2019 - 2034

Volume 2
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Brochure of Report Highlights
Report Findings

This comprehensive report dedicated to Floating Wind illustrates the growing market opportunities across the supply chain over the next 15 years including the most active developers, potential market size, pertinent project activity details and other vital metrics illustrated by region and construction timeline. Quest projects that more than 17.5 GW of Floating Offshore Wind will be installed worldwide to 2033, a number that will grow exponentially following the addition of newly announced projects.

1. The wind industry continues to deliver value to enhance wind’s cost competitiveness and efficiency with steady improvements in the Levelized Cost of Electricity (LCoE). Since 2016, offshore wind particularly has pushed reductions in LCoE in excess of 50%.

2. Offshore globally, there have been more than 1.4 GW of offshore wind auctions planned in 2019 following a strong showing of 3.3 GW in 2018.

3. The European Union is leading projected installed capacity additions in offshore wind (Floating and Bottom-fixed) totaling 92GW at 2030 in the Sustainable Development Scenario growing to 175GW by 2040.

4. Offshore Floating Wind Energy is a robust, fast-moving market. Europe has been the ‘test bed’ for Floating wind and the success of these projects is driving export of this technology to South Korea and Taiwan now and to the USA well before 2025. The view towards large-scale projects aided with ample financial backing will help to drive efficiencies and lead to significantly reduced costs.

5. Ten potential super-sized Floating offshore wind projects, each ranging between $2.2 billion and $10.8 billion in CapEx, represent a sizeable share (over 60%) of the $63 billion total addressable market presently identified.

6. As illustrated in the report’s figures, the near-to-medium term market to 2026 is sizeable representing $44.6 billion in CapEx comprising projected wind power capacity additions of 11,397 MW to be powered by 1,400 Floating Turbine Units (FTUs).

7. Projects with status Online and Under Development denote 869 cumulative MW led by South Korea (504 MW) then France (107 MW), Norway (93 MW) and the United Kingdom (81.5 MW). Japan, Portugal and Spain round-out the total.

8. Near-to-medium-term projects with statuses Under Development and Planned total $15.9 billion in CapEx led by Asia/Pacific with $6.8 billion, USA-Pacific with $6.2 billion, Northern Europe with $2.1 billion, and Southern Europe with $0.7 billion. Over this period, $6.1 billion will be allocated to turbines, $3.5 billion to substructures, $2.5 billion for cabling, $1.8 billion in moorings, and $402 million on installation.

9. Larger scale defines the project mix starting with 2020 & 2021 project sanctions (FIDs) and Q FWE forecasts a crescendo of activity from 2024-2026. Regions leading the charge are the USA-Pacific (Castle Wind), Saudi Arabia (Plambeck) and the 4x 20-25 units each projects in South Korea (Donghae I, Donghae TwinWind, Gray Whale and White Heron). These Planned projects represent wind power capacity additions totaling 3,344 MW from 370 FTUs.

Regional Highlights

10. Projects with status Planned and Possible denote 3,344 and 13,360 cumulative MW, respectively, across the USA-Pacific, Asia/Pacific, Northern Europe, USA-Atlantic and Southern Europe. USA-Pacific and Northern Europe represent 59% of this total while Asia/Pacific denotes 30% and USA-Atlantic and Southern Europe are about 6% and 5%, respectively.

11. The USA, United Kingdom, Taiwan, Japan, South Korea and Spain lead the exponential growth in cumulative total MW for Planned and Possible offshore Floating wind projects to 2033. These countries represent projected wind capacity additions totaling over 16 GW. Other notable contributors include Saudi Arabia, France and Norway.

12. The Asia/Pacific region leads total FTU activity volumes with a 63% share of the projects Under Development representing 65 floaters. As a whole, the Asia/Pacific opportunity sees potentially 815 Floating units by 2033 representing 5.5 GW of installed capacity. Asia Pacific developers and their supply chain, on par with their Northern Europe counter parts, are leading the charge towards improved project economics and more optimized CapEx/MW and ultimately lower LCoE’s.

13. The Asia/Pacific Is a Definite Bright Spot. Quest sees the near domination of Floating wind presently shining through across the Asia/Pacific with a Total Addressable Market exceeding $22.9 B CapEx represented by six projects in South Korea, six in Japan, four in Taiwan, and one in Saudi Arabia. Shell (EOLFI) looks to develop four of the six largest projects as measured in CapEx which are located in Taiwan. Acacia joined with designer Ideol is set to develop the largest project in the region to be situated off the western shore of Japan.

14. In the Asia Pacific, Shell (EOLFI), Marubeni and Acacia lead development activities in the region for announced projects totaling 571 FTUs out of 820 across the Asia/Pacific in total. Top designers include Ideol, PPI, Saipem, and Hexicon when measured in number of Floating Turbine Units.
15. Projected CapEx in Northern Europe is led by the United Kingdom with eight projects representing $13.8 billion in spend and Norway with four presently identified projects totaling $996 million in CapEx.

16. Off Southern Europe 913 MW of offshore Floating wind projects are presently identified denoting an average of $5.5 million CapEx per MW, one of the higher unit costs across regions led from the disproportionate mix of both Demonstrator and Pre-Commercial projects (relative to the smaller number of Commercial projects that received Final Investment Decision). These 10 projects exceed $3.9 billion in CapEx with 39% allocated to turbines, 25% substructure, 9% cabling, 15% mooring system and 3% installation.

17. Nearly six GW of projects comprising 622 FTUs are identified for the USA-Pacific and Atlantic waters averaging $4.2 million CapEx per MW and representing a total spend of about $20 billion. The segmentation by supply chain shows turbines at $8.3 billion (42%), substructure at $4 billion (20%), cabling $3 billion (15%), mooring $2.2 billion (11%) and installation $518 million (2.6%). The majority of USA-Pacific’s offshore Floating wind projects are Commercial scale with the first project stated to be Online in 2023 or 2024.
Sample Charts, Graphs & Tables (Report contains 150 figures in total)

### Seven-Year Comparisons - Under Development, Planned & Possible

**CapEx 2020-2026**

<table>
<thead>
<tr>
<th>Turbine</th>
<th>Total Addressable Market (m$)</th>
<th>Total CapEx (m$)</th>
<th>CPE (CapEx per MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore</td>
<td>$44,566</td>
<td>$1400</td>
<td>$34.0</td>
</tr>
<tr>
<td>Onshore</td>
<td>$1390</td>
<td>$11,397</td>
<td>$5.5</td>
</tr>
</tbody>
</table>

**Supply Chain Segment**

- **Horizon**
- **Substructure**
- **Cabling & Cabling Installation**
- **Mooring**

**Region**

- USA - Pacific $11,999
- S Europe $333
- N Europe $4,570
- Asia Pacific $26,346

### Northern Europe Projects in CapEx by Project Name

Under Development, Planned & Possible

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Country</th>
<th>Status</th>
<th>Turbine</th>
<th>CapEx (m$)</th>
<th>CapEx per MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oosterschelde</td>
<td>Denmark</td>
<td>Planned</td>
<td>100</td>
<td>$3,277</td>
<td>$32.77</td>
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<tr>
<td>Kattegat</td>
<td>Denmark</td>
<td>Planned</td>
<td>100</td>
<td>$3,050</td>
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<tr>
<td>Hywind Tampen</td>
<td>Norway</td>
<td>Planned</td>
<td>100</td>
<td>$2,980</td>
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<tr>
<td>Beatrice</td>
<td>US</td>
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<td>100</td>
<td>$2,890</td>
<td>$28.90</td>
</tr>
</tbody>
</table>

**Charts, Tables and Graphics are sourced from Q Vision Products Suite.**
Project CapEx by Developer
2020-2026 (million USD)

- Shell (combined with their acquisition of EOLFI) leads the most active developers globally with about 18% of the spend, $82.2 billion, for those projects scheduled to be Online from 2020 to 2026.
- About 16% of the project spend remains an available opportunity for developers and totals about $7.26 billion in CapEx.
- The second most active developer is EnBW which has a possible project of 100 units named Castle Wind offshore Morro Bay, California within the USA-Pacific region. It is our understanding that this project has yet to finalize their floater design selection.

Project Activity 2020-2026
Under Development, Planned & Possible

- Offshore Floating wind energy is a fast-moving market. Europe has been the “test bed” for Floating wind and the success of these projects will drive export of this technology to the USA and Asia well before 2025. Planned development of large-scale projects aided with ample financial backing will continue to drive efficiencies and lead to significantly reduced costs. We see this trend in turn making European projects more feasible buoyed by additional government support of long-term Floating wind energy developments.
Sample Charts, Graphs & Tables - Continued

Asia/Pacific Project CapEx
By Supply Chain Segment & Status | Under Development, Planned & Possible

- As a whole, the Asia/Pacific opportunity covers potentially 815 units by 2023 representing 5.5 GW of installed capacity.
- On par with Northern Europe, Asia/Pacific developers and their supply chains are leading the change towards improved project economics, more optimized CapEx per MW and ultimately lower LCoEs.

Global Projects in CapEx by Project Size and Name
Under Development, Planned & Possible

- The offshore Floating wind industry was in its infancy only five years ago, an ‘inner circle’ that met more naysayers than believers. This industry has come a very long way in just a few years delivering new floater designs, scaled Demonstrators, Pre-Commercial projects and new players. The entry of companies such as Equinor, Repsol, SBM, Aker Solutions, Royal Dutch Shell and most recently Total has led to a step-change for this young industry’s viability and ultimate capability to produce 50-to-100 (or even 200-plus) Floating Turbine Units (FTUs) on a serial manufacturing basis.
- Ten potential super-sized Floating offshore wind projects shown at right, each ranging between $2.2 billion and $10.0 billion in CapEx, represent a sizeable share (over 60%) of the $63 billion total addressable market of presently identified Under Development, Planned and Possible projects.

Charts, Tables and Graphs are sourced from our Q Vision Products Suite.
About Q Vision

Q Vision provides instant access to real-time data for the world’s Fixed and Floating Wind Energy projects. Driven from Q FWE’s proprietary database, these Microsoft Power BI tools allow for dynamic analyses of relationships across Markets and Technologies, and an enhanced understanding of project Economics including LCoEs.

Q FWE’s Predictive Analytics and Market Expertise enable clients to see the consequence of change led from this rapidly accelerating market. Q FWE’s Subscription Products provide timely and actionable strategic market information. Data products refreshed weekly at a minimum, and within hours of important project updates.

CapEx / LCoE

Q Vision is our proprietary Business Analytics’ tool delivering real-time data and analysis giving you a competitive advantage to win Fixed and Floating Offshore Wind Energy projects. This Microsoft Power BI tool allows for dynamic analysis of relationships across markets and technologies; robust benchmarking as well as an enhanced understanding of project economics including LCoE. Subscribe now to see the consequence of change led from this rapidly accelerating market. Our Subscription Products provide timely and actionable, strategic market information. The Q Vision database subscription includes an Excel data download containing over 120 attributes.

Offshore Turbine Locator

The report highlights Fixed and Floating offshore wind projects by total MW bubble size on a world map, cumulative total MW to 2030 and beyond, and cumulative Total MW by country, with the backing data on page 4. Each page has filters for Status, Region and Development Type.

A roundup of the known universe of Under Development, Planned and Possible Fixed and Floating wind projects, totaling the number of Turbine units in each project. Very handy for getting a quick overview of the potential future market for turbines, floaters, cables, installation and O&M activities. **Includes backing data in MS Excel.**
Number of FTUs by Region & Hull Type

- Semi: 1,213
- Barge: 186
- Semi-Spar: 82
- Spar: 613
- TLP: 3

Contact Us

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