



Quest Floating Wind Energy
a Quest Offshore Resources company

2020 Global Floating Wind Energy Market and Forecast Report 2019 - 2034

Volume 2

Brochure of Report Highlights



Floating Wind Energy Report debuts at US Offshore Wind Event

Quest Floating Wind Energy releases its highly anticipated market report, 2020 Global Floating Wind Energy Market and Forecast (2019-2034) in December. The long-term Outlook sees upwards of 17 GW of installed generation capacity and provides extensive details for all regions. An analysis of the Global Supply Chain including market shares covers Developers, Turbine Manufacturers, Designers, the Mooring segment, Cabling and Installation activities.

This updated report (Volume Two) provides a comprehensive overview of the Global Floating Wind Energy market, from projects in place with CapEx estimates on all segments of the Supply Chain, along with forecast opportunities within each segment.

The reader gets far more than your typical “top-down” forecast as Quest employs their in-depth methodology (driven from Deep Data) which allows the reader to assess the impact of future growth by analyzing the benchmarks set forth in this report collectively, as well as across the Supply Chain.

\$1,995 Single-User

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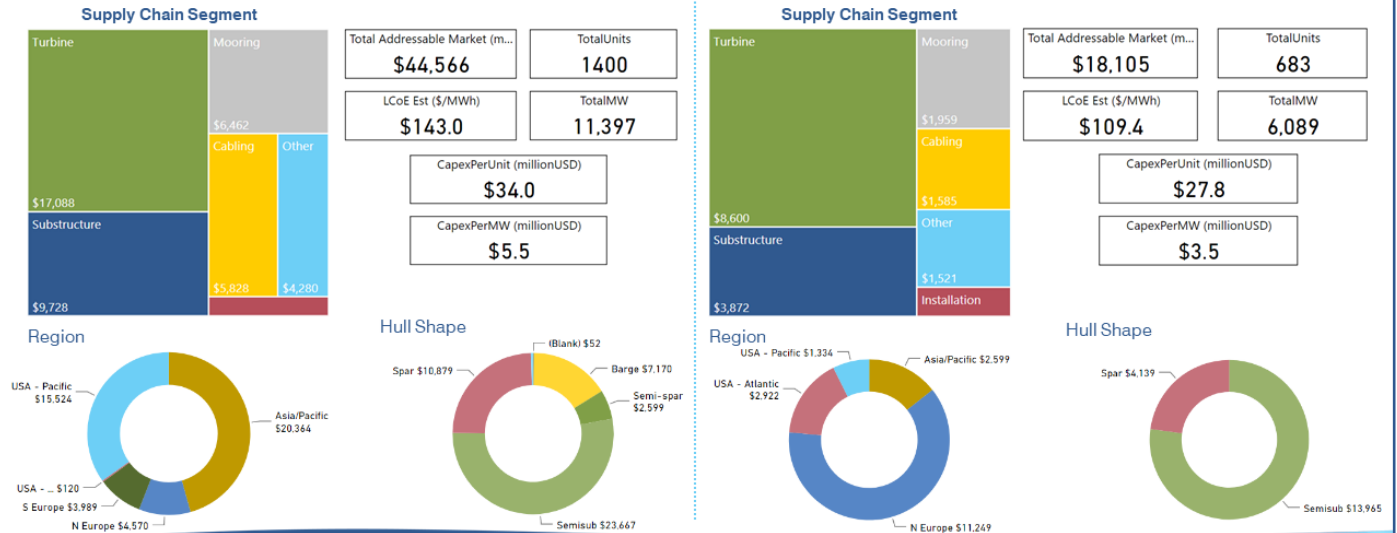
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Sample Charts, Graphs & Tables (Report contains 150 figures in total)



Seven-Year Comparisons - Under Development, Planned & Possible CapEx 2020-2026 vs CapEx 2027-2033



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



Northern Europe Projects in CapEx by Project Name Under Development, Planned & Possible

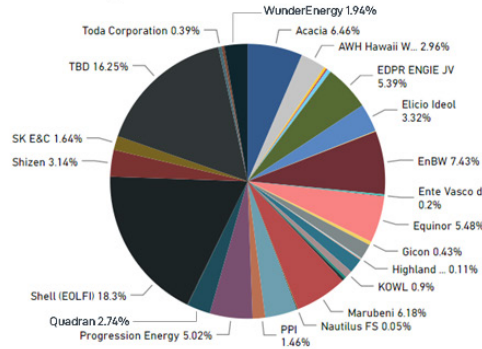
ProjectName	Country	Online Year	FixedOrFloat	DevType	Status	LocAvg WD	Total Units	TotalMW*	Substructure	Turbine	Mooring	Cabling	Installation	Other	CapexEst USD	CapexPer UnitUSD	CapexPer MWUSD	Developer	Designer	DesignName	TurbineMfr
Dolphyn ERM full scale	UK	2033	Floating	Commercial	Possible	100	400	4000	\$2,327	\$5,540	\$1,034	\$718	\$332	\$874	\$10,826	27.1	2.7	Dolphyn	Principle Power (PSR)	WindFloat	MHI Vestas (PSR)
Elio Ideal Scotpower	UK	2023	Floating	Commercial	Possible	105	35	350	\$415	\$485	\$317	\$85	\$29	\$148	\$1,480	42.3	4.2	Elio Ideal	Ideal (PSR)	Damping Pool	TBD
Hywind Scotland II	UK	2024	Floating	Commercial	Planned	100	34	204	\$249	\$339	\$107	\$121	\$28	\$94	\$938	27.6	4.6	Equinor	Equinor (Reported)	Hywind II	Siemens Gamesa (PSR)
Bretagne Sud	France	2025	Floating	Commercial	Possible	62	20	240	\$134	\$266	\$102	\$71	\$17	\$62	\$651	32.6	2.7	Shell (EOLFI)	Naval Energies (PSR)	Sea Reed	GE (PSR)
Hywind Tampen	Norway	2022	Floating	Commercial	Under devel	280	11	88	\$141	\$137	\$68	\$134	\$10	\$54	\$444	49.5	6.2	Equinor	Equinor (Reported)	Hywind III	Siemens Gamesa (Reported)
BP Noaka / Aker	Norway	2027	Floating	Commercial	Possible	220	11	110	\$122	\$152	\$52	\$48	\$9	\$39	\$424	38.5	3.8	Aker	Equinor (Reported)	Hywind III	Siemens Gamesa (PSR)
Kincardine Tranche 2	UK	2020	Floating	Commercial	Under devel	70	5	48	\$105	\$151	\$32	\$63	\$10	\$40	\$400	79.9	8.4	KDOWL	Principle Power (Reported)	WindFloat	MHI Vestas (Reported)
Gicon SDF 5-6 MW	Germany	2025	Floating	Pre-Commercial	Possible	35	6	36	\$30	\$60	\$15	\$44	\$5	\$16	\$170	28.3	4.7	Gicon	Gicon (Reported)	Gicon	Siemens Gamesa (Reported)
Groix & Belle-Ile	France	2022	Floating	Pre-Commercial	Under devel	62	3	29	\$20	\$39	\$15	\$22	\$2	\$10	\$109	36.4	3.8	Shell (EOLFI)	Naval Energies (Reported)	Sea Reed	MHI Vestas (Reported)
Downreay Tri	UK	2026	Floating	Demonstrator	Possible	85	1	10	\$17	\$15	\$8	\$6	\$1	\$2	\$49	49.2	4.9	Highland Floating Wind	Hexicon (Reported)	Hexicon	TBD
Dolphyn ERM full size demo	UK	2026	Floating	Demonstrator	Possible	100	1	10	\$4	\$13	\$4	\$19	\$1	\$2	\$43	42.6	4.5	Dolphyn	Principle Power (Reported)	WindFloat	MHI Vestas (Reported)
ARLOWT Hexafoat	Ireland	2022	Floating	Demonstrator	Under devel	87	1	2	\$9	\$4	\$5	\$14	\$1	\$1	\$34	34.4	6.9	EMEC	Salpem (Reported)	Hexafoat	TBD
Dolphyn ERM Demonstrator (hydrogen)	UK	2021	Floating	Demonstrator	Planned	100	1	2	\$4	\$3	\$4	\$19	\$1	\$1	\$32	32.2	16.1	Dolphyn	Principle Power (Reported)	WindFloat	MHI Vestas (Reported)
Gicon SDF	Germany	2021	Floating	Demonstrator	Possible	35	1	2	\$6	\$5	\$3	\$4	\$1	\$0	\$20	19.9	8.7	Gicon	Gicon (Reported)	Gicon	Siemens Gamesa (PSR)
TetraSpar Demo	Norway	2020	Floating	Demonstrator	Under devel	150	1	4	\$8	\$7	\$4	\$0	\$1	\$0	\$20	19.9	5.5	Shell (EOLFI)	Shesdal (Reported)	TetraSpar	Siemens Gamesa (PSR)
Eolink	France	2021	Floating	Demonstrator	Possible	30	1	6	\$5	\$10	\$3	\$0	\$1	\$0	\$19	19.1	3.2	Eolink	Eolink (Reported)	Eolink Demonstrator	Eolink (Reported)
SeaTwirl S2	Norway	2020	Floating	Demonstrator	Under devel	150	1	1	\$2	\$1	\$2	\$3	\$0	\$0	\$8	8.3	8.3	Seathrill	SeaTwirl AB (Reported)	SeaTwirl 2	Seathrill/Siemens Gamesa (Reported)
Iberdrola Demonstrators	UK	2022	Floating	Demonstrator	Possible	100	2	10	\$13	\$17	\$20	\$20	\$2	\$0			5.8	Iberdrola	TBD	TBD	TBD
Total							535	5150	\$3,613	\$7,243	\$1,776	\$1,392	\$451	\$1,344	\$15,767	34.6	5.8				

Reported = Value Confirmed | PSR = Preferred Supplier Relationship, Project Value
Charts, Tables and Graphs are sourced from our Q Vision Product Suite.

Sample Charts, Graphs & Tables - Continued

Project CapEx by Developer 2020-2026 (million USD)

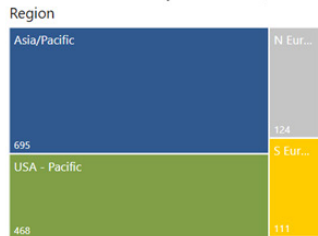
- Shell (combined with their acquisition of EOLFI) leads the most active developers globally with about 18% of the spend, \$8.2 billion, for those projects scheduled to be Online from 2020 to 2026.
- About 16% of the project spend remains an available opportunity for developers and totals about \$7.25 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.



Developer	Substructure	Turbine	Mooring	Cabling	Installation	Other	Total
Acacia	\$660	\$798	\$766	\$313	\$66	\$275	\$2,878
AWH Hawaii Wind LLC	\$307	\$553	\$171	\$131	\$35	\$124	\$1,320
Cobra	\$25	\$50	\$24	\$6	\$4	\$12	\$121
Dolphyn	\$9	\$16	\$8	\$37	\$2	\$3	\$75
EDF	\$37	\$77	\$28	\$37	\$6	\$15	\$199
EDPR ENGIE JV	\$558	\$937	\$228	\$380	\$60	\$240	\$2,403
Elicio Ideol	\$415	\$485	\$317	\$85	\$29	\$148	\$1,480
EMEC	\$9	\$4	\$5	\$14	\$1	\$1	\$34
EnBW	\$640	\$1,385	\$339	\$549	\$83	\$316	\$3,312
Ente Vasco de la Energia	\$27	\$33	\$11	\$8	\$3	\$7	\$89
Eolink	\$5	\$10	\$3	\$0	\$1	\$0	\$19
Equinor	\$655	\$859	\$286	\$328	\$70	\$244	\$2,442
Gicon	\$36	\$65	\$19	\$47	\$6	\$17	\$190
GIG (Macquarie)	\$172	\$277	\$123	\$130	\$21	\$80	\$803
Highland Floating Wind	\$17	\$15	\$8	\$6	\$1	\$2	\$49
Iberdrola	\$13	\$17	\$20	\$20	\$2	\$0	\$52
KNOC Equinor	\$172	\$277	\$94	\$124	\$21	\$76	\$764
KOWL	\$105	\$151	\$32	\$63	\$10	\$40	\$400
Magellan	\$33	\$50	\$14	\$12	\$4	\$13	\$127
Maine Aqua Ventus	\$14	\$43	\$13	\$41	\$4	\$6	\$120
Marubeni	\$470	\$1,406	\$361	\$203	\$59	\$256	\$2,755
Nautilus FS	\$7	\$8	\$3	\$2	\$1	\$0	\$21
NEDO	\$12	\$5	\$7	\$10	\$1	\$1	\$37
Plambeck	\$312	\$693	\$213	\$264	\$42	\$161	\$1,685
PPI	\$125	\$208	\$171	\$72	\$12	\$65	\$653
Progression Energy	\$497	\$895	\$214	\$360	\$57	\$214	\$2,236
Quadrant	\$357	\$399	\$170	\$153	\$25	\$117	\$1,220
Saitec Offshore	\$7	\$3	\$6	\$2	\$1	\$0	\$19
Seawind	\$2	\$1	\$2	\$3	\$0	\$0	\$8
Shell (EOLFI)	\$1,803	\$3,120	\$1,278	\$873	\$285	\$796	\$8,156
Shizen	\$338	\$349	\$412	\$131	\$29	\$140	\$1,399
SK E&C	\$150	\$277	\$123	\$94	\$21	\$69	\$733
TBD	\$1,408	\$3,047	\$746	\$1,165	\$183	\$691	\$7,240
Toda Corporation	\$67	\$33	\$31	\$16	\$8	\$17	\$173
US Air Force	\$33	\$35	\$27	\$25	\$2	\$14	\$137
WunderEnergy	\$231	\$509	\$211	\$119	\$26	\$119	\$1,216
Total	\$9,728	\$17,088	\$6,462	\$5,828	\$1,180	\$4,280	\$44,566

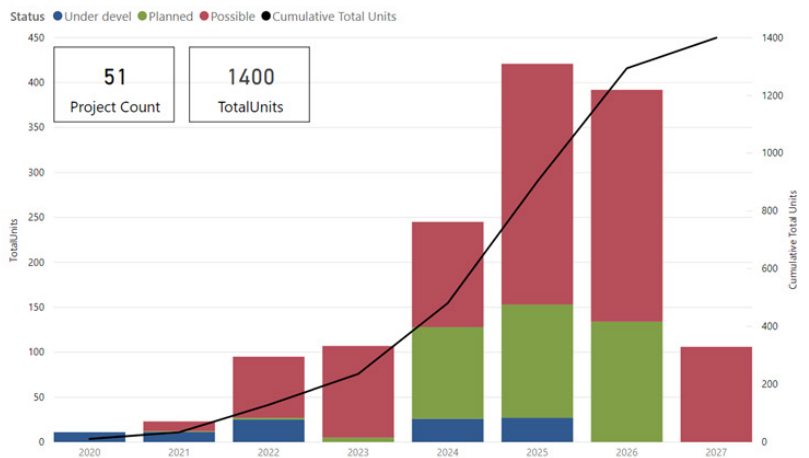
Charts, Tables and Graphs are sourced from our Q Vision Product Suite.

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.

Total FTUs Installed by Year



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

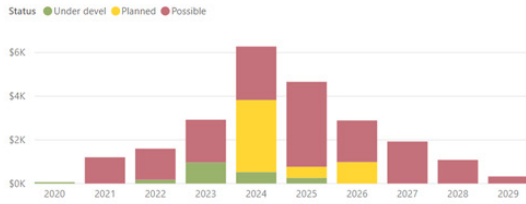
Large projects are spread across several years.



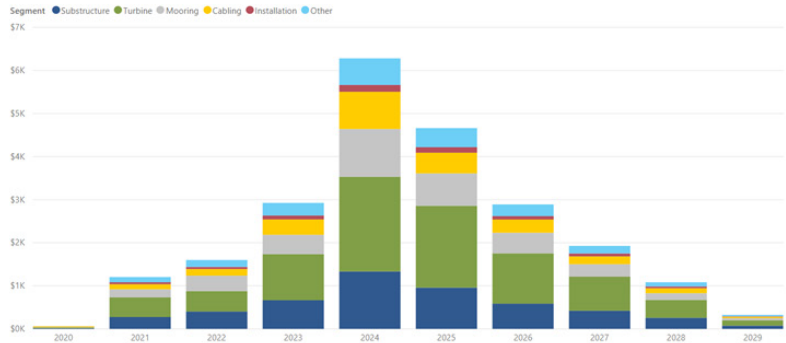
Asia/Pacific Project CapEx

By Supply Chain Segment & Status | Under Development, Planned & Possible

Project CapexEst (millionUSD) by Status and Year*



Project CapexEst (millionUSD) by Segment and Year*



- As a whole, the Asia/Pacific opportunity sees potentially 815 units by 2033 representing 5.5 GW of installed capacity.
- On par with Northern Europe, Asia/Pacific developers and their supply chain are leading the charge towards improved project economics, more optimized CapEx per MW and ultimately lower LCoEs.

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

Mooring Activity by Status

Online 2017-2018

- The Online universe of nine recent 2017 to 2018 projects comprises 13 FTUs representing total installed mooring line lengths over 41,000 meters.
- Japan led the way early-on for Floating wind Demonstrators followed by the United Kingdom, France and Norway.
- Contracts and market shares for four of these projects are represented at right with installed mooring line lengths totaling 18,473 meters.
- As depicted bottom right, TechnipFMC led the mooring installation contractor segment with a 62% share of the work while McGregor led the group of mooring contractors (top right) representing a 62% share of mooring line length related to their work on Equinor's Hywind Scotland floater.

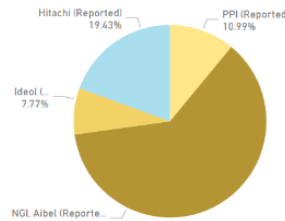
4 Project Count	477 Average of MLineLngEst(m)
8 Total Units	18,473 Sum of MoorTotalLngEst(m)

Mooring Systems' Design selection is fluid for most Planned projects and certainly for most Possible projects. However, Q FWE makes preliminary selections in order to drive our proprietary Q Vision CapEx model which is derived from a bottoms-up perspective. Some selections are also based on the potential for Preferred Supplier Relationships (PSR's).

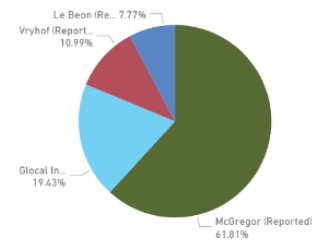
Reported = Value Confirmed | PSR = Preferred Supplier Relationship, Project Value

Charts, Tables and Graphs are sourced from our Q Vision Product Suite. EPCI and In-House developed Mooring Systems included.

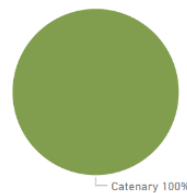
MoorTotalLngEst(m) by MoorDesigner



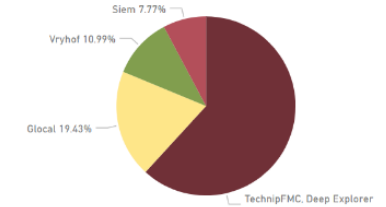
MoorTotalLngEst(m) by MoorContractor



Total Mooring System Count



MoorTotalLngEst(m) by MoorInstContractor



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.*

Project Economics

CapEx / LCoE

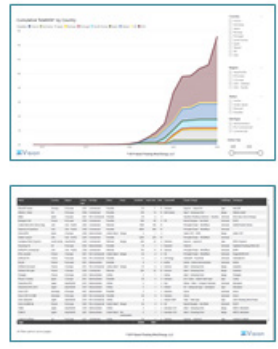
Q Vision is our proprietary **Business Analytics'** tool delivering real-time data and analysis giving you a competitive advantage to win **Fixed** and **Floating** Offshore Wind Energy projects. This *Microsoft Power BI* tool allows for dynamic analysis of relationships across markets and technologies; 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.**



Market Dynamics

Total MW

The report highlights 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. **Includes backing data in MS Excel.**



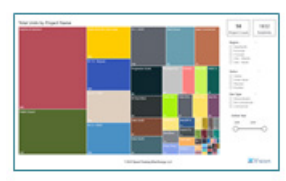
Total FTUs

A roundup of the known universe of current, Planned and Possible floating wind projects, totaling the number of FTU 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.**



Tons per MW

An analysis of Tons/MW and CapEx/MW, highlighting greater efficiencies when plotted both over time, and progressing toward higher turbine capacities. Lower costs and tonnages are colored green while heavier and/or more costly projects tend toward orange and red. Filter on Steel/Concrete, Floater Design, Status, MW and Development Type. **Includes backing data in MS Excel.**



Our Consultancy Practice - *Capabilities and Methodology*

Supporting Clients with Strategic Data-Driven Decisions

Client Directed Inquiries

Supply Chain Analysis

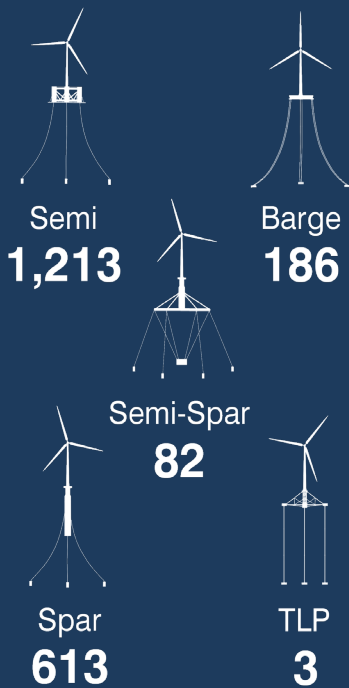
Primary Research

M&A Advisory

Quest Floating Wind Energy provides strategic advisory and consulting to end-clients within the global Energy and Financial sectors. Q FWE delivers highly focused market intelligence tools, products and services to the entirety of the Renewables Supply Chain related to offshore wind encompassing Floating and Bottom-fixed.

- Extensive project benchmarking of key metrics, CapEx & LCoE modeling and assessment
 - Expert and technical market analysis utilizing a bottom-up / top-down approach
- Rigorous quantitative and qualitative research, vendor analysis and predictive analytics
 - M&A advisory and market evaluation
 - Actively develop and assist clients in sourcing niche financing alternatives
 - Market reviews, sizing and demand modeling
 - First source referencing (Market/Client/Customer)
 - Early project planning & feasibility studies

Number of FTUs by Region & Hull Type



Contact Us

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International, maintaining our global energy insight from hubs in Amsterdam and Houston with support from our representatives in Rio de Janeiro, New York and London

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