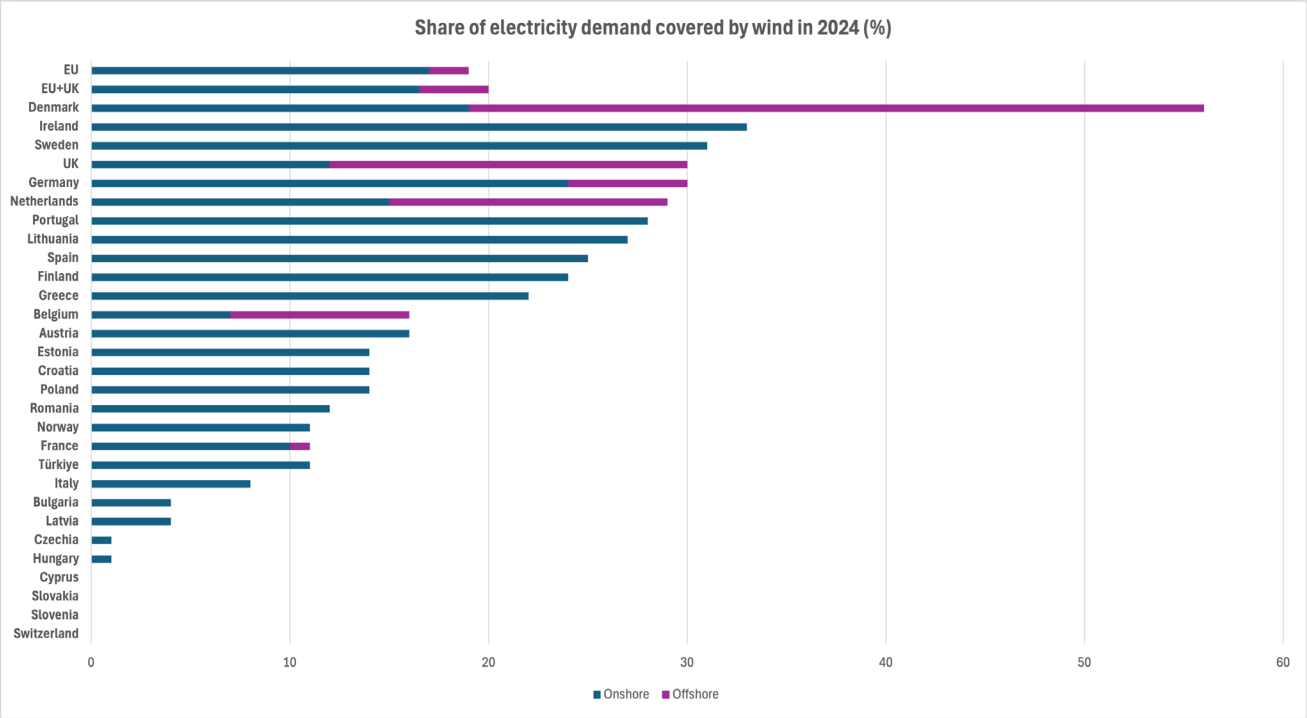
Unlocking France's Offshore Wind Potential

- *Despite its considerable potential, France has been very slow in building offshore wind power, lagging far behind its North Sea neighbours.*
- *The main hurdles have been lengthy administrative procedures, legal challenges and local stakeholder opposition.*
- *Since 2022, France has started to catch up by commissioning its first offshore wind parks.*
- *Offshore wind will be the critical technology to fill the void left by the looming closure of many of France's nuclear plants.*

The renewable energy transition is a critical component of global efforts to combat climate change. Offshore wind power has emerged as a key technology in this shift. Renewables make sense economically (they are at grid power parity in Northwest Europe), from a security of supply angle (no dependence on imported fuels) and from a climate neutrality perspective since they don't emit greenhouse gases.

Countries such as the UK, Germany, Denmark, Belgium and the Netherlands have made significant strides in developing offshore wind farms, establishing themselves as leaders in this sector. France, however, has lagged behind its neighbours in the development of offshore wind, despite having substantial potential due to its extensive coastline and favourable wind conditions. The reasons for France's slower progress in this sector are numerous but do not justify underutilising a technology that can partially replace its ageing fleet of nuclear power stations.

Figure 1: Wind Share of Electricity Demand Across Europe (%), 2024



Source: Wind Europe

As Figure 1 shows, France has a very low share (11%) of its electricity demand covered by wind power; offshore wind is just 1%. That places France far below its Northwest European neighbours.

France's Offshore Wind Tenders and Capacity Growth vs North Sea Countries

Since 2011, France has carried out numerous tenders to develop offshore wind, but so far projects from only one tender round have started operations (Table 1).

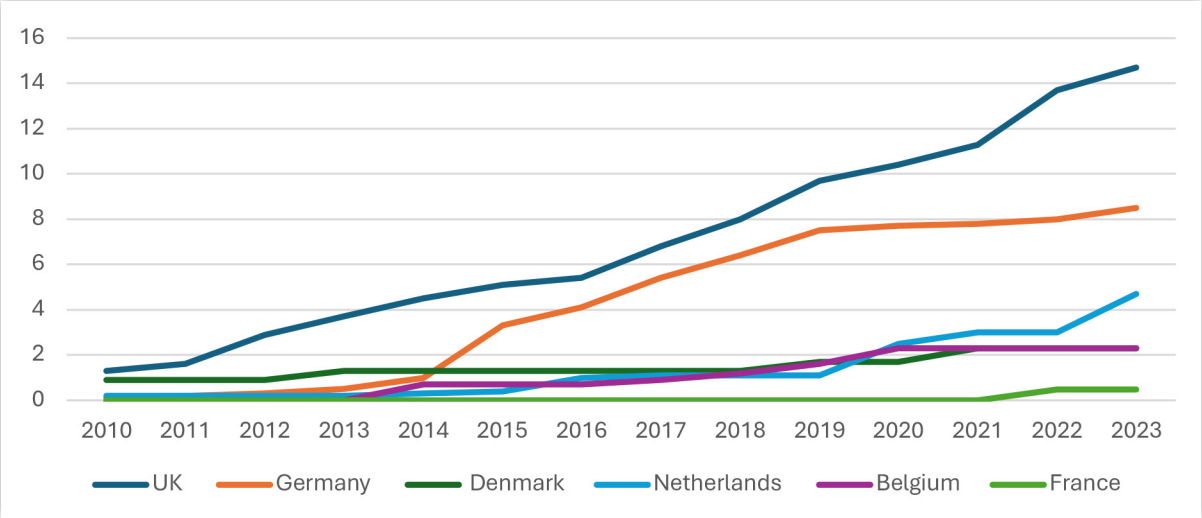
Table 1: France's Offshore Wind Tenders, Capacities Awarded and Project Status

Call for tender	Launch date	Award date	Expected commissioning	Total capacity	Location	Current status
AO 1	Jan-11	Apr-12	2022-2024 (1.5 GW), 2026 (500 MW)	2 GW	North Atlantic, North Sea Channel	500 MW completed in 2022 and 1 GW in 2024; 500 MW under construction
AO 2	Mar-13	May-14	2026	1 GW	North Sea Channel	Under construction
AO 3	May-16	Jun-19	2028-2032	600 MW	North Sea Channel	Feasibility studies and licence application
AO 4	Apr-21	Mar-23	2032	1.05 GW	North Sea Channel	Feasibility studies and licence application
AO 5	Oct-21	May-24	2031	250 MW	Britanny South	Feasibility studies and licence application
AO 6	Jun-22	Dec-24	2031	500 MW	Mediterranean	Feasibility studies and licence application
AO 7	2022	2026	2032	1.2 GW	South Atlantic	Workshop dialogue with potential bidders
AO 8	2022		2034	1.5 GW	North Sea Channel	Workshop dialogue with potential bidders
AO 9	2024		2032	550 MW	Extension of AO 5, 6 and 7	In public debate

Source: French Directorate General of Energy and Climate

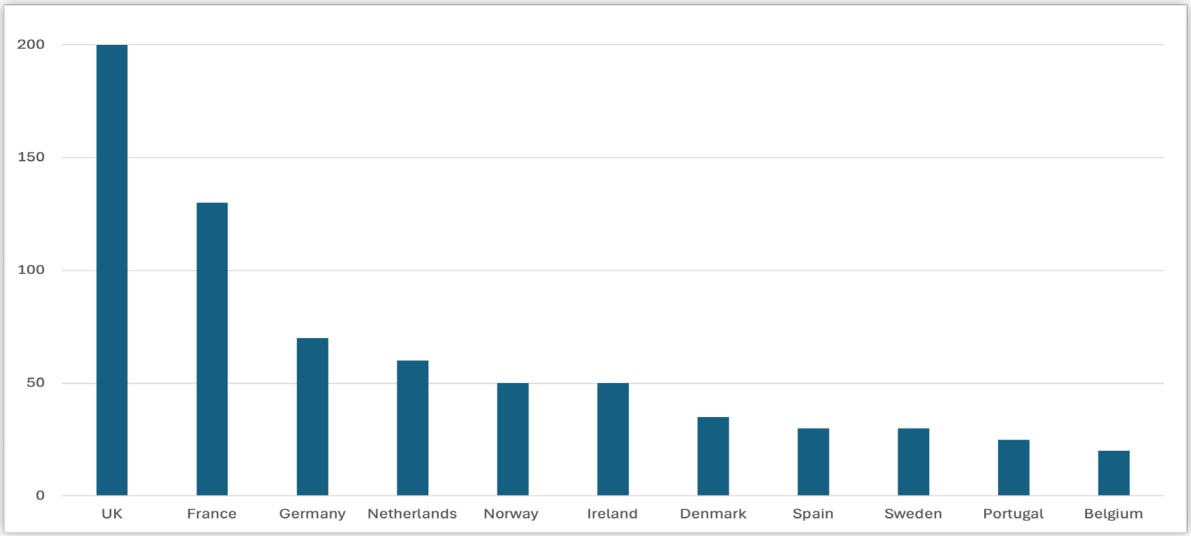
As Table 1 shows, only 1.5 gigawatts (GW) of the 8.65 GW of capacity awarded or due to be awarded in tenders is operational. It took the winning bidders 10 years to install the first 500 megawatts (MW) and a further two years for the next gigawatt. Surprisingly, this delay is not due to construction lead time or technology (the first projects employ more advanced seabed technology instead of the more challenging floating option). It is instead largely an aggregation of administrative delays, legal challenges and fierce opposition (for example, from fishing and tourism industries, and local communities).

Figure 2: France's Installed Offshore Wind Capacity vs North Sea Countries (GW)



Sources: Wind Europe, Enwind

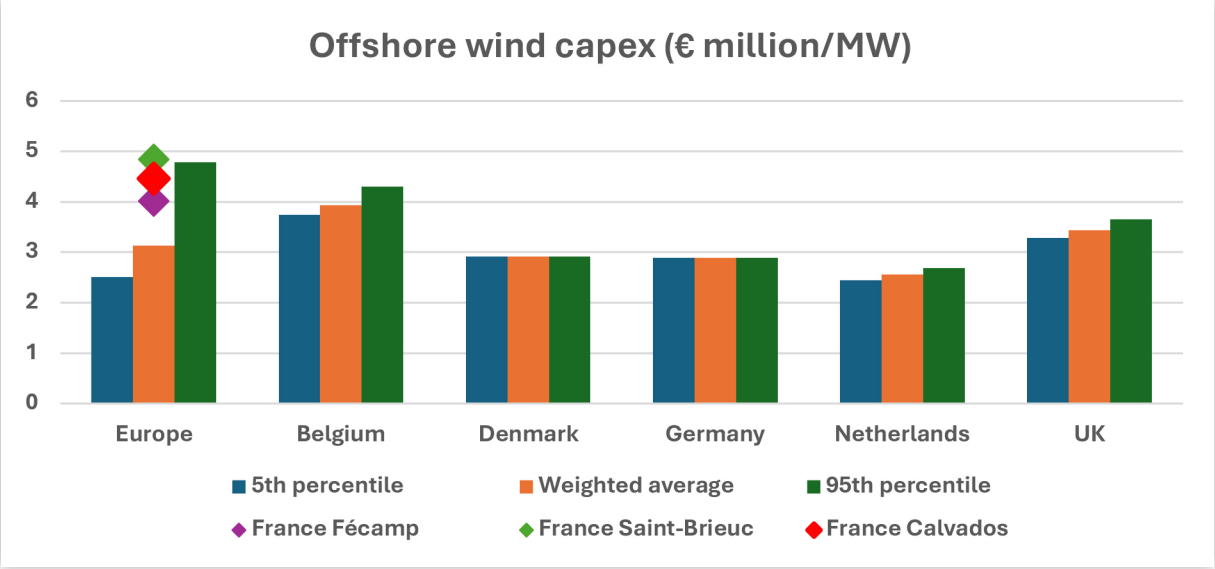
Figure 3: European Countries With Highest Potential Offshore Wind Power Capacity (GW)



Source: Wind Europe
Note: Includes fixed and floating wind power generation

Despite having the second-largest offshore wind power capacity potential in Europe, France languishes in sixth by operational capacity, far behind countries with much less potential, such as Germany and the Netherlands. North Sea countries grasping the importance of wind in the energy transition, and streamlined administrative processes, partly explain why France's neighbours took such an advanced lead.

Figure 4: France's Offshore Wind Park Investment Costs Among the Highest in Europe



Sources: International Renewable Energy Agency for Europe, Enbridge for Calvados, European Investment Bank for Fécamp and Iberdrola for Saint-Brieuc [1, 2, 3, 4]

Capital expenditure (capex) for offshore wind farms is typically €3-5 million/MW, depending on factors including site-specific conditions, technology and market dynamics.

Countries with established supply chains and favourable site conditions, such as the UK and Denmark, often achieve lower capex figures within this range.

France's first three offshore wind parks have capex costs at the high end of the range (despite being based on the more advanced seabed technology), highlighting the need to reduce supply chain logistics costs and achieve economies of scale.

Barriers to Offshore Wind Uptake in France

There are multiple reasons offshore wind has not yet reached its full potential in France. These explain, but do not justify, why France lags its neighbours in the deployment of this technology and should be resolved to ensure the country's long-term energy security.

Regulatory and Administrative Challenges

One of the primary reasons for the slow development of offshore wind in France is the complex and lengthy regulatory and administrative processes. The French permit system for offshore wind is long and bureaucratic, involving multiple layers of approval from various government agencies. This has caused significant delays in project implementation. For example, France launched its first offshore wind tender in 2011, but as of 2021, not a single turbine was operational. In contrast, countries such as the UK and Germany have streamlined their approval processes, enabling faster project development.

Public Opposition and Legal Battles

Public opposition and legal challenges have also hindered the progress of offshore wind projects in France. Local communities, environmental groups and the fishing industry have raised concerns about the visual impact of wind turbines, potential harm to marine ecosystems and disruptions to fishing activities. These concerns have led to numerous legal battles, further delaying projects. In countries such as Denmark and the Netherlands, there has been greater public acceptance of offshore wind projects, partly due to effective community engagement and compensation mechanisms.

Focus on Nuclear Energy

France's energy policy has historically been dominated by nuclear power, which accounts for about 75-80% of the country's electricity generation. This heavy reliance on nuclear energy has reduced the urgency to invest in renewable energy sources, including offshore wind. Meanwhile, neighbouring countries have added significant wind power capacity and diversified their energy mixes. There is a lack of political and financial support for wind power in France, where nuclear energy has traditionally provided the vast majority of the country's power load. This ignores the many challenges facing nuclear power (such as safety, costs, and long lead and construction times) and the fact that most of France's reactors will reach the end of their operational lifetimes in the next decade.

Industrial and Infrastructure Limitations

Offshore wind development requires specialised infrastructure, such as port facilities and installation vessels, and a skilled workforce. France has been slower to develop this industrial ecosystem than its neighbours. For instance, the UK and Germany have invested heavily in building a robust supply chain for offshore wind, including manufacturing facilities for turbines and components. France, on the other hand, has faced challenges in scaling up its offshore wind industry, which has contributed to delays in project execution.

Financial and Investment Barriers

Offshore wind projects require significant upfront capital investment, and financing has been a challenge in France. While neighbouring countries have benefited from stable policy frameworks and incentives that attract private investment, France has struggled to provide the same level of certainty for investors. Additionally, the high costs associated with overcoming regulatory hurdles and legal challenges have made France's offshore wind projects less financially attractive than other European countries.

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Geographical and Environmental Considerations

France's coastline presents unique geographical and environmental challenges that have slowed the development of offshore wind. The Mediterranean Sea, for example, has deeper waters and lower wind speeds than the North Sea, where many of the UK's and Germany's offshore wind farms are located. These conditions require more advanced and costly technology, such as floating wind turbines, which are still in the early stages of commercialisation. These technology gaps particularly affect tenders 5 and 6, in South Brittany and the Mediterranean, respectively.

Commissioning of France's First Three Offshore Wind Parks a Step in the Right Direction

France's first large-scale offshore wind farm – at Saint-Nazaire off the west coast – was commissioned in 2022, 10 years after operator EDF won the tender. It features 80 turbines with a total capacity of 480 MW. Fécamp wind farm off the north-west coast was inaugurated in May 2024. It has 71 turbines and a total capacity of 497 MW. The third project, Saint-Brieuc in Brittany, was also commissioned in May 2024, with 62 turbines and a combined capacity of 496 MW. This brings France's total operational wind capacity to 1.5 GW. Three additional parks, totalling 1.5 GW, are in the early stages of construction and are not expected to be commissioned before 2026.

Under an optimistic scenario, France could have 3 GW of operational offshore wind by 2027, the equivalent capacity of just two European Pressurised Reactors. France has 58 operational nuclear reactors.

While this momentum is encouraging after years of delays, progress could stall again. The 2.4 GW of capacity awarded in tenders between 2019 and 2022 is not expected to be commissioned until 2028-2032, as projects are still at the feasibility study stage. France's lengthy, complex licence application procedures are again responsible for the long lead times.

IEEFA recommends France makes the following actions an urgent priority:

- Streamline the licensing process. It could take a similar approach to the Netherlands Enterprise Agency,[5] which acts as the coordinating administrator (one-stop shop) under the country's Ministry of Economic Affairs and Climate Policy.
- Shorten the timeframe for legal challenges to the award of tenders.

If it fails to accelerate deployment, France might have only 3 GW of operational offshore wind capacity by 2032, far below the government's 18 GW target by 2035,[6] meaning the technology would play a limited role in replacing nuclear reactors that will need to be decommissioned.

Offshore Wind Can Partially Replace France's Ageing Nuclear Fleet

France's nuclear fleet is ageing, and most of its reactors will have reached their planned 40-year operational lifetime by 2030. Despite this, nuclear power remains a key obstacle to the country's development of renewables, especially offshore wind. The fundamentals explaining this include:

- **Energy market saturation:** France already generates 75-80% of its electricity from nuclear power. This leaves little room for offshore wind as the grid is already supplied with a stable, low-carbon energy source.
- **Government priorities and investment:** The French government has prioritised extending the lifespan of existing nuclear reactors and developing new ones (through the European Pressurised Reactor 2 programme). This diverts financial resources and policy focus away from offshore wind.
- **Grid constraints:** France's electricity grid is designed around centralised nuclear plants, making it less adaptable to the variable nature of offshore wind. Upgrading the grid to integrate large-scale offshore wind requires major investments.
- **Low electricity prices from nuclear:** The relatively low cost of existing nuclear energy in France makes offshore wind less competitive financially. Since nuclear already provides cheap, stable power, there is less urgency to rapidly expand offshore wind capacity.

However, these arguments ignore the void left when France's 58 nuclear reactors are decommissioned without being fully replaced (the government's most optimistic scenario will see 14 new nuclear reactors built by 2050).

To prevent nuclear energy from hindering offshore wind development in France, IEEFA recommends the following measures:

Develop a Nuclear Phase-Down Plan With Offshore Wind as a Pillar

When ageing nuclear plants are phased out (after having their lifetimes extended), the government should create a structured transition plan that prioritises offshore wind and other renewables to meet the load. Hybrid energy solutions should also be promoted more actively, such as pairing offshore wind with green hydrogen production (as planned in the Netherlands)[7] or battery storage to ensure reliability.

Invest in Grid Adaptation

France's transmission system operator should develop a modernised, smarter and more flexible grid that can handle intermittent renewables. It should also strengthen links with neighbouring countries to allow surplus wind power exports when needed.

Reform Market Regulations

Ensuring a fair market to prevent nuclear power from receiving preferential treatment should be a priority, so offshore wind can compete on a level playing field. Nuclear should cease to have priority access to the grid and should not be granted a preferential feed-in tariff. (Under France's Regulated Access to Historic Nuclear Electricity mechanism, 100 terawatt-hours a year of nuclear power can be purchased by operators at a fixed price.)[8]

The next step would be to make renewables eligible for capacity mechanism payments. Currently, only thermal, nuclear and hydropower can receive capacity payments. Intermittent renewables are denied access since their firm capacity is 0% by definition. The Capacity Remuneration Mechanism should be based on the nameplate capacity of renewable projects rather than firm capacity to avoid technology discrimination.

Diversify Energy Investments

Offshore wind projects should be made more attractive to investors through stable policies and incentives. This can be achieved by reallocating funding to reduce excessive nuclear subsidies (such as capacity payments and preferential nuclear feed-in tariffs) and redirecting public investment to offshore wind and renewable infrastructure.

Conclusion

Europe, especially France and the UK, has vast offshore wind resource, with the potential to meet a large portion of its energy needs through this renewable source.

France has made progress in offshore wind development, but the pace has been slower than anticipated. As of 2024, only about 1.48 GW of the 8.65 GW of offshore wind capacity awarded or due to be awarded in tenders is operational, with most projects still under construction or in the planning phase.

France's offshore wind development has been hampered by a combination of regulatory inefficiencies, legal and technical challenges, public opposition, a historical focus on nuclear power, industrial limitations and financial barriers. To catch up with its neighbours, France must address these issues by streamlining regulatory processes, improving stakeholder engagement, diversifying its energy policy, investing in infrastructure and creating a more favourable investment climate. By doing so, France can unlock the full potential of its offshore wind resources and contribute more effectively to the global renewable energy transition.

For France to succeed in its transition from a nuclear-dominated power mix to a more balanced system with significant renewables baseload, it will require a steep acceleration in solar and wind capacities. Of these, offshore wind is the key technology that can be deployed at gigawatt scale in the next decade. Encouraging progress has been made since 2022. To maintain this momentum, French energy authorities must now provide stronger support to help fast-track offshore wind development.

Endnotes

1 International Renewable Energy Agency. Renewable power generation costs in 2023. 2024.

2 Enbridge. EDF Renewables, Enbridge and wpd launch construction of the Calvados offshore wind farm. 22 February 2021.

3 European Investment Bank. France: Investment Plan - EIB co-finances the construction of an offshore wind farm in Fécamp for €450 million. 5 June 2020.

4 Iberdrola. Saint-Brieuc: Iberdrola's first large-scale offshore wind power project in Brittany.

5 Netherlands Enterprise Agency. Dutch Offshore Wind Guide. 2022.

6 French Energy Ministry. Stratégie française pour l'énergie et le climat. November 2024.

7 OranjeWind. Project information.

8 French Energy Regulatory Commission. Accès régulé à l'électricité nucléaire historique (ARENH). 17 December 2024.

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The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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Jonathan Bruegel is a Power Sector Analyst for IEEFA's Europe team. Before joining IEEFA, Jonathan worked more than 20 years in the energy sector and became an expert on power markets worldwide, working for several power generation utilities. His fields of expertise are conventional/renewable power generation, power storage, hydropower optimization, power market ancillary services, green hydrogen and LNG.

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