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ENERGY RESEARCH

Status and outlook for offshore wind in the EU

DFBEW/OFATE conference on offshore wind

18th of October 2022

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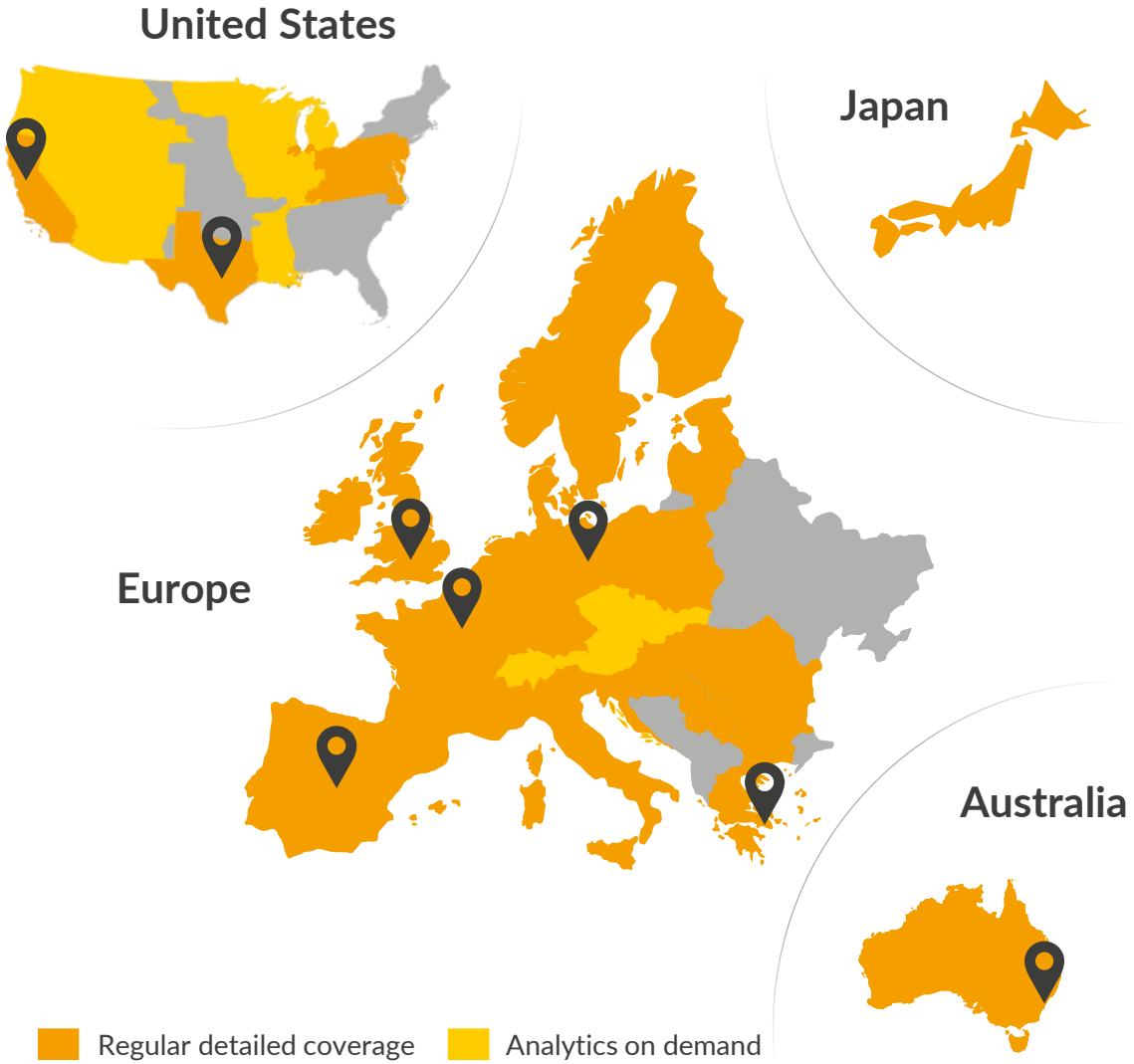

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Source: Aurora Energy Research

Agenda

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I. Overview of European wind offshore capacity

II. Offshore wind in Germany and France

III. Policy and regulatory overview – Germany

IV. Policy and regulatory overview – France

Germany and the UK have the highest targets for offshore wind, but supply chain constraints and grid limitations can risk its expansion

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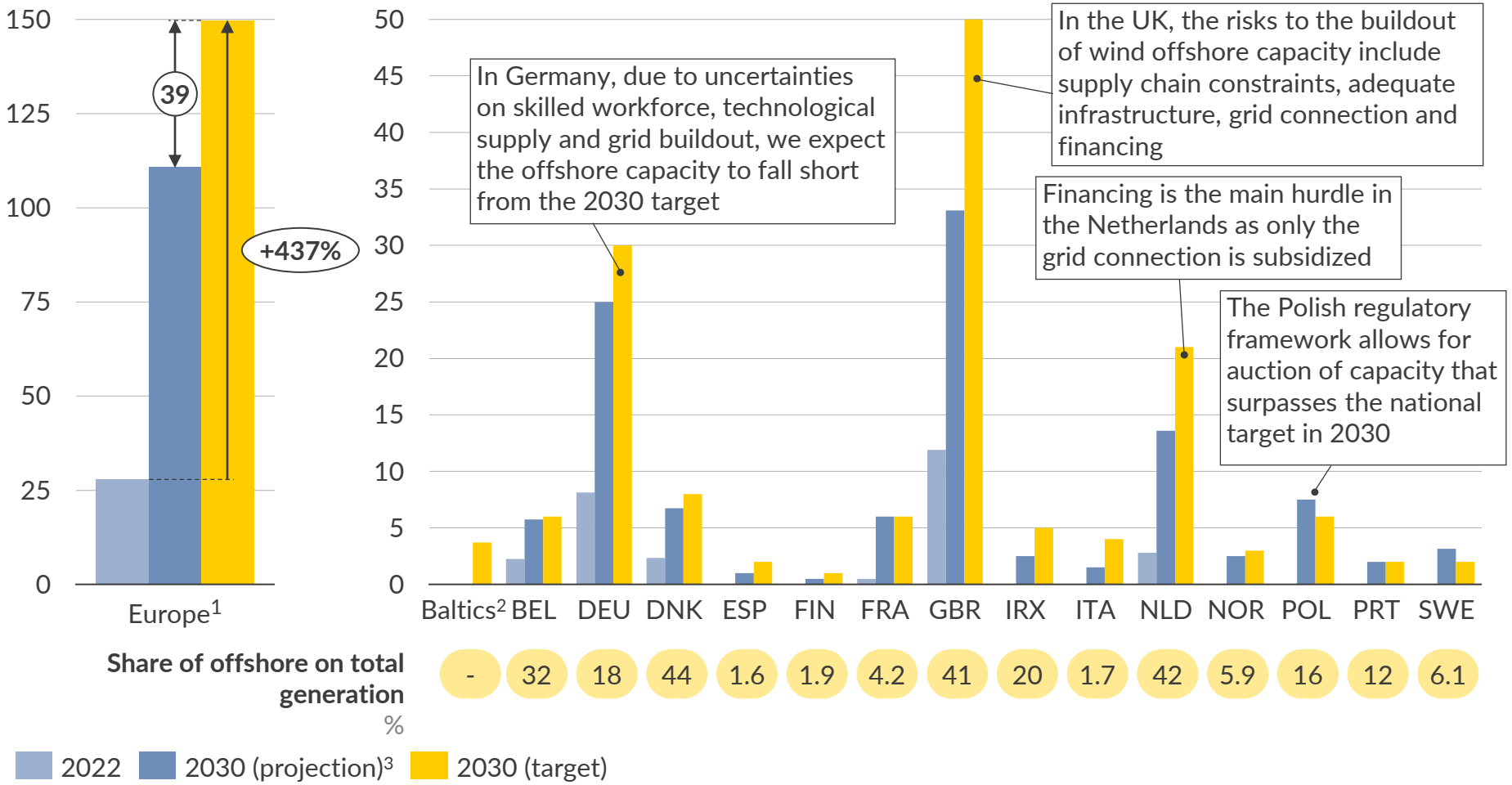
Offshore installed capacity in European countries

GW



1) Includes the EU-27, the UK, and Norway; 2) Baltics include Estonia, Latvia and Lithuania – first Aurora reports for this region are planned for early 2023; 3) Based on Aurora Central scenario from the Power and Renewables Market Forecast of July 2022

Source: Aurora Energy Research, European Commission, RTE, Nordic TSO, NECP, National energy strategies

Comments

- The European countries have ambitious targets for the expansion of offshore wind capacity until 2030, requiring an almost **four-fold increase** compared to the levels of 2022
- The Aurora Central scenario from July 2022, however, expects that total European offshore wind capacity **will fall short from its target** in 2030
- Main challenges come from the very ambitious targets of Germany and the UK as they face **supply chain constraints, lack of infrastructure and grid connection** as the main risks

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Offshore wind has a relevant role for the decarbonization of Germany and France, representing over 10% of total capacity by 2050

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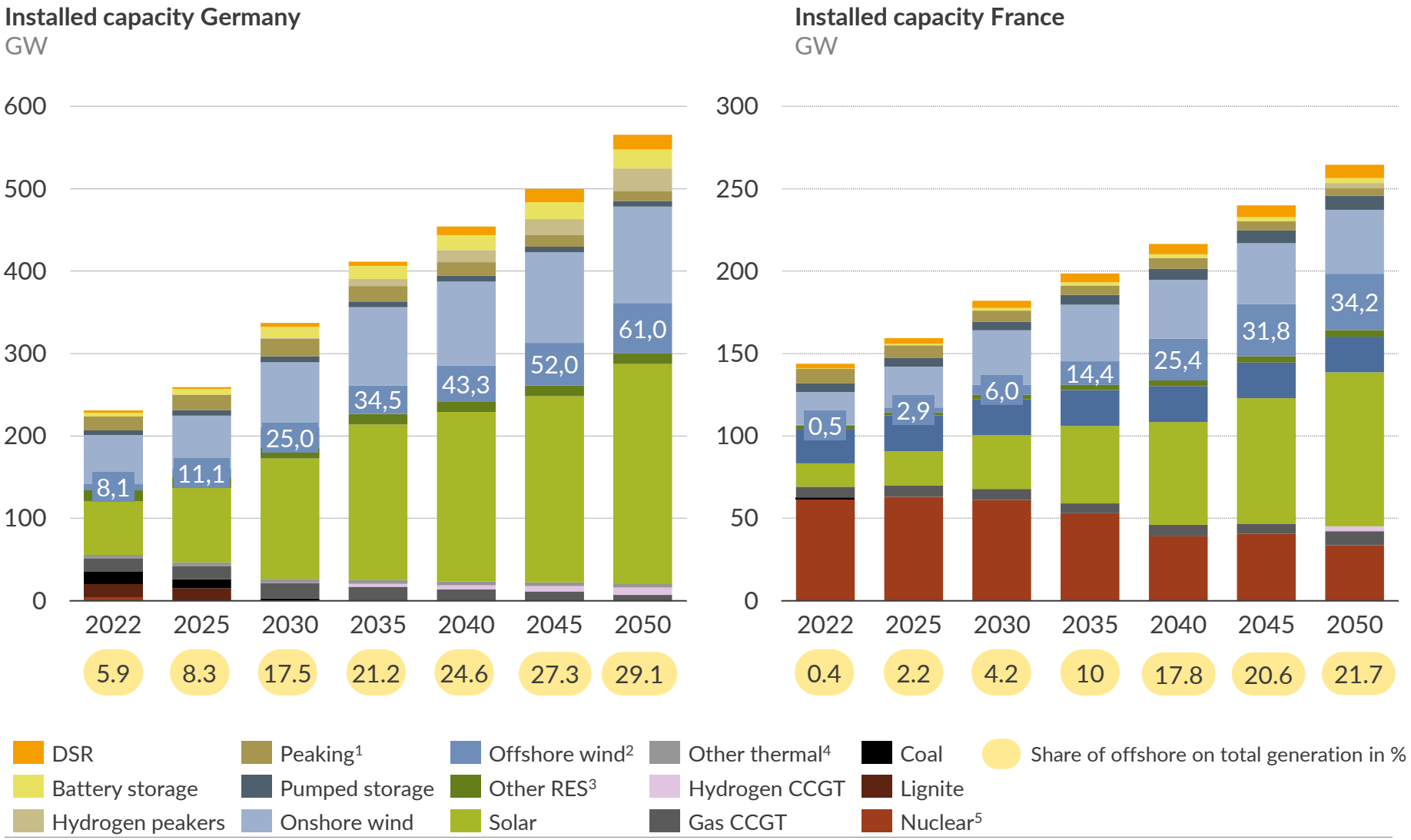

1) Peaking includes OCGT, reciprocating engines, oil and DSR; 2) Offshore wind includes fixed and floating offshore wind; 3) Other renewables includes biomass, hydro run-of-river and tidal; 4) Including waste plants and on-site industrial thermal power plants, 5) Nuclear includes large nuclear reactors and SMR.

Sources: Aurora Energy Research

Comments

- Offshore wind is the third technology in installed capacity in Germany and France by 2050, representing 10.8 and 12.9% of total installed capacity, respectively
- The level of offshore wind capacity in France by 2050 is quite significant, as it is expected to match that of nuclear capacity
- Nevertheless, solar PV and onshore wind remain as the main renewable technologies in Germany and France, representing 68 and 50% of total installed capacities by 2050, respectively

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The amendment of the Offshore Wind Act aims to speed up offshore wind buildout and introduces new rules for tenders

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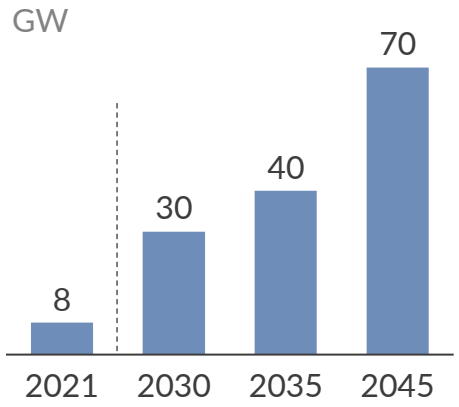
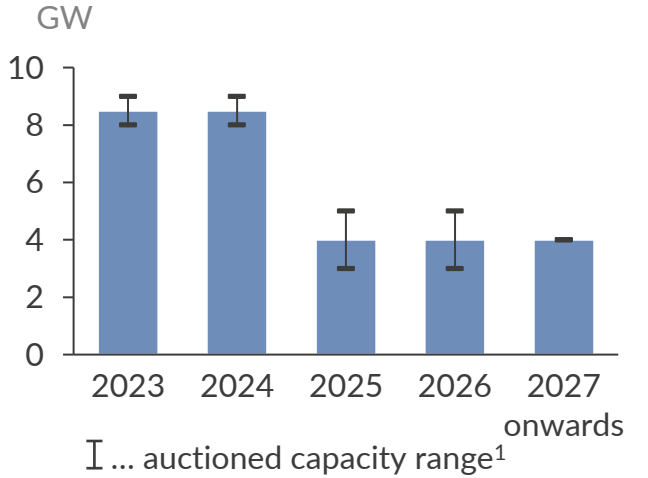
Main updates introduced in the Offshore Wind Act

- Significant increase of capacity targets — 30 GW in 2030 and 70 GW in 2045
- Offshore wind expansion defined as paramount public interest, significantly improving likelihood of accelerated project realisation
- Revamped auction system (see below)
- Mandatory and shortened deadlines for planning and approval process
- Grants government the authority to pass regulation for auctions for Contracts for Industry (CI) for pre-examined sites, i.e., set offtake agreements with industrial offtakers

Offshore wind capacity targets



Offshore wind auctioned capacity per year



Revamped auction system is set to ensure competitive bidding while expecting zero subsidy bids

1 Tenders for pre-examined[2] sites …

… are awarded based on comprehensive bidding criteria, with the highest score winning the tender:

- Value of one-time payment for the site by the developer (max. 60 pts for highest bid)
- Additional criteria (max. 35 pts)
  - Contribution to decarbonisation of offshore wind plants (max. 5 pts)
  - Production volume contracted under PPAs (max. 10 pts)
  - Noise pollution & seabed sealing (max. 10 pts)
  - Contribution to secure/develop skilled labour (max. 10 pts)

2 Tenders for NON pre-examined sites …

… are awarded based on a sealed bid in the first round, which, if necessary, is followed by a dynamic bidding process:

- First round – sealed bid for support level in market premium scheme; lowest bid wins
- Second round – if more than one zero subsidy bid was handed in during the first round:
  - All zero subsidy bidders participate in dynamic bidding process
  - Bidders agree to incrementally increasing one-time payment they have to make if they win the auction, until only one bidder remains

1) Range reflects the yearly possible range of auctioned capacity defined in the Offshore Wind Act. 2) Pre-examined sites refers to sites which have been deemed suitable for the development of offshore wind infrastructure by the Federal Maritime and Hydrographic Agency (*Bundesamt für Seeschifffahrt und Hydrographie*, BSH).

Sources: WindSeeG, Aurora Energy Research

Last auction for offshore wind in Germany was held in Sept 2022 with COD planned for 2027, bid cap at 64EUR/MWh but only zero-bids won

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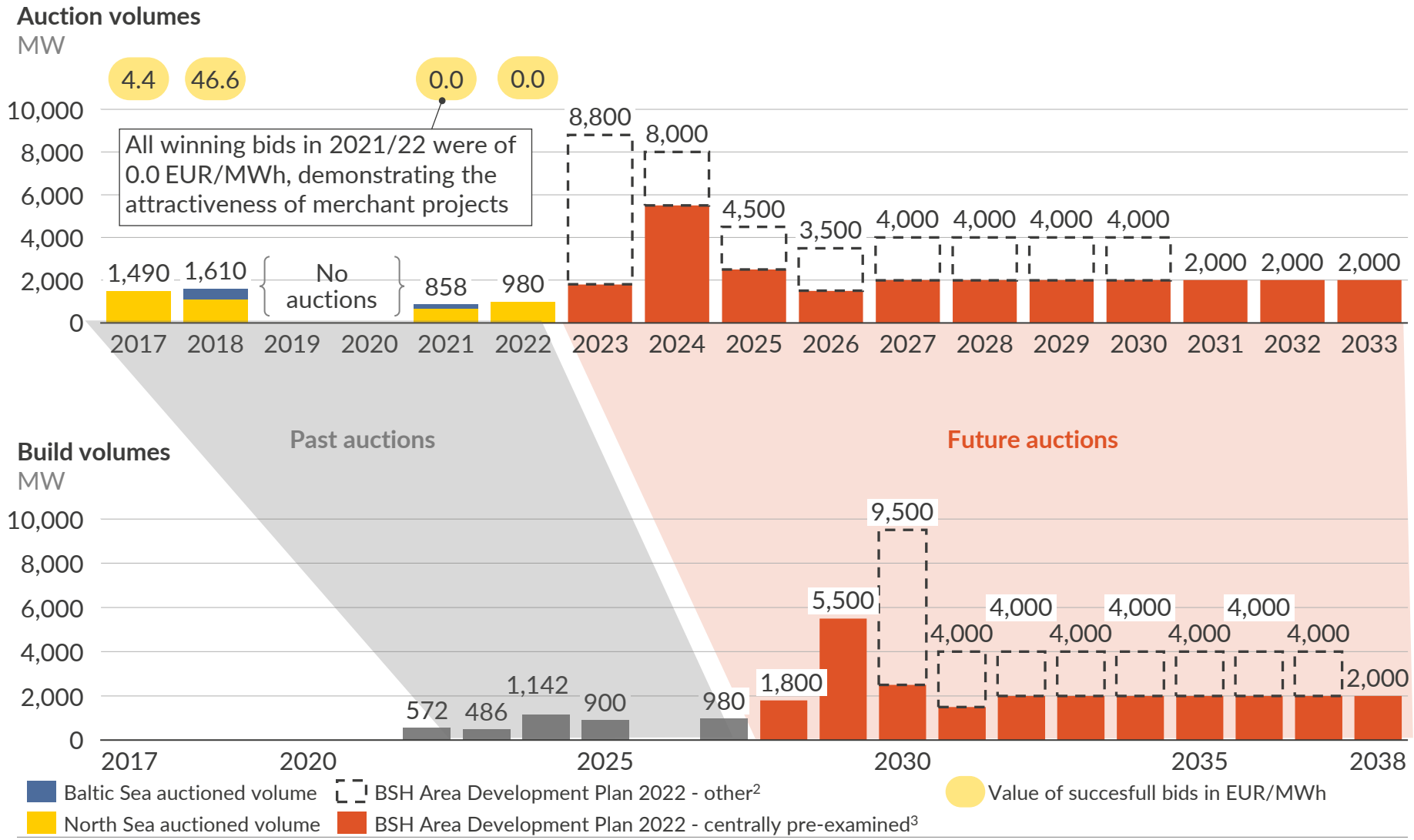

- Government is set to hold more auctions for offshore wind power in the next months
- Additional auction rounds will fill the gap in tenders for the next years and to meet the new offshore targets (30 GW in 2030 and 70 GW in 2045)

- Between 2021 and 2025, 3 GW of offshore build-out will become operational as a result from previous auction rounds

1) The National Hydrogen Strategy outlines a need for up to 5 GW (10 GW) of offshore capacity for hydrogen production by 2030 (2035, by latest in 2040). For 2030, we assume that 3 GW will come from regular offshore sites connected to the power grid (10 GW in 2040); 2) Non-centrally pre-examined areas have longer construction lead times and are subject to different auction rules 3) All centrally pre-examined areas are in the North Sea according to the German Federal Maritime and Hydrography Agency's Area Development plan for North and Baltic Seas

Sources: Aurora Energy Research, BNetzA, BSH

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According to RTE, France's offshore capacity in 2050 will range between 22 and 62GW, and the current main financing scheme are CfDs

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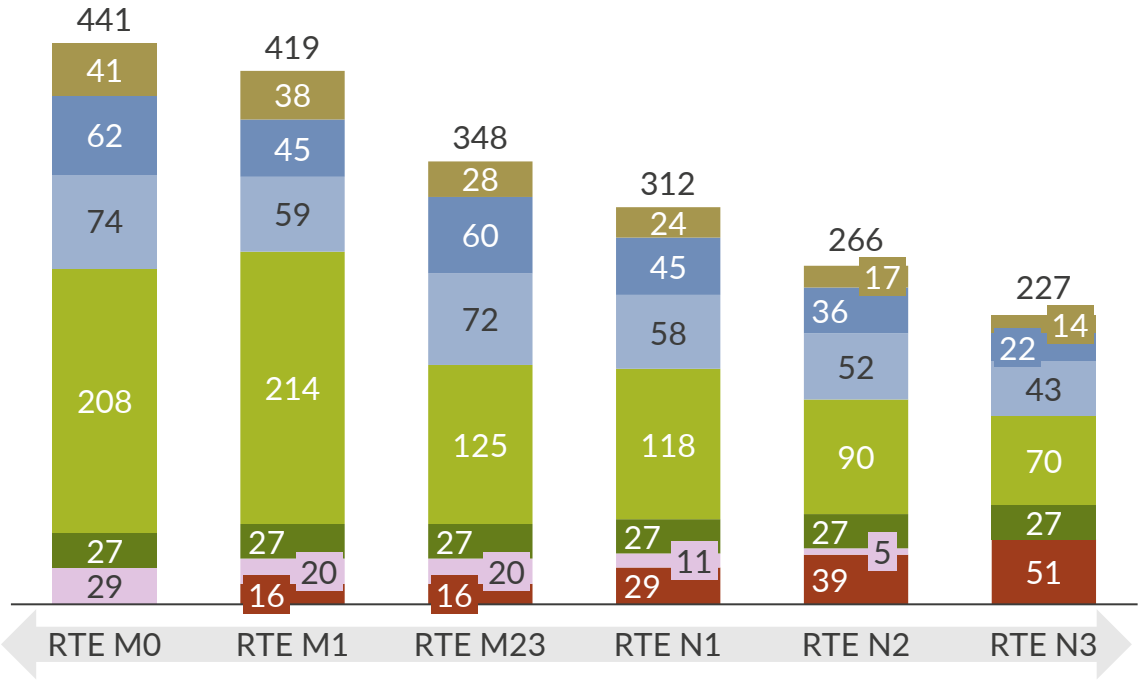
Capacity mix in 2050 across RTE capacity scenarios

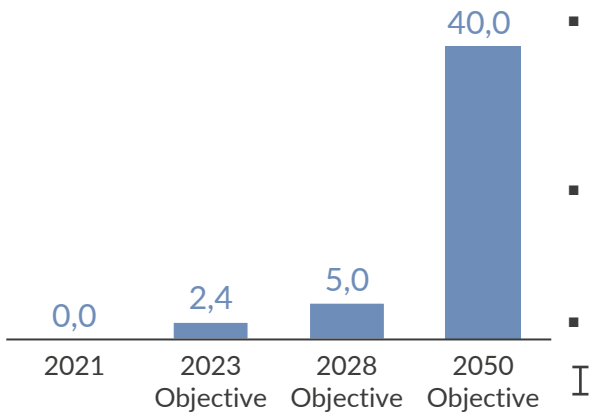
GW



Commissioned by the French government, RTE's "Futurs Energétiques 2050" (October 2021) report presents 6 scenarios on the evolution of production and consumption to reach the Net Zero by 2050 objective. Offshore wind capacity for 2050 ranges between 22 and 62 GW, versus 36 GW in Aurora Central.

Flexibility[1] | Onshore wind | Other RES[2] | Nuclear[4]
Offshore wind | Solar | Hydrogen thermal[3]

Long term national target for wind offshore[5]



Source : Programmations pluriannuelles de l'énergie (PPE) 2019 - 2023

- Ambition to build 50 offshore wind farms by 2050 and to become one of the top market for floating offshore.
- 1st offshore wind farm (in Saint Nazaire) to be commissioned in 2022
- Offshore wind can partake in site-specific tenders to obtain a CfD

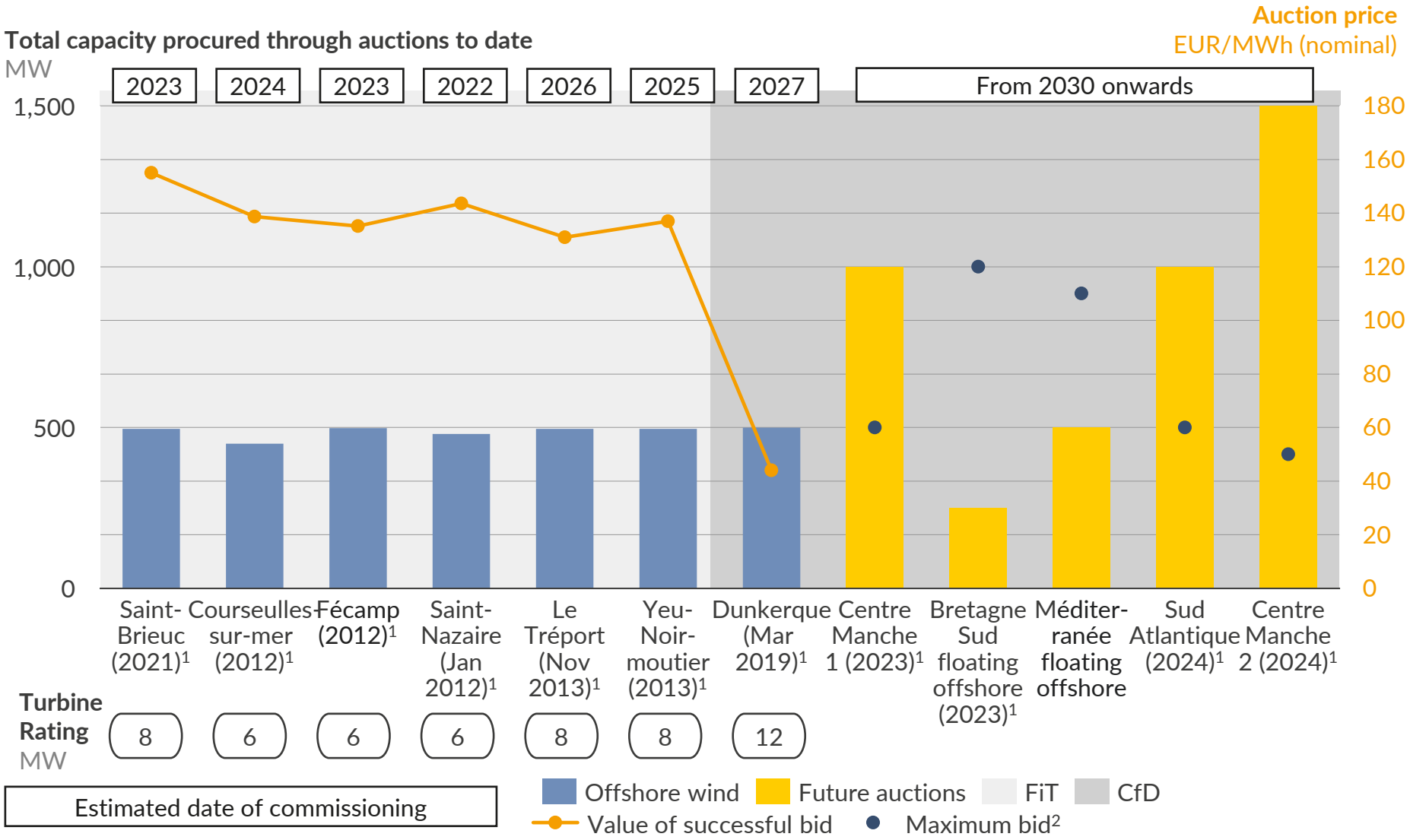
Detailed view on the French CfD – Contract for difference

- Contract duration: 20 years
- Auction design:
  - Type: Pay-as-bid
  - Rating: Price (80); Environmental criteria (20)
- Strike price: Pre-specified cap and floor of the bid vary across periods. Dunkirk maximum bid allowed was set to 90 EUR/MWh and the minimum one to 0 EUR/MWh.
- Reference price: Monthly capture price of the entire wind fleet (both onshore and offshore), when prices are ≥ 0.

1) Flexibility includes battery storage, pumped storage, gas reciprocating engines, oil-fired plants, gas OCGTs and DSR; 2) Other RES includes biomass, hydro and tidal; 3) Hydrogen thermal refers to hydrogen CCGTs; 4) Nuclear refers to both large scale reactors and small modular reactors; 5) Targets from the Programmations pluriannuelles de l'énergie (PPE) 2019 - 2023

Sources: Aurora Energy Research, Futurs Energétiques 2050, Ministère de la Transition écologique et de la Cohésion des territoires

Dunkerque auction saw price plummeting to 44 EUR/MWh against an average of c. 140 EUR/MWh for the first 6 auctions



1)Announcement of winning offer; 2) Maximum bid based on "*Construire Ensemble l'avenir maritime de la France*" Mars 2022 - Sécrétariat général de la Mer

Sources: Aurora Energy Research, CRE, FEE, Eoliennes en Mer, Comité interministériel de la Mer

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Comments

- No auctions between 2013 and 2019 mainly due to limited area for the installation of fixed turbines. Technology development required for floating offshore only happened in recent years and auctions resumed
- The first offshore turbine was installed in April 2022 as part of the Saint Nazaire wind farm, which saw its 80 turbines installed this September and will be operational at the end of the year
- On the 9th of August of 2022, the preliminary dialogue led by CNDP decided that there would be auctions for two wind farms in Normandy: Centre Manche 1 and 2

Details und Haftungsausschluss

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Status and outlook for Offshore wind in the EU

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