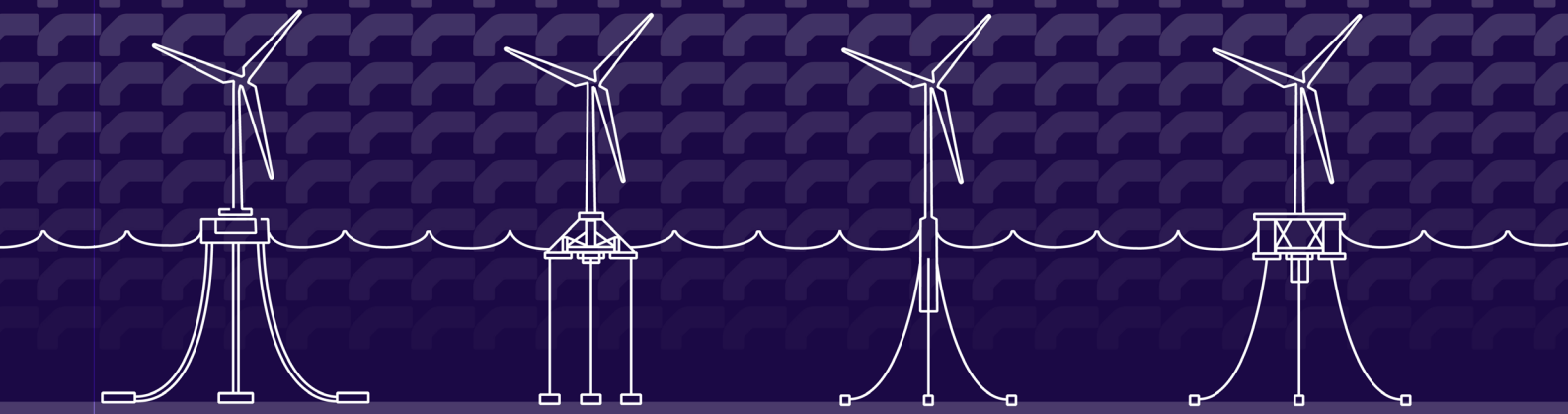


HOW FLOATING OFFSHORE WIND WILL CHANGE THE WORLD

In the first of our new series of articles on this emerging industry, we discuss why floating offshore wind is something to get excited about – from its role in the energy transition to the project and investment opportunities.

ALUN WILLIAMS, GLOBAL OFFSHORE RENEWABLES DIRECTOR

Floating offshore wind is the new kid on the block. Compared to its more established sibling, fixed offshore wind, it has different deployment challenges due to projects being sited in deeper waters. However, despite pressing global goals for reaching net zero carbon, there will always be limits on the capacity of fixed offshore wind. In fact, most wind resource potential exists at depths that rule out fixed turbines. That makes floating offshore wind an important avenue to explore – one full of possibility. Once, it was a technology considered too new for some investors and developers to take a serious interest, but that is rapidly changing as commercial scale projects get established.

The opportunity

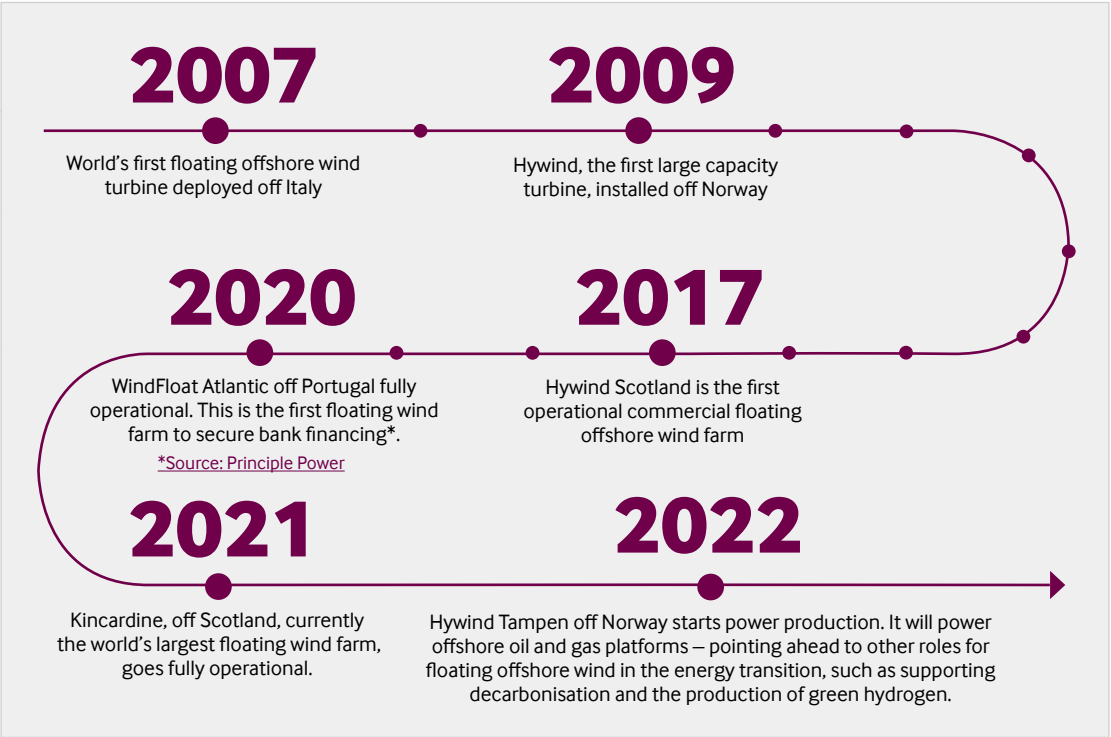
The further offshore you go, the stronger the wind speeds, meaning greater potential for energy generation. What's more, **80% of offshore wind resource occurs in waters exceeding 60m depth**. This means new opportunities for markets where fixed foundations are unsuitable, such as the US West Coast. It also represents opportunities to develop as clean energy pioneers, to generate local jobs and achieve greater energy independence.

Floating projects avoid some of the disadvantages of developing lease areas closer to the shore. These include limits on the amount of coastline available for development; the need for suitable seabed for foundations; flora and fauna that live in shallow water; and challenges on the grounds of visual impact.

As for the size of the opportunity, the Global Wind Energy Council (GWEC) describe the **forecast for floating offshore wind** as "increasingly bullish, rising from our 2020 forecast of 6.5GW by 2030 to 16.5GW in our 2021 forecast". The trade association RenewableUK found that the global **project pipeline has more than doubled in the last 12 months**, from 91GW to 185GW. (That's a jump from c.**130 to 230 projects**.) And floating wind opportunities were a headline in California's first ever offshore wind lease auction in December, which achieved **$757 million in bids**.

A brief history of floating offshore wind

Although actual development began relatively recently, the project landscape is clearly heating up.



Who will lead the world?

While the UK and Denmark were first to develop fixed offshore wind farms, the field is wide open to become a leader in floating offshore wind – with various markets vying to take the title. The UK's former prime minister Boris Johnson included ambitions for floating projects when he spoke of how "as Saudi Arabia is to oil, the UK is to wind".

Meanwhile, it's been suggested that **Norwegian companies could corner 5-14%** of the global floating offshore wind market by 2050. And Copenhagen Offshore Partners' Chief Development Officer - Japan has said that "**Japan can be the largest floating market in the world**", with a potential to be a 100GW market by 2050, most of that from floating projects. To support this, however, it will need to set clear targets and establish the legal frameworks needed for development.

Some countries have set ambitious goals for this new technology, while others look set to increase them. For example, the **US target is 15GW of floating offshore wind capacity by 2035**. Having **previously aimed for 1GW**, the UK **raised its own target to 5GW by 2030**, having allocated 15MW of floating projects in the ScotWind leasing round and looking to award 4GW of floating leases in the Celtic Sea. **Italy's target for offshore wind** is just 900MW, but there are calls for that to **rise to 3.5GW** now floating technology is more mature.

Ambitions and targets don't necessarily follow the same ranking order as the **market readiness list** recently published by the UK innovation and research centre Offshore Renewable Energy (ORE) Catapult. In this list of near-term floating offshore wind markets, countries are ranked by meeting or exceeding basic thresholds for offshore wind, although ORE point out that not all will develop it commercially.

MARKET READINESS LIST: NEAR-TERM FLOATING OFFSHORE WIND MARKETS

1	United Kingdom	12	Spain
2	Japan	13	Vietnam
3	France	14	Greece
4	South Korea	15	Poland
5	Taiwan	16	Sweden
6	Norway	17	Philippines
7	United States	18	Brazil
8	China	19	Denmark
9	Portugal	20	Australia
10	Ireland	21	Canada
11	Italy	22	India

Source: Offshore Renewable Energy (ORE) Catapult

Around **58% of the actual floating offshore wind pipeline** is for European projects, including 18% from the UK, followed by the US, Australia, and South Korea.

It's clear that the industry is pushing for the support it needs to get projects operational: on government policy, the **supply chain**, technology, and a skilled workforce. While potential for this varies, there are some strong commitments: the US plans to cut related technology costs by 70% by investing **$50 million in R&D and demonstration projects**, and the UK has pledged **over £60 million in private and public funding** to develop floating wind technology.

Dealing with the depths needed for floating wind also makes experience from oil and gas and other deep-water projects increasingly transferable and relevant. This is one way that the '**just transition**' of the energy workforce into renewables could be achieved.

Related read: find out more about offshore wind workforce development here

When will floating become the new fixed?

The 2020s will likely see the first generation of GW-scale floating projects as the market moves from pre-commercial to commercial phase. To achieve this, the sector will need to mature, overcome a number of challenges and demonstrate rapid cost reduction (all things that the industry has achieved during the maturing of fixed foundation wind).

Everyone is watching to see how long it takes to bring costs for floating and fixed offshore wind in line. Matei Negrescu, Vice President of Area Development, North Sea Renewables at Equinor has stated that, "We believe that **cost parity with fixed bottom wind can be achieved in the early 2030s**, but you really need to go at scale".

In due course, it's likely that floating offshore wind deployment will catch up with, and ultimately surpass, fixed foundation wind. In addition, as the floating industry matures, fixed offshore wind will inevitably reach constraints on its further expansion.

An age of innovation

It's true that floating technology is still evolving. There are unique challenges to be answered, such as entanglement risk related to moorings and the question of exclusion zones for fisheries, as well as the need for dynamic, high-capacity cables. (Cabling ready for the level of voltage required by some proposed projects **has not yet been used**.)

However, floating offshore wind isn't starting from scratch. It could leverage and develop on existing technology, learning from fixed offshore wind and also from floating oil and gas platforms. It could also revitalise ports, which will be needed for assembly and maintenance.

And the floating offshore wind industry is clearly looking hard for even better methods of generating power. For example, the American car giant General Motors has invested in the Norwegian developer of **multi-turbine 'wind catcher'**, which aims for commercial installation by 2027. Meanwhile, the **TetraSpar project** is a world-first demonstration of an industrialised offshore foundation, with "**a leaner manufacturing process**, faster assembly, and lower material costs". The foundation and keel were assembled in-port using no welding, and the demonstrator is in full operation off Norway at a water depth of 200m.

Floating offshore wind is an exciting, achievable next step in the evolution of global energy generation. In our next articles in this series, we'll explore how these development projects can be brought to fruition.