



Latest wind energy data for Europe

Wind[°]
EUROPE

Autumn 2024

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DISCLAIMER

This report summarises new installations and financing activity in Europe's wind farms from 1 January to 30 June 2024.

It also provides an update on the analysis from December 2023 of how European markets will develop in the next years (2024 to 2030). The outlook is based on WindEurope internal analysis and consultation with its members.

The data represents gross installations per site and country unless otherwise stated. Rounding of figures is at the discretion of the author.

This publication contains information collected on a regular basis throughout the year and then verified with relevant members of the industry ahead of publication. Neither WindEurope, nor its members, nor their related entities are, by means of this publication, rendering professional advice or services. Neither WindEurope nor its members shall be responsible for any loss whatsoever sustained by any person who relies on this publication.

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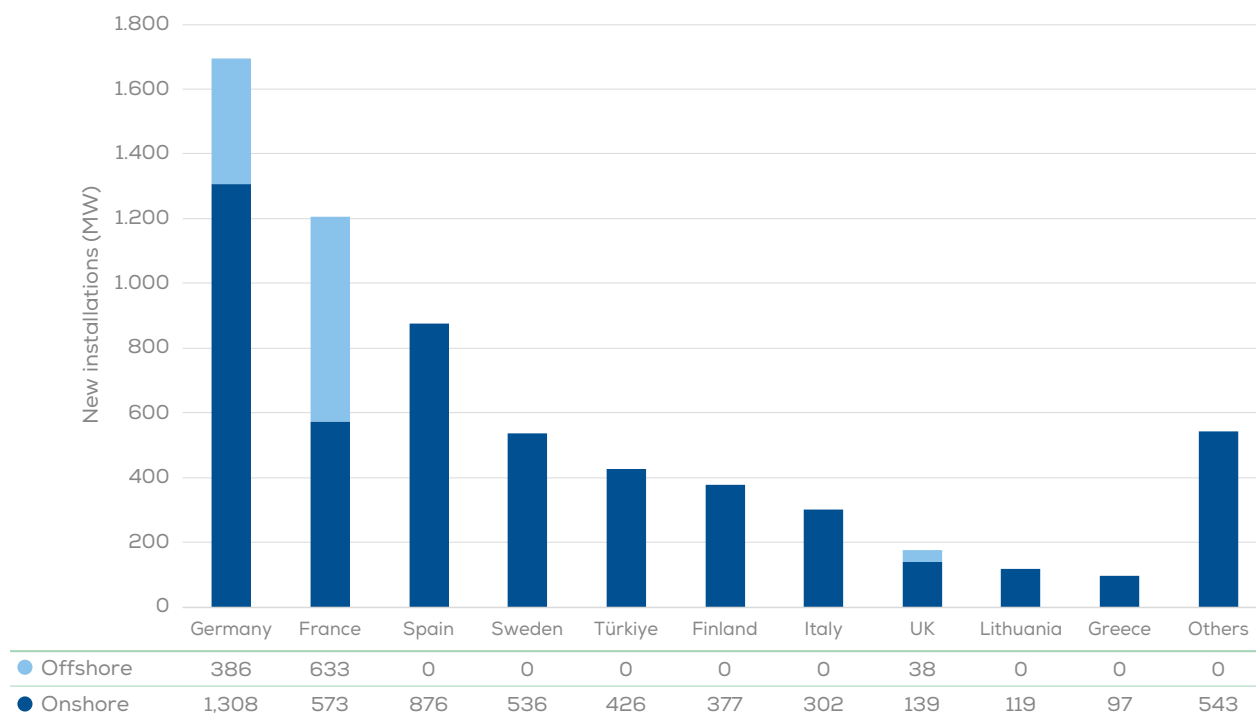
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Executive summary

EUROPE NOW HAS
278 GW
 OF WIND CAPACITY

FIGURE A. New onshore and offshore wind installations in Europe in H1 2024



Source: WindEurope

As the new European Parliament and Commission take office following the EU elections in June, this autumn update outlines the latest data for wind energy in Europe and our expectations for the rest of the decade.

Europe installed 6.4 GW of new wind power capacity in the first half of 2024. 5.7 GW of these were in the EU-27.

83% of the new capacity was onshore.

Germany built the most wind energy in H1 2024 (1.7 GW), followed by France (1.2GW) and Spain (876 MW).

Europe now has 278 GW of wind power capacity. 242 GW of this is onshore and 35 GW offshore. The EU now has 225 GW of wind power capacity: 205 GW onshore and 20 GW offshore.

Europe ordered 9.5 GW of new wind turbines in H1 2024. This was 11% up on H1 2023. The 9.5 GW breaks down to 7.4 GW onshore and 2.1 GW offshore.

Europe took €15.4bn of final investment decisions (FIDs) in new wind farms in H1 2024. This is less than 30% of the total investment in 2023. There were only three investments in offshore wind farms in the first half of 2024.

Europe’s Governments awarded 19.7 GW of wind power capacity in auctions in H1 2024: 6.5 GW onshore and 13.2 GW offshore. This is already 72% of what they awarded in the whole 2023.

Onshore wind permitting volumes are improving. Of the 5 countries for which data is available in 2023 and H1 2024, the volume of new permits awarded in H1 2024 is already 2/3 of the entire 2023 volumes.

New installations in H1 2024 are slightly less than we had expected. We therefore expect the total figure for new installations this year to come in below our original expectations, and to be slightly less than 2023.

With the increase in turbine orders, auction volumes and new permits awarded we now expect the EU to build 22 GW of new wind farms a year on average over the period 2024-2030.

To meet its 2030 climate and energy targets the EU now needs to build 33 GW a year on average.

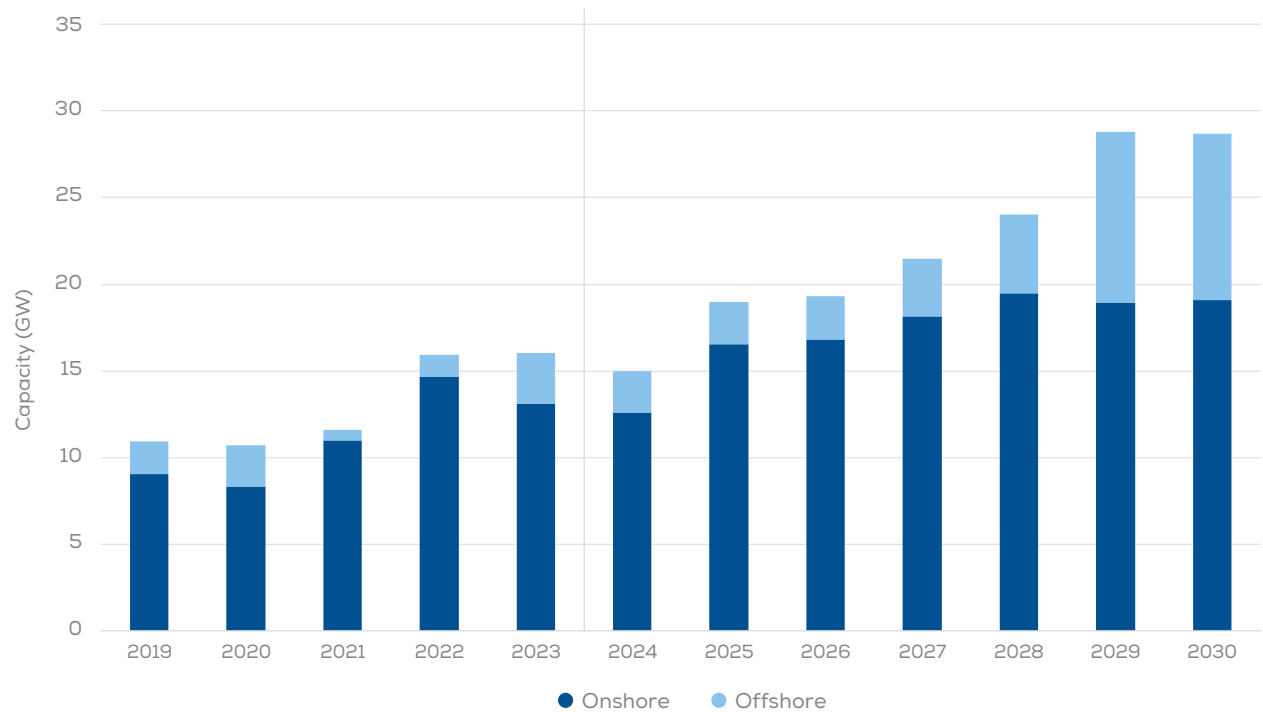
Grid bottlenecks, continued issues with permits in many countries and challenging financial conditions all mean that wind energy is expanding less quickly than Governments want.

Restrictions in grid capacity, port capacity and vessel availability are also hindering the expansion of offshore wind.

We now expect the EU to have 350 GW of wind energy capacity by 2030: 296 GW onshore; 54 GW offshore. The EU target is 425 GW¹.

1. 2030 REPowerEU target reduced from 440 GW after the compromise of a 42.5% renewable energy target for 2030 was reached in 2023

FIGURE B. 2024-2030 annual wind power installations in the EU



Source: WindEurope

The project pipeline is healthy and we expect a continued strong build-out beyond 2030. But Governments must prioritise the expansion and modernisation of electricity grids, investments in port infrastructure and the full implementation of the EU’s new permitting rules

H1 2024 figures

- Europe installed 6.4 GW of new wind power capacity in H1 2024 (gross installations). Onshore wind made up 83% of new installations for a total of 5.3 GW.
- 5.7 GW of the new capacity was installed in the EU-27. 81% of this was onshore (4.7 GW).
- New offshore wind installations in Europe were 1.1 GW.
- Germany installed the most wind power capacity in H1 2024 (1.7 GW). 77% of that was onshore.
- France (1.2 GW), Spain (0.9 GW) and Sweden (0.5 GW) came next.

Total installed capacity

- Europe now has 278 GW of installed wind power capacity: 243 GW onshore and 35 GW offshore.
- The EU-27 has 225 GW installed wind capacity: 205 GW onshore and 20 GW offshore.

Market developments

- Onshore wind permitting volumes were up in H1 2024. Recorded volumes are already 2/3 of the total volumes in comparable markets last year.
- Europe's Governments awarded 19.7 GW of wind energy in auctions in H1 2024: 6.5 GW for onshore wind and 13.2 GW for offshore wind.
- Total investments from "Final Investment Decisions" (FIDs) in new onshore and offshore wind farms amounted to more than €15.4bn. These investments will finance 9.1 GW of new wind power capacity.
- Wind turbine orders in Europe were up 11% compared with H1 2023. Firm orders of 9.5 GW were recorded, including 7.4 GW for onshore turbines and 2.1 GW for offshore turbines.
- Turbine orders in the EU-27 were up 33% on H1 2023 orders at 8.9 GW.

2024-2030

- We now expect Europe to install 207 GW of new wind power capacity over 2024-2030. The EU-27 should install 156 GW of this – 22 GW a year on average.
- This will give the EU 350 GW of wind energy capacity by 2030: 296 GW onshore and 54 GW offshore. This compares with 225 GW total wind capacity today in the EU: 205 GW onshore and 20 GW offshore.
- The EU needs to build 33 GW a year on average to meet its 2030 climate and energy targets.
- Electricity grids are now the main bottleneck to the build-out of wind energy. Grids are not being expanded or modernised fast enough.
- The grid issues are partly about permitting and supply chains. They are also partly about incentives and business models for grid investments. Grid operators also need to start filtering the huge volumes of grid connections they now get.
- Europe also faces bottlenecks in the offshore wind value chain which threaten to compound the grid issues. For example, port capacity is not expanding fast enough, and there are issues around the availability of installation vessels.

Wind power in H1 2024

1.1 Overview

In the first half (H1) of 2024, Europe added 6.4 GW of new wind energy capacity: 5.3 GW onshore and 1.1 GW offshore. In the EU-27, 5.7 GW were added: 4.7 GW onshore and 1 GW offshore.

Germany, France and Spain alone installed 3.8 GW, 60% of Europe’s installations, including 1 GW of offshore wind capacity in Germany and France.

In the previous outlook from our 2023 Statistics and Outlook for 2024-2030 report, we anticipated 21 GW of new capacity to be installed in 2024. The half-year installations amount to just 30% of the anticipated figure.

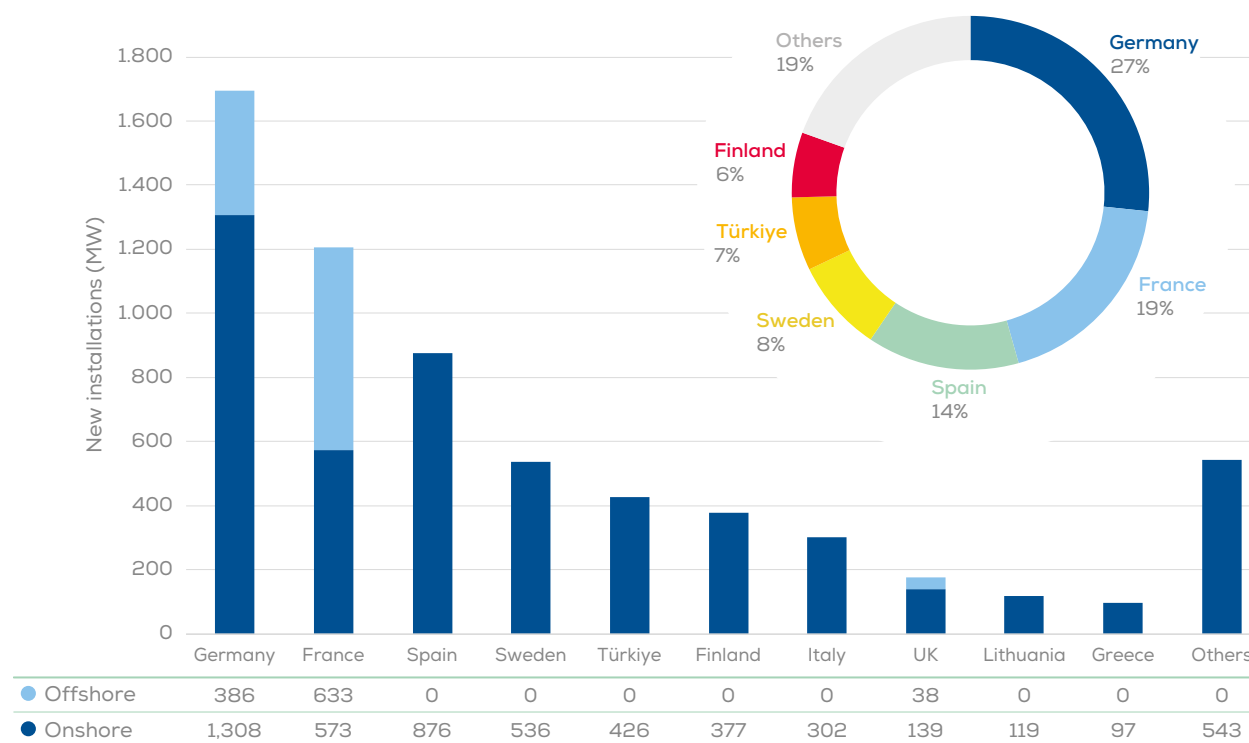
Installations are not carried out at an even or consistent rate throughout the year, however. Offshore wind installations in particular are dependent on weather conditions. Over the last ten years, on average more offshore wind construction work has taken place in the second half of the year compared with the first.

Despite this uncertainty, we have revised our outlook for 2024. In particular we have accounted for delays during the construction of the 1.2 GW Dogger Bank A offshore wind farm in the UK which only installed 38 MW in H1. The reasons for the delays have not been disclosed, but we expect the wind farm to be fully commissioned in 2025. Chapter 3 looks at the onshore and offshore outlook in more detail.

Our new forecast for installations in Europe in 2024 is 19 GW, down from 21 GW.

Therefore, we expect 13 GW of installations in the second half of the year. In the EU, we expect 9 GW of installations during the same period.

FIGURE 1. New onshore and offshore wind energy installations in Europe in H1 2024



Source: WindEurope

1.2 Onshore installations

Installations of new onshore wind capacity in Europe were 5.3 GW in H1 2024 – Europe installed 14.4 GW of new onshore wind in 2023. Onshore wind energy installations do not tend to be evenly distributed across the year. Often, the installed capacity in the first six months the year is less than the capacity installed in the last six months of the same year. Finland, for instance, installed around 1/3 of its respective annual figure for onshore wind in H1 2022 and 2023, with the remaining 2/3 installed in the second half (H2) of the year. In Germany, installations in H1 2022 and H1 2023 were 41% and 44% of the annual installations respectively. More examples are given in Table 1 below.

Germany installed the most onshore wind energy capacity in H1 2024 with just over 1.3 GW. The newly installed capacity came from 250 wind turbines with an average power rating of 5.2 MW, up from 4.8 MW in 2023. 379 MW of onshore capacity was decommissioned bringing the net additions to 929 MW. Onshore installations in H1 2024 dropped 16% compared with the same period last year.

Installations were particularly delayed in May and June due to the partial shutdown of the A27 freeway in northwest Germany, which is a crucial route for rotor blades entering the country through the port of Cuxhaven. Germany is expected to add another 2.7 GW of new onshore wind power facilities in H2 to reach 4.0 GW by the year's end. This would mean that Germany installed 33% of its expected annual figure during H1 2024.

Spain installed the second largest onshore wind energy capacity in H1 2024, with 876 MW. This came from 217 turbines, making the average newly installed turbine 4 MW, up from 3.8 MW in 2023. Spain has already exceeded the entire onshore wind installation figure for 2023, when it installed 762 MW.

The country also decommissioned 78 MW of onshore wind in H1, bringing net additions to 798 MW. We expect 1.8 GW of onshore wind energy installations in Spain in 2024, meaning that 49% of the expected amount was installed during the first half of the year.

France added the third largest onshore wind energy capacity in H1 2024, with 573 MW. That is 20% less than in H1 2023, when it installed 713 MW, an exceptionally high value compared with previous years. The H1 2024 installations included 187 turbines, resulting in an average power rating for newly constructed onshore wind turbines of 3.1 MW, slightly above the 2.8 MW average seen in 2023.

Stringent height restrictions in the French market limit the power ratings of installed turbines, leading to one of the lowest averages of newly installed turbine power ratings in Europe and limiting the potential benefits of onshore wind.

The country also dismantled 7 MW in H1 2024, bringing total net additions to 566 MW. We expect 1,140 MW of onshore wind energy installations in 2024, meaning that during the first half of 2024 France installed 50% of the expected total amount.

Sweden installed the fourth largest volume of onshore wind energy in H1 2024, with 536 MW spread across 87 turbines, making the average power rating of newly installed turbines 6.2 MW. This compares with almost 1,089 MW installed in H1 2023. Sweden is a purely merchant market, so installations are not influenced by wind energy auction schedules as is the case in other European countries. The country also decommissioned 4 MW of onshore wind, taking net additions in H1 2024 to 532 MW. Our outlook for Sweden forecasts a total 1.1 GW of onshore wind energy installations for 2024 meaning that during H1 2024, Sweden installed 49% of the forecast amount.

TABLE 1. Onshore wind installations by half-year in 2022 and 2023 for selected countries

Country	Onshore wind installations			
	H1 2022	H2 2022	H1 2023	H2 2023
Finland	784 MW	1,646 MW	439 MW	839 MW
France	615 MW	976 MW	713 MW	520 MW
Germany	977 MW	1,426 MW	1,565 MW	2,002 MW
Greece	83 MW	148 MW	253 MW	291 MW
Sweden	645 MW	1,681 MW	1,089 MW	884 MW

Türkiye installed the fifth-largest volume of onshore wind energy in H1 2024, with 426 MW. This capacity was comprised of 78 turbines giving an average power rating for newly installed turbines of 5.5MW.

The installed capacity in H1 2024 has already exceeded the wind installations for 2023, which were 397 MW. The reasons for this considerable increase are the capacity extension projects of current wind farms that are coming online, as well as the additions from YEKA-2 (EnerjiSA and Enercon projects with a total capacity of 1 GW), which are due to be fully commissioned by the end of 2025.

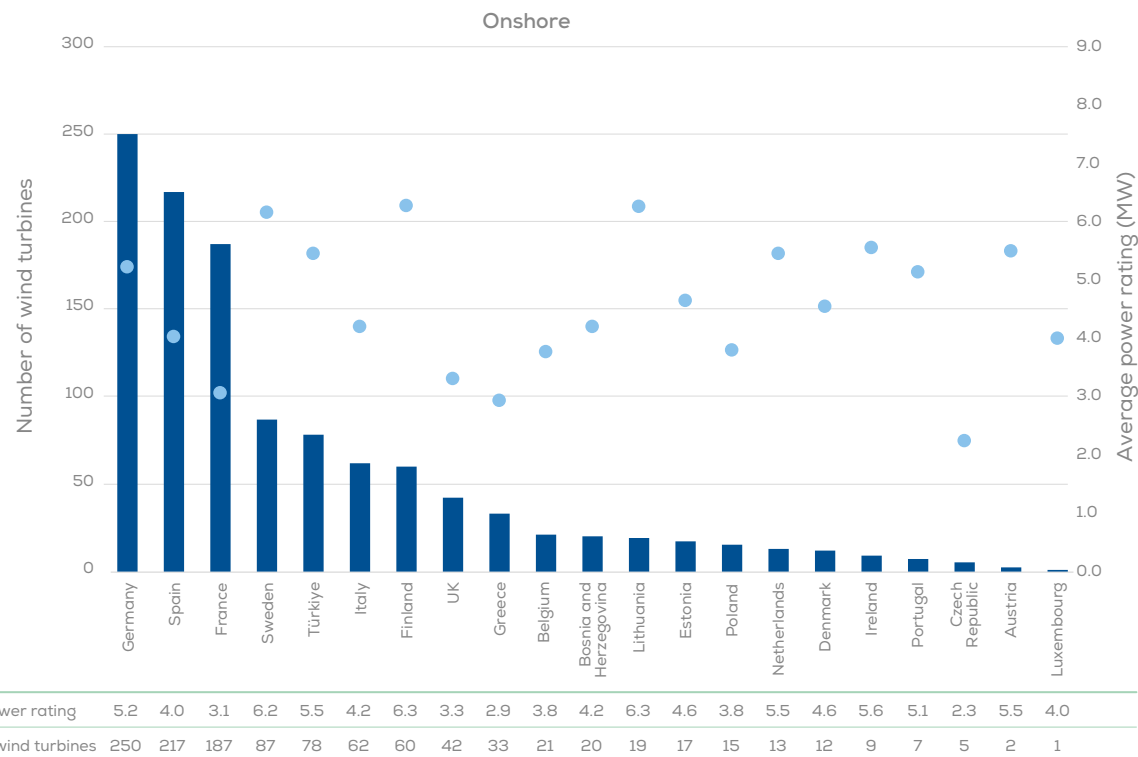
Our outlook for Türkiye anticipates 1,350 MW of onshore wind energy additions this year. This means that the country installed 32% of the forecasted amount during the first half of 2024.

Finland and Italy were the only other two countries that installed more than 300 MW of onshore wind in the first six months of 2024, with 377 MW and 302 MW respectively.

Finland was once again the country with the highest average power ratings for newly installed onshore wind turbines with 6.3 MW. The country benefits from a low population density, sensible regulations and a smooth permitting process. Installations in H1 2024 were just 62 MW less than over the same period in 2023. We expect total installations in 2024 to reach 1,100 MW with the majority of construction works taking place over the summer. Installations in H1 therefore represent 34% of the total expected amount in 2024.

Italy, on the other hand, experienced a slight increase (+30 MW) in installations compared with H1 2023. With an expected installed capacity in 2024 of 400 MW, Italy is already close to reaching this amount (76% already achieved in H1) and could end up exceeding expectations for 2024.

FIGURE 2. Number of turbines installed onshore in H1 2024 and their average power rating



Source: WindEurope

Completing the top 10 countries for newly installed onshore wind capacity were the **UK** (139 MW), **Lithuania** (119 MW), and **Greece** (97 MW). The UK’s onshore installations were 71% lower than those of H1 2023, while installations in Greece were 62% lower than in H1 2023. However, Greece had an exceptionally good 2023 (second best year) installing 543 MW. We expect installations to come to 330 MW in 2024.

The average onshore turbines installed were 5.5 MW in the UK, 6.3 MW in Lithuania, and 2.9 MW in Greece. Installations in Lithuania have already reached 63% of the expected total for 2024 (190 MW) but Greece and the UK have seen only a small fraction of the expected amount for 2024, with Greece installing 29% (of the expected 330 MW) and the UK only 14% of the 1,020 MW we are expecting in 2024.

1.3 Offshore connected capacity

WindEurope reports new offshore wind energy capacity connected to the grid, rather than newly installed capacity. Offshore wind farms are in general significantly larger than onshore wind farms, and construction works tend to take longer. There can be periods when turbines have been installed at the wind farm but are not yet connected to the grid, and not feeding renewable electricity into the grid at that point.

In the first half of 2024, Europe connected 1.1 GW of new offshore wind capacity in France, Germany, and the UK. This was 30% less than H1 2023 when 1.6 GW was connected.

France connected the most offshore wind energy capacity to the grid in H1 2024. In total 633 MW were connected after 360 MW were connected at Saint-Brieuc wind farm (496 MW) and 273 MW were connected at Fécamp wind farm (497 MW). Both wind farms are now fully commissioned.

84 turbines were connected over the period – 45 x 8 MW turbines at Saint Brieuc and 39 x 7 MW turbines at Fécamp - giving an average power rating of connected offshore wind turbines of 7.5 MW.

Total offshore additions in 2024 are expected to come to 688 MW, indicating that 92% of the anticipated offshore capacity has already been connected in H1 2024. Remaining additions would come from two floating demonstrators - Provence Grand Large (25 MW) and EFGL (30 MW).

Germany connected 386 MW of offshore wind capacity to the grid over the same period: 191 MW from the Baltic Eagle wind farm (476 MW) and 195 MW from the Gode Wind 3 wind farm (253 MW).

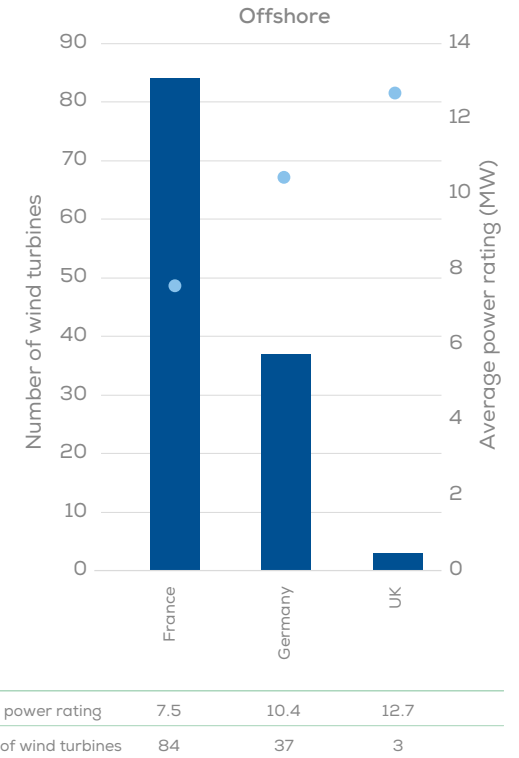
37 turbines were connected over the period – 20 x 9.5 MW turbines at Baltic Eagle and 17 x 11.5 MW turbines at Goede Wind 3 - giving an average power rating of 10.5 MW for connected offshore turbines.

The outlook for Germany is 1,670 MW of new offshore wind capacity connected to the grid in 2024. This means that during H1 2024 Germany connected 23% of the forecasted offshore capacity additions.

The UK connected just 38 MW from three 12.6 MW turbines at the Dogger Bank A wind farm (1.2 GW). Unspecified construction delays at the wind farm took place and the expected commissioning date has been pushed back from 2024 to 2025. Installation works are now underway and the new commissioning date is expected to be met.

Nevertheless, given the scale of the wind farm, the delays have a large impact on the UK's forecast. In December 2023 we forecast 2.7 GW to be connected in 2024. We are now revising this downwards to just under 1.5 GW. We will still need to see strong performance in the second half to the year with additions at Dogger Bank A, and the first turbines connected at Dogger Bank B (1.2 GW) and Moray West (882 MW).

FIGURE 3. Number of turbines installed offshore in H1 2024 and their average power rating



Source: WindEurope

TABLE 2. New additions and total wind capacity in H1 2024

EU-27	New installations in H1 2024 (MW)			Cumulative capacity (MW)		
	Onshore	Offshore	Total	Onshore	Offshore	Total
Austria	11	-	11	3,896	-	3,896
Belgium	80	-	80	3,311	2,261	5,572
Bulgaria	-	-	-	706	-	706
Croatia	-	-	-	1,256	-	1,256
Cyprus	-	-	-	158	-	158
Czechia	11	-	11	362	-	362
Denmark	55	-	55	4,965	2,652	7,617
Estonia	79	-	79	455	-	455
Finland	377	-	377	7,249	71	7,320
France	573	633	1,206	22,348	1,475	23,823
Germany	1,308	386	1,694	62,068	8,850	70,918
Greece	97	-	97	5,323	-	5,323
Hungary	-	-	-	329	-	329
Ireland	50	-	50	4,827	25	4,852
Italy	302	-	302	12,608	30	12,638
Latvia	-	-	-	137	-	137
Lithuania	119	-	119	1,327	-	1,327
Luxembourg	4	-	4	212	-	212
Malta	-	-	-	-	-	-
Netherlands	71	-	71	6,825	4,739	11,564
Poland	57	-	57	9,440	-	9,440
Portugal	36	-	36	5,845	25	5,870
Romania	-	-	-	3,100	-	3,100
Slovakia	-	-	-	3	-	3
Slovenia	-	-	-	3	-	3
Spain	876	-	876	31,360	7	31,367
Sweden	536	-	536	16,781	192	16,973
Total EU-27	4,642	1,019	5,661	204,894	20,327	225,221

Others	New installations in H1 2024 (MW)			Cumulative capacity (MW)		
	Onshore	Offshore	Total	Onshore	Offshore	Total
Albania	-	-	-	-	-	-
Belarus	-	-	-	3	-	3
Bosnia & Herzegovina	84	-	84	219	-	219
Faroe Islands	-	-	-	68	-	68
Iceland	-	-	-	3	-	3
Kosovo	-	-	-	137	-	137
Liechtenstein	-	-	-	-	-	-
Montenegro	-	-	-	118	-	118
North Macedonia	-	-	-	73	-	73
Norway	-	-	-	5,083	101	5,184
Russia	-	-	-	2,043	-	2,043
Serbia	-	-	-	512	-	512
Switzerland	-	-	-	101	-	101
Türkiye	426	-	426	12,768	-	12,768
UK	139	38	177	15,005	14,794	29,799
Ukraine	5	-	5	1,907	-	1,907
Total others	654	38	692	38,040	14,895	52,935
Total Europe	5,296	1,057	6,353	242,934	35,222	278,156

All numbers are rounded and therefore may now sum to totals

X and Y figures are estimates

Impact of war on Ukrainian and Russian installations unknown

Market developments in H1 2024

2.1 Permitting

Until recently, permitting was the number one bottleneck for wind energy build-out in Europe, holding up the pipelines of projects across the continent. But things have been improving on the ground, mainly thanks to new EU permitting rules agreed as part of the revised Renewable Energy Directive (RED).

TABLE 3. Permitted onshore wind volumes in H1 2024 (MW)

	All of 2023	H1 2024
France	2,219	743
Germany	7,504	4,700
Greece	800	618
Ireland	n.a.	228
Italy	n.a.	479
Spain	3,041	2,680
UK	1,080	615
	14,644	10,062

In 2023 more onshore wind permitting volumes were recorded in Germany, Spain, France and the UK relative to 2022, with 13.8 GW permitted in these countries alone. Four out of five countries where permitting volume data from 2023 and H1 2024 is now available, have permitted more than half of the 2023 amount by the time of reporting. On average, almost 2/3 of the total permitted figures for 2023 have already been met in these five countries.

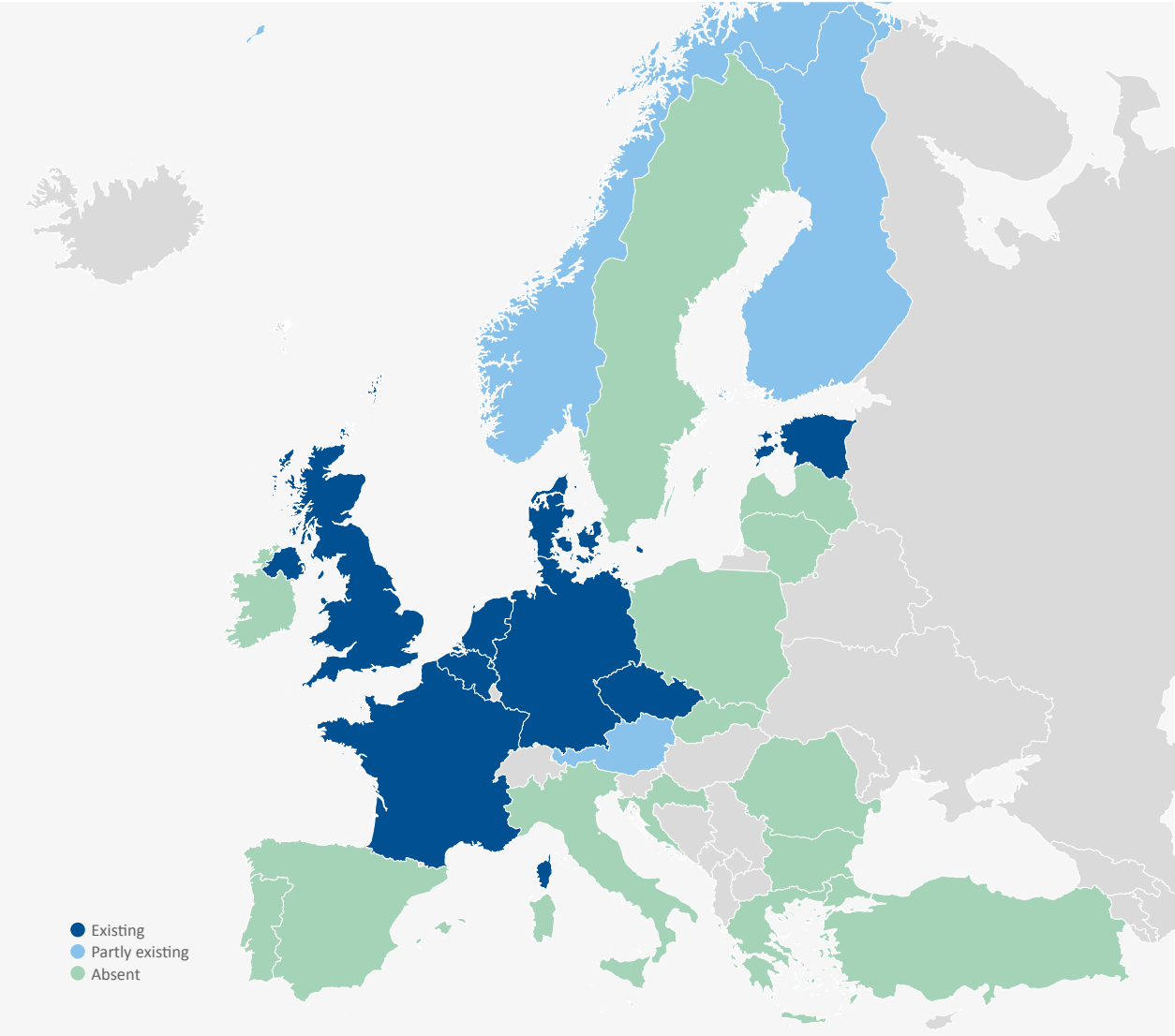
In Spain the Government gave administrative construction permits to a large number of renewable projects which were approaching their 3-year construction deadline and which were at risk of losing their grid access and connection rights. The Ministry for the Ecological Transition and Demographic Challenge (MITECO) approved 48 onshore wind energy projects with a combined capacity of 2,680 MW, following changes to meet various requirements, including environmental standards.

EU Member States are in the process of implementing the requirements set out in the RED. Seven countries now have a one-stop shop for administrative procedures. Four have implemented the principle of “overriding public interest” and 14 have implemented permitting deadlines for authorities to approve all necessary permits².

As progress continues to be made, we expect permitting processes to become more efficient. In turns this means we can expect to see more permitted wind energy volumes across Europe.

2. WindEurope members with full access to the Intelligence Platform can access the Permitting Insights tool here: <https://windeurope.org/intelligence-platform/product/permitting/>

FIGURE 4. European countries with one-stop shops for administrative permitting procedures



Source: WindEurope

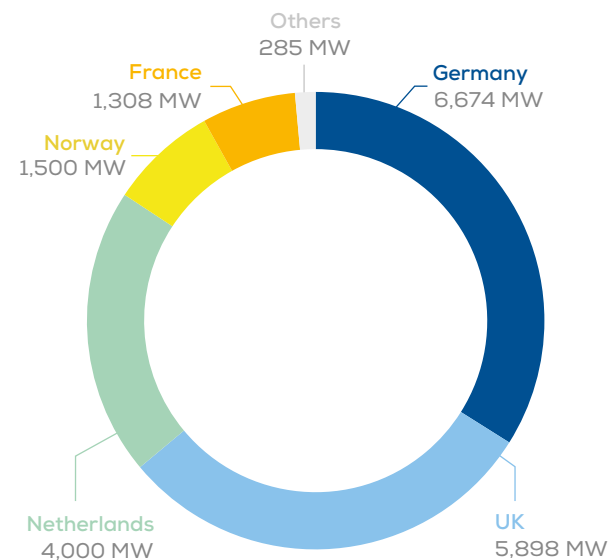
2.2 Auctions and tenders

In the first six months of 2024 governments awarded 19.7 GW of wind energy capacity across eight countries, 6.5 GW for onshore wind and 13.2 GW for offshore wind.

This is already 72% of what they awarded in the whole of 2023, when 27.3 GW of wind energy were awarded. The 2023 figures were impacted by the UK's Allocation Round 5 (AR5), where no offshore projects submitted bids because the bid price ceiling was too low.

The total awarded volume in H1 2024 is already more than 70% of the total volume awarded in 2023 (27.6 GW).

FIGURE 5. Share of awarded support in wind energy auctions in H1 2024



Source: WindEurope

Onshore wind energy auctions

2/3 of the awarded onshore wind capacity was for support from 20-year floating feed-in premiums (4.3 GW), where projects are guaranteed a minimum price for the electricity they sell. Almost 90% of this was awarded in Germany. The average strike price was €74.2/MWh across the awarded projects in Germany and Austria, slightly up from an average of €73.1/MWh awarded across Europe in 2023. The remaining 2.2 GW (33%) of onshore capacity was awarded 2-sided Contracts-for-Difference (2-sided CfDs) in France, Italy, Czechia and the UK.

Under 2-sided CfDs, projects receive a minimum price for the electricity they sell, as they do under the floating feed-in premium model, but electricity sold in excess of this maximum price is returned to the state. The projects therefore receive a fixed price for the power they sell. Since projects do not receive an “up-side” (when prices are high), strike prices tend to be higher than feed-in premiums.

The average strike price for 2-sided CfDs for onshore wind in EU Member States in H1 was €87.5/MWh, up from €81.6/MWh in 2023. The average strike price is not just determined by the underlying costs of onshore wind but also by the markets awarding support. The average strike prices awarded in 2023 for example, varied between €72.4/MWh in Italy and €100.5/MWh in Ireland.

The only EU markets which awarded 2-sided CfDs to onshore wind in both 2023 and H1 2024 were France and Italy which saw 2% and 4% increases in the strike prices respectively.

In the UK, 990 MW were awarded at £50.9/MWh (€58.2/MWh) in 2012 prices – this was a decrease of almost 3% from 2023 when the winning strike price was £52.3/MWh.

In H2, a further 13.9 GW of onshore wind capacity will be offered in auctions across Europe.

Offshore wind energy auctions

In H1 2024 there were six offshore sites auctioned – five bottom-fixed projects in Germany, the Netherlands and Norway with a total capacity of 8 GW and the first commercial scale floating offshore wind project in France (250 MW).

There were also two allocation rounds for CfDs in the UK and Lithuania. In the UK 4.9 GW of bottom-fixed offshore wind and 400 MW of floating wind were awarded, but the auction round in Lithuania was unsuccessful, only attracting one bidder.

In total 13.2 GW of offshore wind was awarded.

Negative bidding was used to award projects in Germany and the Netherlands with a total capacity of 6.5 GW. Developers will pay a combined €3.9bn to National Governments for the right to develop the four sites.

The remaining 6.7 GW were awarded 2-sided CfDs. In Norway, the first CfD auction round was successfully awarded 1.5 GW of bottom-fixed offshore wind capacity with a strike price of €99.4/MWh. And in France, the A05 Brittany floating project was awarded with a strike price of €86.5/MWh.

This was a record low for floating offshore wind. But the tender was unique in many ways, for example project developers did not have to pay for a grid connection, neither for the export cables nor for the offshore substation. Floating offshore wind is a relatively young industry and we expect prices to vary greatly across Europe depending on the specifics of the projects and auction characteristics.

In the UK, the 4.9 GW of bottom fixed capacity was a combination of new projects and projects that had been permitted to rebid part of their capacities after the significant cost increases since AR4 in 2022. The weighted average winning strike price was €57.4/MWh (€65.6/MWh) in 2012 prices, a significant

increase on the record low £37.4/MWh (€43.9/MWh) for projects awarded in AR4.

The 400 MW floating wind was awarded with a strike price of £139.9/MWh (€159.9/MWh) in 2012 prices.

In H2, a further 11.9 GW could be offered, 8.5 GW via negative bidding in Germany and Denmark and 3.4 GW of support from CfDs to be offered in France, Ireland, Italy and Portugal.

See the appendix for more details on a country basis.

2.3 Financed capacity

In the first six months of 2024 there were €15.4bn of investments in wind farms, financing 9.1 GW of new wind energy capacity that will be commissioned over the next few years.

Onshore wind investments in Europe totalled €9.2bn and financed approximately 7.2 GW of new onshore wind capacity.

In the EU, onshore investments were approximately €8bn which financed 6.4 GW of new projects. Including three offshore wind project final investment decisions (FIDs), total investments came to more than €14bn and financed 8.3 GW of new onshore and offshore wind capacity.

In recent years, we have seen a downward trend in investment figures for onshore wind, a trend which is particularly stark given the high levels of inflation Europe has seen (so we would expect to see more € investment per GW).

For this reason, the H1 investment figure, despite being around half of the 2023 figure for total investments in onshore wind, points to a risk that onshore wind volumes reaching FID are starting to diverge from the volumes required for the expansion of wind capacity in Europe.

The economic landscape and investment conditions remain challenging and variable having not fully recovered from the shock of the pandemic. This is still impacting investments and complicating project prioritisation.

Since offshore wind farms tend to be very large (many recently on the GW scale) only a few offshore wind FIDs take place in a given year. This means that offshore wind investment figures are volatile on an annual basis and are highly dependent on the timing of these large transactions.

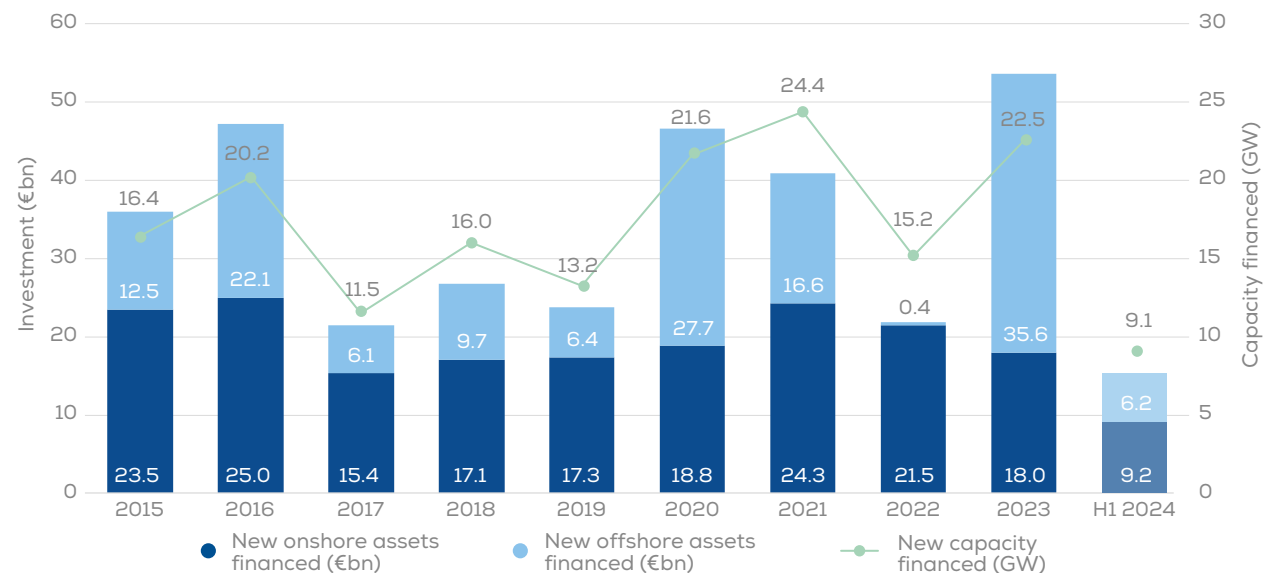
Three offshore wind farms, all in Germany, with a combined capacity of 1.9 GW reached FID, raising approximately €6.2bn in capital.

In H2 2024, the 760 MW OranjeWind project in the Netherlands has already taken FID (July 2024) and we expect two more FIDs to take place. These would take investment figures to around €17bn, financing a total of 5.2 GW of offshore wind capacity in 2024.

In addition, another 2 GW of offshore wind capacity is expected to reach FID in Q1 2025, which would raise more than €8bn. The actual timings for these projects could have a big impact on the investments recorded for both 2024 and 2025.

It is possible that a strong second half of the year could leave us in a better position by the year-end. On average however, onshore investments over the years have tended to be higher in H1 compared with H2.

FIGURE 6. Investment in new wind farms 2015 - H1 2024 (GW and €bn)



Source: WindEurope

2.4 Wind turbine orders

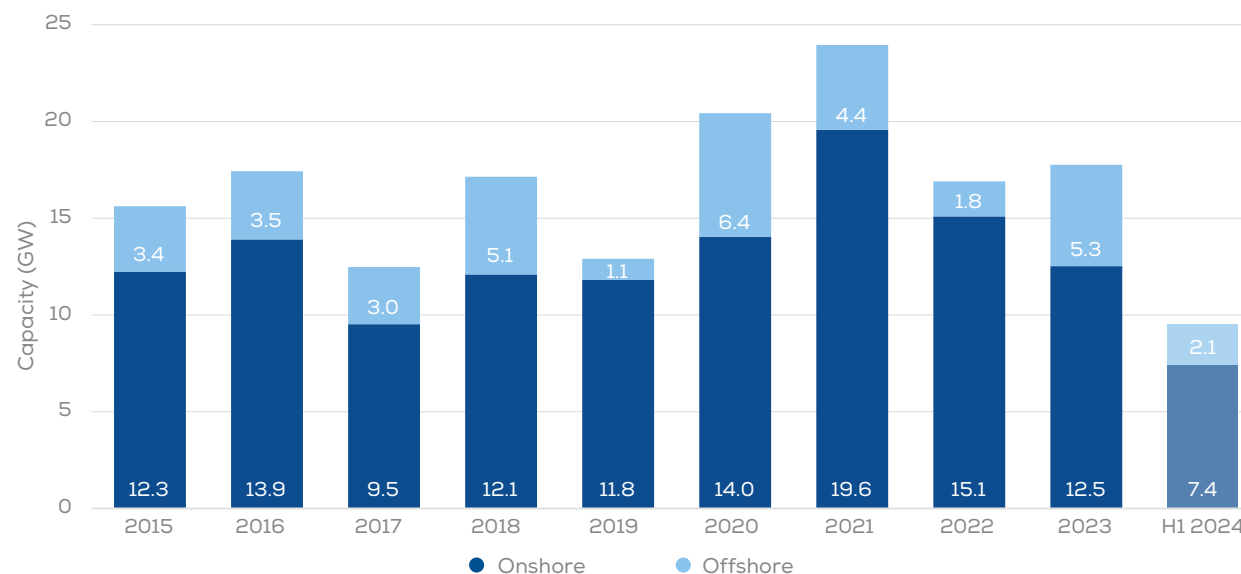
Europe saw 9.5 GW of firm orders in the first six months of 2024; 7.4 GW for onshore wind turbines and a further 2.1 GW for offshore. This marks an 11% increase for orders recorded in H1 2023.

Onshore wind turbines ordered had an average power rating of 5.8 MW, a record for the average size of ordered onshore turbines despite orders in several markets for turbines with power ratings in the 2-4 MW range.

Offshore turbines were ordered for four projects, with two opting for 15 MW turbines and two for 14.4 MW, giving an average power rating of 14.7 MW for offshore turbines order in H1 2024.

In the EU, there were orders for 8.9 GW of new wind power capacity. All of the offshore orders were in the EU (2.1 GW) and there was a further 6.8 GW of onshore wind turbine orders. For the EU this represented a 33% increase in turbine orders compared with H1 2023.

FIGURE 7. Annual volume of wind turbine orders (GW)



Source: WindEurope

2024-2030

In February 2024, we published our report 2023 Statistics and the outlook for 2024-2030³. For the first time we issued our forecast looking more than 5 years into the future and considered the outlook to 2030. This gave us our first clue of how the overall picture is shaping up compared with the targets set by the EU and by National Governments across Europe.

The outlook was based largely on those Government ambitions and their National Energy and Climate Plans. By definition it was an optimistic outlook. And it rightly opened the debate about how realistic it was and posed the question: “what is actually possible by 2030?”.

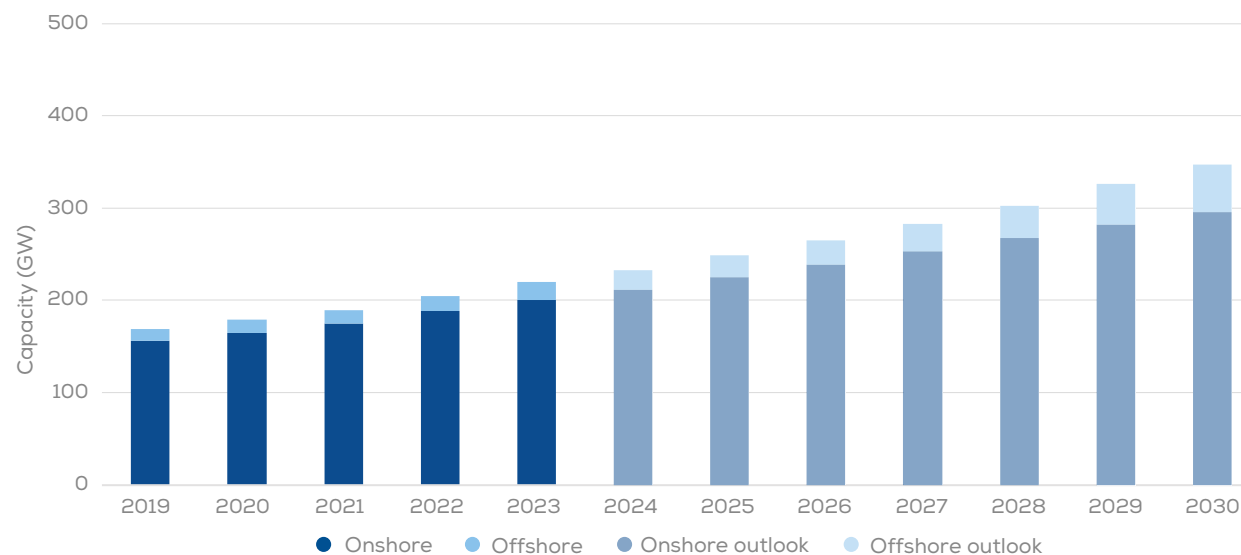
The ambitions have not changed, though some Governments have recognised that their original schedules required some adjustments. However, it is now clear that a number of bottlenecks will impact the installation rates over the rest of this decade. These are particularly relevant for offshore wind energy projects.

- **Electricity grids** are the main bottleneck: Grids are not being expanded or modernised fast enough. The grid issues are partly about permitting and supply chains. They are also partly about incentives and business models for grid investments. Grid operators also need to start filtering the huge volumes of grid connections they now get.

- **Port capacity:** The current port capacity in Europe is sufficient to deliver the anticipated investments over the next five years. However, even with the investments in expansions already announced, we believe that capacity will start to limit installation rates from 2029. This is a particular concern due to the long lead times for port expansion and upgrade works.

- **Vessel availability:** There are currently only five vessels globally that can install the latest offshore turbines. Given that the majority of turbines installed towards the end of the decade will need to make use of these specialist vessels, and Europe is not the only customer, this could lead to further installation delays.

FIGURE 8. Evolution of cumulative wind power capacity in the EU



Source: WindEurope

3. <https://windeurope.org/intelligence-platform/product/wind-energy-in-europe-2023-statistics-and-the-outlook-for-2024-2030/>

These factors, together with current trends in new installations and investments, now point to the EU having a total of 350 GW wind energy capacity by 2030. This breaks down to 296 GW onshore and 54 GW offshore. The EU today has 225 GW of wind energy. Its 2030 target is 425 GW⁴.

We expect total installed capacity in Europe to reach 453 GW by 2030 – 363 GW will be onshore with 90 GW installed offshore. We do not envisage that installations in Europe to fall below the ambitions which Governments have previously set.

Installations could be delayed by one or two years, but we expect a stable level of installations of around 25 GW a year onshore and 15 GW a year offshore for the immediate post 2030 period.

3.1 Onshore wind outlook

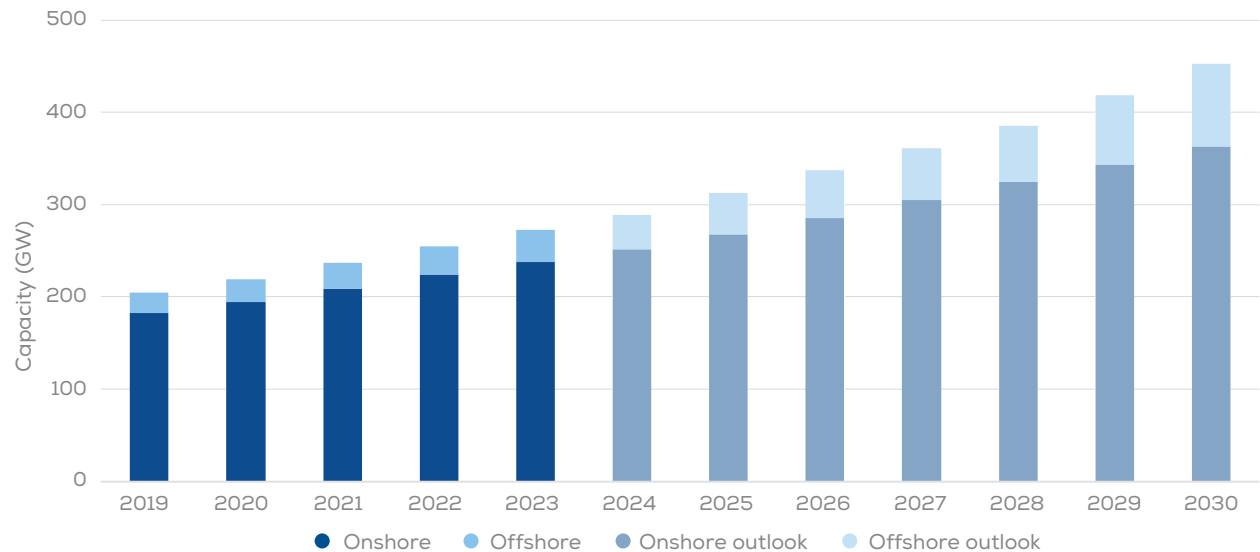
Onshore wind is still expected to make up the overwhelming majority of installations over the period to 2030. Factoring in the 5.3 GW installed in H1 2024, we expect 152 GW of new capacity to be installed over 2024-2030, 73% of the total forecasted additions in Europe of 207 GW.

Taking account of our expected decommissioning over the period, we expect total onshore installations in Europe to reach 363 GW by 2030.

In the EU, onshore additions to 2030, including the 4.6 GW installed in H1, are expected to be almost 122 GW, 78% of the total of 156 GW to be installed by 2030. Total installed onshore wind capacity in the EU is expected to reach 296 GW.

Auctions and tenders are set to play a major role in the build-out of onshore wind with almost 60% of new capacity to be awarded in central auctions, consistent with the last few years. The remaining capacity will either be supported by the expanding corporate PPA market or on an entirely merchant basis in some markets.

FIGURE 9. Evolution of cumulative wind power capacity in Europe



Source: WindEurope

4. Based on 2030 REPowerEU wind energy production targets after the compromise of a 42.5% renewable energy target for 2030 was reached in 2023.

Figure 10 sets out the expected annual onshore installations in the EU by support type. Capacity labelled as “Already awarded in auctions” indicates those projects which have already been successful in auctions and which have revenue support in place. These projects therefore represent a high likelihood of being developed and represent approximately 30 GW over 2024-2027.

The light blue category labelled “Scheduled to be auctioned” shows capacity that we expect to be awarded in auctions which have already been scheduled and which will take place over the next few years. We do not assume that all capacity offered will be awarded, and different markets are anticipated to have varying degrees of success in terms of their proportion of offered capacity being awarded. The allocation rate assumption is between 65% and 100% for each country.

We expect 31 GW of total wind capacity to be awarded in auctions over the period 2024-2030.

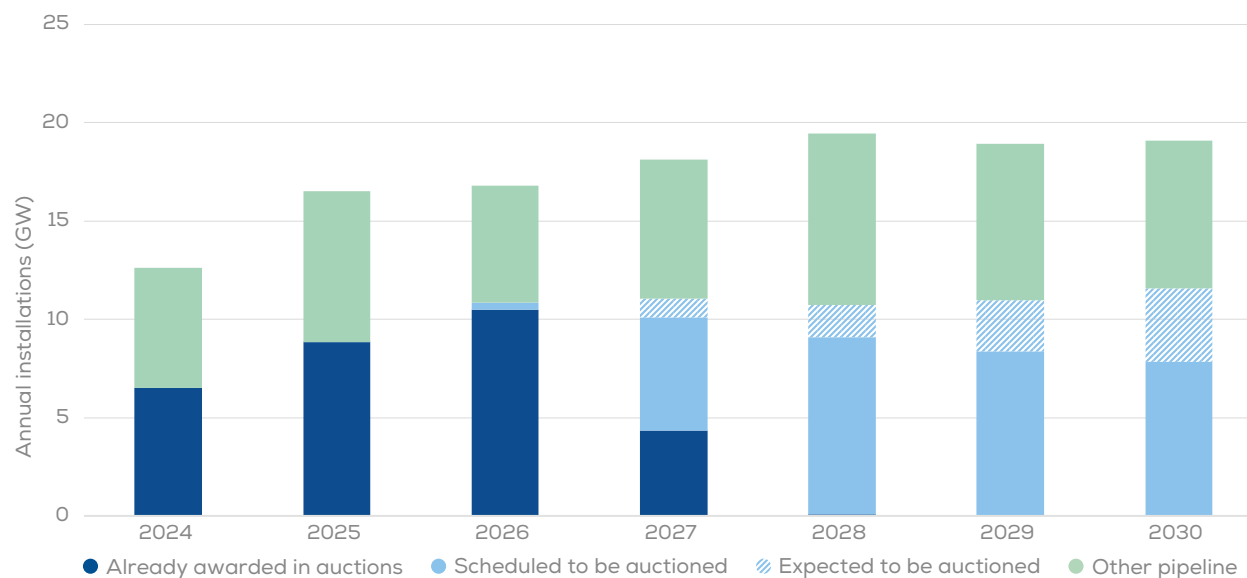
The patterned light blue labelled “Expected to be auctioned” is the capacity likely to be awarded in auctions that have not yet been finalised. In many cases the auctions have been announced but the details have not been finalised or there is no schedule in place yet. Over the rest of the decade to 2030, the total capacity in this category is 9 GW.

Total onshore installations in the EU over the period 2024-2030, including H1 2024, are expected to come to 122 GW. We therefore anticipate that at least 71 GW or 58% will be from wind farms which are awarded in auctions.

The light green area labelled “Non-auction projects” represents wind power capacity that is developed without going through central auctioning systems, i.e. projects which will be either supported through Power Purchase Agreements (PPAs) or will be developed on an entirely merchant basis.

In some markets like Sweden and Finland there is no support provided by the Government so all projects are developed in this way. The capacity expected to be developed on a merchant or PPA basis encompasses those markets plus a proportion of project capacity in other markets including those with centralised auction systems. We expect a total capacity of 51 GW to be developed on a merchant/PPA basis from 2024-2025.

FIGURE 10. Breakdown of auctioned and non-auctioned new build onshore projects in the EU



Source: WindEurope

3.2 Offshore wind outlook

Europe has ambitious plans for offshore wind. In many ways it is ideally suited – there is an abundance of shallow waters available with very good wind resources, particularly in the North Sea and Baltic Sea. And Europe has been the global leader in offshore wind development with a strong supply chain and track record.

Governments across Europe have recognised the value that offshore wind brings. From combined 2030 offshore wind targets of 114 GW at the start of 2021, ambitions were revised up to a maximum value of 157 GW by 2030 in December 2022.

Since this peak, many National Governments have scaled back their 2030 targets as they realise that the time needed to develop a political framework for offshore wind, construct and improve electricity grids to connect the projects and develop local supply chains means that getting projects in the water by 2030 is a tall order.

But despite the fact that it will likely not be possible to develop offshore wind in many markets as quickly as hoped to meet the 2030 targets, markets are still being developed nonetheless. Many will see new projects enter the electricity system soon after the turn of the decade.

On a Europe-wide level there are also some important limitations to the huge expansion of offshore wind envisaged by 2030.

The most acute bottleneck is likely to be port capacity. As things stand, we believe there is sufficient port capacity in Europe to service the build-out to 2028. But in 2029 we expect the planned rate of installations to outstrip port capacity, even when new expansion are taken into account. We therefore anticipate delays to the construction of projects across Europe from 2029.

Port capacity is also our primary focus for offshore wind build-out because from all the value chain it has the longest lead times for development. Lead times (from permitting to commissioning) are typically 6-10 years for port expansions. This means that it is critical that ports investments happen as soon as possible to limit the potential delays.

Other crucial factors which are likely to limit the build-out of offshore wind in Europe to 2030 are the pace of **electricity grid development and ineffective practices to manage grid connection requests**. Onshore and offshore grid expansion and reinforcement face significant delays in many regions. This leaves no or limited grid capacity available for new connections on time. At the same time several national authorities still stick to the ‘first come first-served’ approach in grid permitting instead of dynamic approaches to filter viable projects and prioritise the most mature and strategic ones.

Finally there is uncertainty about the **availability of vessels**. There are currently around 80 vessels involved in the construction and installation of wind farms in Europe, however only five are capable of handling the largest 14-15 MW turbines being installed at the latest projects. The vast majority of turbines being installed toward the end of the decade will be of this size or larger. There is also a limited number of vessels capable of installing the large substructures (substations and converter platforms) at offshore wind farms.

The availability of vessels is also impacted by global demand. During the winter months in Europe when conditions at sea make it almost impossible to install turbines, vessels are often contracted to markets in the southern hemisphere. The development of other markets such as the USA, could also impact vessel availability for Europe in the future.

New vessels have a lead time of 2-3 years, so understanding the global capacity required over the next couple of years and ensuring sufficient investment in new vessels capable of installing the largest turbines and grid infrastructure, will be critical to prevent delays arising from their lack of availability in Europe.

Our autumn 2024 outlook takes account of these potential restrictions to 2030. Although we are indicating that the offshore wind build-out to 2030 across Europe will be unlikely to match government ambitions for that target date, we do not envisage any reduction in installations – just a delay of 1-2 years in many cases. Governments across Europe remain committed to offshore wind development and the outlook for the industry is very positive.

Figure 11 sets out the expected annual offshore wind installations in the EU by their current status. The total amount, including the 1 GW installed in H1 2024, is 34 GW which would take the EU’s installed capacity to 54 GW in 2030.

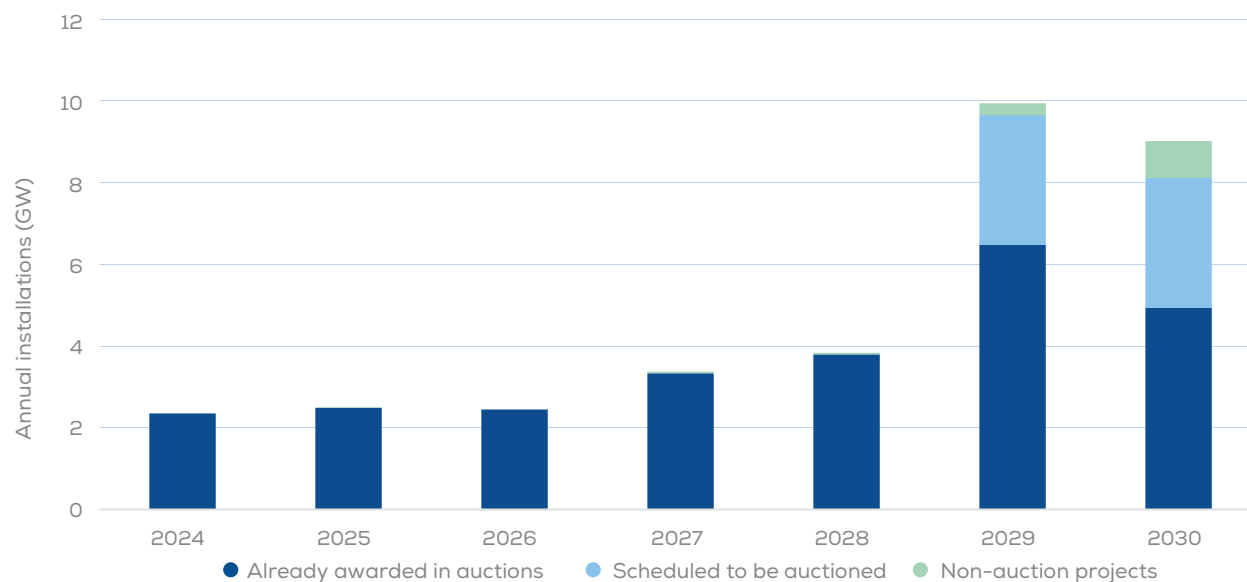
In dark blue labelled “Already awarded in auctions” is all the capacity that has been awarded in auctions across the EU (including in countries where no revenue support is awarded). This capacity is likely to be installed on time as the projects have already taken final investment decisions (FIDs) or are expected to shortly and therefore have all supply and construction contracts in place. The total capacity of projects in this situation is 26 GW.

Capacity from projects in the light blue category labelled “Scheduled to be auctioned” is from projects which are set to take part in auctions over the next couple of years. These projects are likely to be developed but there is some uncertainty on their timing given that they have not yet secured the rights to develop. These projects represent an additional 6 GW which can be installed in the EU by 2030.

The light green area labelled “Non-auction projects” represent a small number of projects which will be developed in open door regimes such as in Sweden and Finland. Projects in this capacity have the largest uncertainty regarding their development timescales but we believe they have a realistic chance of being installed by 2030. The total capacity represented by these types of projects over 2024-2030 is approximately 1.3 GW.

In Europe, 42 GW of the total expected installations of 56 GW have already been awarded in auctions with a further 13 GW expected to be auctioned over the next few years. Projects developed outside of auction systems are also expected to total 1.3 GW by 2030.

FIGURE 11. Breakdown of auctioned and non-auctioned new build offshore projects in the EU



Source: WindEurope

TABLE 4. Expected new installations per country, 2024-30

EU-27 (MW)	2024		2025		2026		2027		2028		2029		2030		Total installations by 2030	
	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore
Austria	120	-	450	-	400	-	400	-	410	-	410	-	430	-	6,290	-
Belgium	220	-	230	-	240	-	250	-	250	-	250	630	250	160	4,760	3,050
Croatia	150	-	100	-	50	-	50	-	300	-	190	-	40	-	2,120	-
Czechia	10	-	40	-	30	-	50	-	70	-	70	-	80	-	680	-
Denmark	50	-	120	-	230	370	260	420	270	-	280	1,580	280	1,570	5,820	6,580
Estonia	230	-	130	-	150	-	200	-	240	-	430	-	460	-	2,200	-
Finland	1,100	-	1,400	-	970	-	1,210	-	1,460	-	1,470	-	1,470	180	15,930	250
France	1,140	690	2,000	980	2,000	500	2,000	-	2,000	-	1,390	180	1,160	630	33,400	3,820
Germany	4,000	1,670	5,130	940	5,590	320	6,230	1,100	6,740	860	6,740	3,700	7,380	2,930	88,280	19,980
Greece	330	-	500	-	420	-	400	-	400	-	400	-	100	-	7,700	-
Ireland	340	-	450	-	550	-	480	-	380	600	480	600	500	1,090	7,690	2,310
Italy	400	-	400	-	490	-	1,020	-	1,260	-	1,390	-	1,400	40	17,530	70
Latvia	-	-	220	-	230	-	300	-	200	-	190	-	-	-	1,250	-
Lithuania	350	-	350	-	450	-	350	-	300	-	300	320	300	320	3,590	640
Luxembourg	10	-	80	-	50	-	30	-	50	-	30	-	20	-	470	-
Netherlands	400	-	500	-	390	380	300	760	330	1,430	350	1,730	380	1,060	9,110	10,080
Poland	560	-	250	570	470	890	580	1,100	580	920	600	1,230	780	870	13,000	5,580
Portugal	120	-	230	-	230	-	380	-	500	-	500	-	500	-	7,720	30
Romania	50	-	260	-	450	-	460	-	480	-	470	-	530	-	5,680	-
Slovakia	-	-	60	-	50	-	80	-	100	-	120	-	120	-	530	-
Spain	1,800	-	2,000	-	2,030	-	2,450	-	2,470	-	2,100	-	2,100	290	38,110	300
Sweden	1,100	-	1,340	-	1,260	-	670	-	700	40	740	180	770	640	22,350	1,040
Total EU-27	12,490	2,360	16,270	2,500	16,820	2,460	18,250	3,380	19,600	3,850	18,990	10,150	19,150	9,780	295,870	53,740

Others (MW)	2024		2025		2026		2027		2028		2029		2030		Total installations by 2030	
	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore	Onshore	Offshore
Albania	-	-	20	-	40	-	40	-	40	-	40	-	40	-	220	-
Bosnia & Herzegovina	80	-	-	-	130	-	130	-	70	-	70	-	-	-	610	-
Kosovo	-	-	-	-	-	-	-	-	20	-	50	-	80	-	290	-
Montenegro	-	-	60	-	60	-	160	-	-	-	-	-	-	-	400	-
North Macedonia	-	-	20	-	110	-	160	-	110	-	110	-	110	-	690	-
Norway	-	-	-	-	-	-	-	-	150	-	180	-	190	680	5,560	780
Russia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,040	-
Serbia	160	-	150	-	400	-	100	-	200	-	130	-	160	-	1,810	-
Switzerland	-	-	-	-	30	-	40	-	40	-	50	-	50	-	310	-
Türkiye	1,350	-	1,600	-	1,900	-	2,300	-	2,240	-	2,240	-	2,240	-	26,040	-
UK	1,020	1,460	1,220	4,260	1,500	3,990	2,000	1,990	2,000	1,120	2,360	3,160	2,570	4,460	27,150	35,120
Ukraine	10	-	-	-	-	-	-	-	-	-	-	-	-	-	1,900	-
Total others	2,620	1,460	3,070	4,260	4,170	3,990	4,930	1,990	4,870	1,120	5,230	3,160	5,440	5,140	67,090	35,900
Total Europe	15,110	3,820	19,340	6,760	20,990	6,450	23,180	5,370	24,470	4,970	24,220	13,310	24,590	14,920	362,960	89,640

Appendix: Auctions & Tenders by country

Onshore capacity awarded in auctions in H1 2024

Germany held two technology-specific auction rounds, offering support to 5.3 GW of onshore wind and awarding 4.2 GW (79% allocation rate). The awarded volume is 40% more than that awarded during the first half of 2023, when Germany awarded support to 3 GW of onshore wind projects. Two more rounds will be offered in the second half of 2024, with a combined capacity of 6.8 GW (the Federal Network Agency BNetzA could reduce the volume offered in the last round of the year, currently set at 4.1 GW). Therefore, Germany is expected to offer support to 12.1 GW of onshore wind projects in 2024. If the H1 2024 award rate holds true for the second half of the year, Germany would award support to 9.5 GW of onshore wind in 2024, 50% more than it did in 2023 (6.4 GW). The support offered is a 20-year Feed-in-Premium.

France held one technology-specific auction round in the first half of 2024 in which it offered support to 925 MW of onshore wind. However, it awarded almost 1.1 GW, due to the auction round being oversubscribed. The high subscription rates observed since May 2023 are partly explained by the re-bidding of projects that had already been awarded in previous rounds and obtained permission to renounce their winning bids due to cost increases. The volume of awarded support is slightly below that awarded in the sole auction round held in H1 2023 where, for the reasons highlighted above, almost 1.2 GW were awarded support.

Another onshore wind technology-specific round will be held in the second half of 2024 which will aim to allocate support to 925 MW of onshore wind. If the auction is over-subscribed as it was in H1, around 2.1 GW of onshore wind could receive support across the entire year. That would be 32% less than in 2023 but France held an extra auction round in that year. There will also be a technology-neutral round where support is offered to 500 MW of onshore wind or solar PV. The support offered under both schemes is a 20-year 2-sided CfD, with strike prices fully indexed to inflation indices relevant for onshore wind.

The UK awarded almost 1 GW of onshore wind under Pot 1 (established renewable energy technologies, including onshore wind energy) of the Allocation Round (AR) 6 under which a 15-year 2-sided CfD is offered. While there is no fixed MW capacity quota for the support offered to onshore wind, the budget for Pot 1 was set at £185 million. Most capacity was awarded in Scotland, with only three projects in Wales (73 MW) and one in England (8 MW). The support offered is a 15-year 2-sided CfD.

Italy held one auction round in the first half of 2024 under its FER 1 renewable energy auction scheme, in which it allocated 98 MW of onshore wind. In the first half of 2023, Italy held two technology-neutral auction rounds where it awarded 224 MW of onshore wind.

An auction round is scheduled for the second half of 2024 under the FER 1 auction scheme. Separately, the FER 1 scheme will be replaced by the FER X renewable energy auction scheme as early as the second half of 2024. However, the exact dates and offered volumes of the first round are still not known.

The support offered under both schemes is a 20-year 2-sided CfD with strike prices indexed to the Consumer Price Index (CPI).

Austria awarded support to 162 MW of onshore wind in the only technology-specific auction round it held in the first half 2024, in which it sought to allocate support to 282 MW of onshore wind (57% allocation rate). The country will be running three technology-specific auction rounds in the second half of 2024, in which it will seek to allocate support to 300 MW of onshore wind projects. The support offered is a 20-year Feed-in-Premium.

Czechia awarded 25 MW of onshore wind in the first half of 2024, while it sought to allocate support to 35 MW (71% allocation rate). In the first half of 2023 Czechia awarded 20 MW, after offering support to 25 MW. The country is running another auction round in the second half of 2024, in which it will seek to allocate support for 90 MW of onshore wind.

Offshore capacity awarded in auctions in H1 2024

The UK allocated support to over 5.3 GW of offshore wind energy projects under Pot 3 (bottom-fixed offshore wind energy) and Pot 2 (emerging technologies, which includes floating offshore wind energy) of the CfD AR 6. In particular, 4,942 MW of bottom-fixed offshore wind energy projects were awarded. However, 1,579 MW of this capacity was part of projects that were awarded under the UK CfD AR4 but that were allowed to re-bid part of their awarded capacity to

secure a higher strike price. A 400 MW floating project was also awarded. While there is no fixed MW capacity quota for the support offered to offshore wind, the budget for Pot 3 was set at £1.1 billion while that of Pot 2 was set at £280 million. The award was based on price only. The support offered is a 15-year 2-sided CfD.

The Netherlands awarded 4 GW of offshore wind in the first half of 2024, evenly spread across the IJmuiden Ver Alpha and Beta sites. Bids were ranked using both negative bidding

and non-price criteria, focused on ecology for the Alpha site and system integration for the Beta site.

Germany awarded 2.5 GW of offshore wind in the first half of 2024 spread across the N-11.2 site (1.5 GW) and the N-12.3 (1 GW). Concessions were secured through the dynamic bidding procedure, whereby if more than one zero-cent bid is received for a site, bidders enter a multi-round negative bidding process.

Table A. Auctions and tenders for wind energy in H1 2024

Onshore	Auction	Type of auction	MW available	MW awarded	Allocation rate	Policy mechanism	Strike price
Austria	EAG- Technology specific May round	Technology specific	282	162	57%	Feed-in-Premium	€95.8/MWh
Czechia	Technology-specific auction	Technology specific	35	25	71%	Contract for Difference	€124.6/MWh
France	AO PPE 2 Eolien terrestre- 7th round	Technology specific	925	1,058	114%	Contract for Difference	€87.8/MWh
Germany	EEG- Technology specific Feb round	Technology specific	2,486	1,795	79%	Feed-in-Premium	€73.4/MWh
Germany	EEG- Technology specific May round	Technology specific	2,795	2,379		Feed-in-Premium	€73.3/MWh
Germany	EEG- Technology neutral innovation May round	Technology neutral	583	-	0%	Feed-in-Premium	n.a
Italy	FER 1- 14th round	Technology neutral	n.a.	98	n.a.	Contract for Difference	€75.6/MWh
United Kingdom	AR6 Pot 1	Technology neutral	n.a.	990	n.a.	Contract for Difference	£50.9/MWh (2012 prices)

Offshore	Auction	Type of auction	MW available	MW awarded	Allocation rate	Policy mechanism	Strike price
France	A05- Sud Bretagne floating	Technology specific	250	250	100%	Contract for Difference	€86.5/MWh
Germany	N-11.2 (non-central)	Technology specific	1,500	1,500	100%	Feed-in-Premium with negative bidding option	n.a
Germany	N-12.3 (non-central)	Technology specific	1,000	1,000	100%	Feed-in-Premium with negative bidding option	n.a
Lithuania	Technology-Specific auction 2	Technology specific	700	-	0%	Contract for Difference	n.a
Netherlands	IJmuiden Ver Alpha	Technology specific	2,000	2,000	100%	Negative bidding	n.a
Netherlands	IJmuiden Ver Beta	Technology specific	2,000	2,000	100%	Negative bidding	n.a
Norway	Soerlige Nordsjoe II	Technology specific	1,500	1,500	100%	Contract for Difference	€99.4/MWh
United Kingdom	AR6 Pot 2 (including floating offshore)	Technology neutral	n.a.	400	n.a.	Contract for Difference	£139.9/MWh (2012 prices)
United Kingdom	AR6 Pot 3 (including fixed-bottom offshore)	Technology neutral	n.a.	4,942	n.a.	Contract for Difference	£57.4/MWh (2012 prices)

Germany is tendering an additional 5.5 GW of offshore wind in the second half of 2024, distributed across three sites: N-9.1 (2 GW), N-9.2 (2 GW), and N-9.3 (1.5 GW). These will be awarded through negative bidding and non-price criteria including contribution to decarbonisation, PPAs, noise levels, and contribution to workforce development.

Norway held its first ever offshore wind auction in the first half of 2024 for the Sørlige Nordsjø II site (1.5 GW). The evaluation of the bids was based on both the bid price (a 15-year 2-sided CfD was offered with the strike price indexed to the CPI) and pre-qualification criteria. The latter included execution capability, sustainability, and positive ripple effects. The country will not be tendering any further offshore wind capacity in the second half of 2024.

France awarded the first commercial scale (250 MW) floating offshore wind farm, the AO5 Sud Bretagne. The bids ranking included both price and non-price criteria focused on social and territorial development issues as well as environmental issues. France is expected to award an additional 500 MW of floating offshore wind energy in 2024, as part of the AO6 Mediterranean I and II tender, again using a mixture of price and non-price criteria. The support offered is in the form of a 20-year 2-sided CfD with a maximum strike price of €130/MWh, indexed to industry-relevant inflation indices.

Lithuania held its second offshore wind energy auction in the first half of 2024. The country sought to allocate support with a 15-year 2-sided CfD for a 700 MW wind farm. However, only one bid was received rendering the auction unsuccessful. The auction is expected to be held again and the winner will be announced in June 2025.

Upcoming onshore auctions

In the second half of 2024, several countries will hold onshore wind energy auctions.

Ireland will hold its annual technology-neutral renewable energy auction round (RESS 4) in the second half of 2024, to provide support to 2,500-4,500 GWh of renewable electricity from onshore wind and solar PV. The introduction of technology-specific caps has lowered the maximum onshore wind bidding price from €110/MWh in last year's RESS 3 to €93.50/MWh. This is expected to negatively impact the financial viability of some onshore wind energy projects, possibly negatively impacting the auction subscription rate.

The support offered is a 16.5-year 2-sided CfD, with strike prices partially indexed to the Harmonised Index of Consumer Prices (HICP).

The Netherlands will run its yearly SDE++ scheme in the second half of 2024. The SDE++ scheme is a technology-neutral auction scheme which features onshore wind energy as one of several competing technologies. The 2024 edition features an overall budget increase of €3.5 billion to €11.5 billion compared with the 2023 edition. However, the scheme does not feature a fixed quota for the support offered to onshore wind. The support offered is a 15-year capped Feed-in-Premium.

Spain is unlikely to hold the 1.5 GW onshore wind auction round originally scheduled to take place in 2024. The country is currently designing a new renewable energy auction scheme that will replace the existing scheme and embed EU Net-Zero Industry Act provisions. The new scheme is rumoured to be launched in 2025.

Poland will seek to award support to 21.75 TWh of renewable electricity from onshore wind and solar PV systems with a project capacity greater than 1 MW. The maximum bidding price for onshore wind has not yet been announced. Last year's round was heavily unsubscribed, with only 25 MW of onshore wind awarded, owing in part to better conditions offered by the Polish PPA market. The support offered is a 15-year 2-sided CfD, with strike prices indexed to the CPI.

Romania will launch its first renewable energy auction in the second half of the year, in which it will aim to allocate support to 1 GW of onshore wind energy projects. The country will offer a 15-year 2-sided CfD contract with a maximum bidding price of €82/MWh. Additionally, the strike price is indexed to inflation (CPI), but increases occur only once every three years if CPI increases by 10% or more.

Serbia and **Croatia** are each expected to run an onshore wind energy auction in the second half of 2024 seeking to allocate support to 150 MW and 300 MW respectively. Both countries offer a 2-sided CfDs. Croatia offers support for 15 years with a maximum price of €75/MWh and while Serbia will provide support for 12 years, it has not yet disclosed the price details.

Upcoming offshore auctions

Denmark is set to auction 3 GW of offshore wind energy across the three sites in the North Sea I area in 2024. Bids will be evaluated based on the financial offer (negative bidding) and non-price criteria focusing on sustainability and social responsibility.

Ireland is set to auction 900 MW of offshore wind energy under the ORESS 2.1 auction round in the second half of 2024. The award will be based on price only. The support offered is likely remain a 16.5 year 2-sided CfD. Details on the reference price have not yet been revealed.

Italy is expected to launch the first of three calls for offshore wind energy in Italy by the end of 2024. The long-awaited FER 2 offshore renewable energy auction scheme has been approved by the European Commission and signed off by the competent authority earlier this year. The volume that will be offered in the first call has yet to be announced.

Support will be offered in the form of a 25-year 2-sided CfD with a reference price of €185/MWh. Winning projects will be awarded on price only. Support to 3.8 GW of offshore wind energy will be offered under the scheme.

Portugal is still aiming to launch its first floating offshore wind energy auction round in the second half of 2024, for a total of 2 GW. However, terms and conditions including details on support are not yet known.

Table B. Upcoming auctions and tenders results for wind energy in H2 2024

Onshore	Auction	Type of auction	MW available	Policy mechanism
Austria	EAG- Technology specific Sept-Oct round	Specific	100	Feed-in-Premium
Austria	EAG- Technology specific Jul-Aug round	Specific	100	Feed-in-Premium
Austria	EAG- Technology specific Nov-Dec round	Specific	100	Feed-in-Premium
Croatia	2024 auction	Specific	150	Contract for Difference
France	AO PPE 2 Neutre- 3rd round	Neutral	500	Contract for Difference
France	AO PPE 2 Eolien terrestre- 8th round	Specific	925	Contract for Difference
Germany	EEG- Technology specific Aug round	Specific	2,708	Feed-in-Premium
Germany	EEG- Technology specific Nov round	Specific	4,093	Feed-in-Premium
Germany	EEG- Technology neutral innovation Sept round	Neutral	583	Feed-in-Premium
Ireland	RESS 4	Neutral	-	Contract-for-Difference
Italy	FER 1- 15th round	Neutral	-	Contract-for-Difference
Italy	FER X 2024	Specific	3,300	Contract for Difference
Netherlands	SDE++ Autumn 2024	Neutral	-	Feed-in-Premium
Poland	2024 technology neutral auction	Neutral	-	Contract for Difference
Romania	1st technology specific auction	Specific	1,000	Contract for Difference
Serbia	2024 technology specific auction	Specific	300	Contract for Difference

Offshore	Auction	Type of auction	MW available	Policy mechanism
Denmark	North Sea I- Area 3	Specific	1,000	Negative bidding
Denmark	North Sea I- Area 2	Specific	1,000	Negative bidding
Denmark	North Sea I- Area 1	Specific	1,000	Negative bidding
France	AO6-Mediterranean I floating	Specific	250	Contract for Difference
France	AO6-Mediterranean II floating	Specific	250	Contract for Difference
Germany	N-9.2 (central)	Specific	2,000	Negative bidding
Germany	N-9.1 (central)	Specific	2,000	Negative bidding
Germany	N-9.3 (central)	Specific	1,500	Negative bidding
Ireland	ORESS 2.1	Specific	900	Contract for Difference
Italy	FER 2- 1st round	Specific	TBC	Contract for Difference
Portugal	Floating	Specific	2,000	Contract for Difference

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