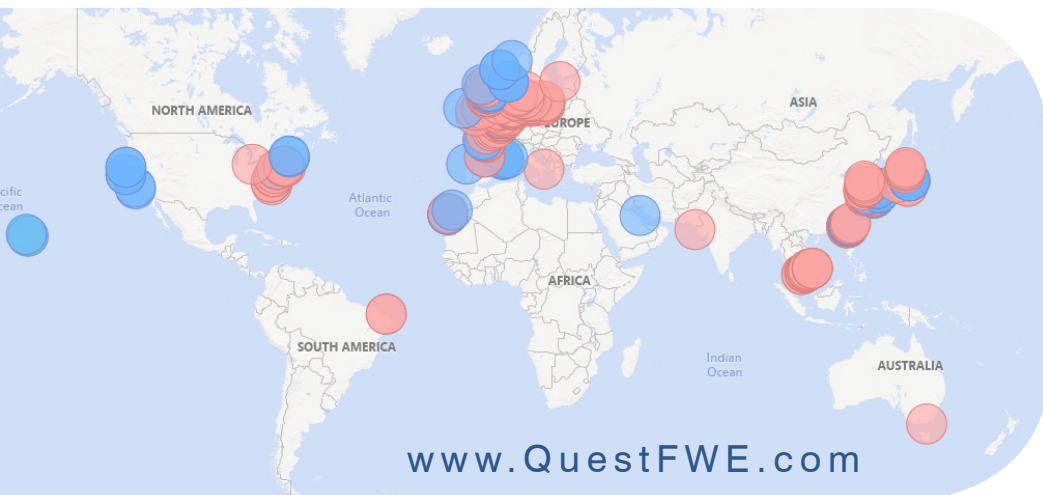




# Quest Fixed & Floating Wind Energy Commercial Offering



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Quest Floating Wind Energy  
a Quest Offshore Resources company

# Quest Offshore Wind Turbine Index (QOWTI)



**Total No. Projects**   **Total No. Turbines**   **Total MW**   **CapEx**   **Economic Indicators**   **Leading Industry Indicators**   **Supply Chain Indicators**

**QOWTI**

GLOBAL	Projects				Total MW				CapEx/Unit			substructure CapEx				turbine CapEx			mooring CapEx			cabling CapEx			other CapEx			rotor diameter			MW/unit			distance to shore			water depth			project size (units)			mooring line length			anchors			array /km			export /km		
	total	total	total	total	total MW	total MW	total MW	total MW	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil							
Global Total	209	11,624	11,087	537	101,782	96,849	4,933	\$310,830	\$296,099	\$14,732	\$26.7	\$3.3	\$74,411	\$155,972	\$6,876	\$25,387	\$38,031	\$30,151	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4									
Global Fixed	153	10,015	9,517	498	89,079	84,387	4,692	\$261,894	\$248,458	\$13,436	\$26.1	\$3.2	\$63,881	\$116,779	-	\$24,025	\$31,685	\$25,523	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2	176.2									
Global Floating	56	1,609	1,570	39	12,704	12,463	241	\$48,937	\$47,641	\$1,296	\$30.4	\$4.1	\$10,530	\$19,193	\$6,879	\$1,362	\$6,346	\$4,627	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5									



**Offshore Wind Turbine Index** (October 2019)

GLOBAL	total	total	total	total	total MW	total MW	total MW	total MW	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	
Global Total	209	11,624	11,087	537	101,782	96,849	4,933	\$310,830	\$296,099	\$14,732	\$26.7	\$3.3	\$74,411	\$155,972	\$6,876	\$25,387	\$38,031	\$30,151	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4	172.4

**27** Data Attributes

**2,430** Total Values

**4** Regions

**24** Countries

Quest Offshore Wind Turbine Index (QOWTI) illustrates the Total Addressable Market for global Offshore Wind. QOWTI analyzes key economic indicators and provides an overview of Supply Chain opportunities by segment (array km, export km, mooring line length, number of anchors, etc.)

QOWTI spots important leading indicators such as average rotor diameter, average distance to shore, average MW per unit, average number of units per project in addition to benchmarking of key metrics and CapEx trends.

The creation of QOWTI for the offshore wind industry is inspired and modeled after Quest Offshore's Deepwater oil & gas data that was streamed into the Bloomberg terminal for many years.

Total Addressable Market (TAM) - the competitive landscape of Global Offshore Projects stages of "under development", "planned" and "possible". Counts exclude non-competitive areas such as China. Online projects excluded.

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By Region and Country

REGIONAL	Projects				Total MW				CapEx			Economic Indicators				Leading Industry Indicators			Supply Chain Indicators																				
	total	total	total	total	total MW	total MW	total MW	total MW	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	total \$mil	
ASIA/PACIFIC TOTAL	61	4,132	4,112	221	28,617	28,171	105	\$84,513	\$83,283	\$573	\$22.8	\$3.5	\$23,194	\$46,844	\$3,797	\$5,210	\$10,163	\$5,157	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1
Australia	77	261	261	1	3,306	3,306	1	\$22,101	\$22,101	\$1	\$19.9	\$3.5	\$8,500	\$16,500	\$1,500	\$2,000	\$3,500	\$1,500	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1
EUROPE TOTAL	128	10,757	10,243	498	50,435	48,849	1,713	\$130,535	\$126,614	\$4,921	\$24.3	\$3.2	\$58,811	\$114,779	\$6,025	\$17,882	\$26,523	\$21,181	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8
EUROPE Fixed	128	10,757	10,243	498	50,435	48,849	1,713	\$130,535	\$126,614	\$4,921	\$24.3	\$3.2	\$58,811	\$114,779	\$6,025	\$17,882	\$26,523	\$21,181	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8	175.8
EUROPE Floating	56	1,609	1,570	39	12,704	12,463	241	\$48,937	\$47,641	\$1,296	\$30.4	\$4.1	\$10,530	\$19,193	\$6,879	\$1,362	\$6,346	\$4,627	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5
USA TOTAL	50	2,933	2,901	200	14,902	14,486	2,539	\$58,381	\$56,307	\$3,074	\$24.0	\$3.2	\$17,724	\$34,141	\$2,688	\$6,159	\$11,613	\$8,134	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9
USA Fixed	50	2,933	2,901	200	14,902	14,486	2,539	\$58,381	\$56,307	\$3,074	\$24.0	\$3.2	\$17,724	\$34,141	\$2,688	\$6,159	\$11,613	\$8,134	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9	163.9
USA Floating	11	804	800	20	5,994	5,912	111	\$19,157	\$18,336	\$838	\$28.0	\$3.3	\$5,600	\$10,000	\$800	\$1,500	\$2,000	\$1,500	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5



# Q Vision - Robust Analytics and Market Analysis

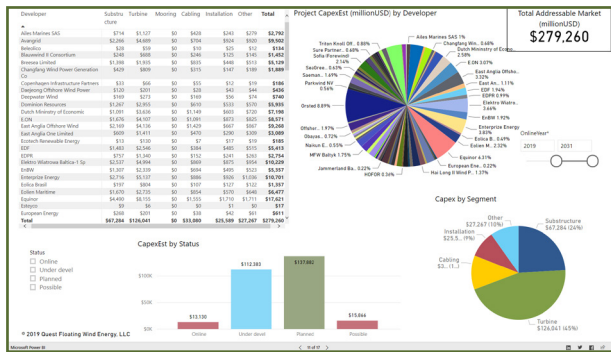
Q Vision is our proprietary **Business Analytics**' tool delivering real-time data and analysis giving you a competitive advantage to win **Fixed** and **Floating** Offshore Wind Energy projects. This *Microsoft Power BI* tool allows for dynamic analysis of relationships across markets and technologies;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

**CapEx / LCoE** Analyze the Total Addressable Market in CapEx by segment including LCoE across projects.

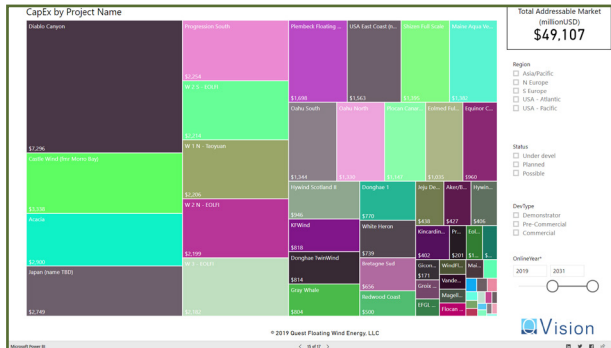


## Project Economics

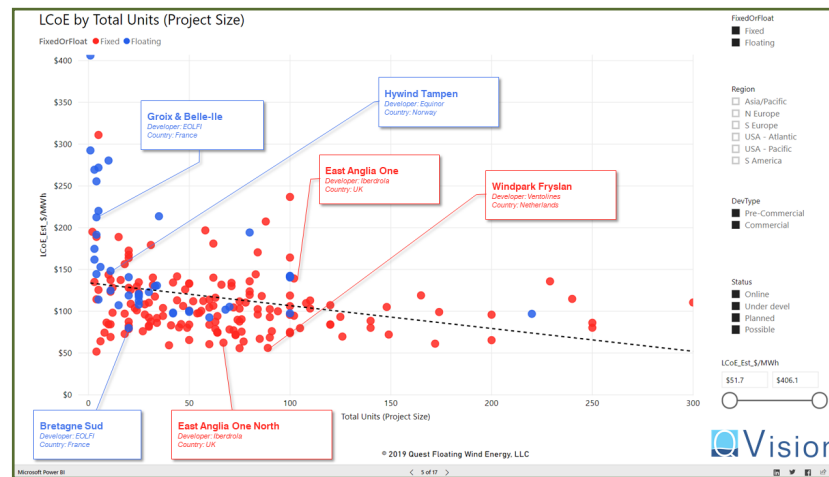
### Fixed



### Floating



## LCoE



Quest's *LCoE Modeling* capabilities are illustrated in this scatter plot chart for 160 Fixed and 43 Floating Wind Projects. This Power BI scatter plot chart and regression analysis demonstrate modeled LCoE values allowing comparisons between projects already built and those planned in the future. As illustrated, when

comparing the Levelized Cost of Energy between Fixed and Floating wind projects by project size (in number of units), you can see the steady progression towards lower costs for each, in addition to the cost benefits from Economies of Scale related to large sized projects. Also shown are the relationships between select pre-commercial and commercial projects. In Fixed we see increased project size not always resulting in lower costs. Economies of scale are easier to identify in Floating wind. The cost reduction between Eolfi's Groix Belle Isle pre-Commercial and Bretagne Sud looks to see a decline in costs greater than 60%. Moreover, we fully expect that once 100-to-200 unit projects become the norm, that their costs will come-in well under \$100 MW/h.

**\$4,995**  
yearly subscription

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# Project Data

Q FWE's proprietary Fixed and Floating Offshore Wind Database tracks the global universe of wind energy projects. Available as an Excel subscription delivered monthly.

To start your annual subscription please contact David Southerland at david.southerland@questfwe.com or +1 (832) 862-3390.

Please call +1 (832) 862-3390 for multi-user or enterprise-wide licensing.

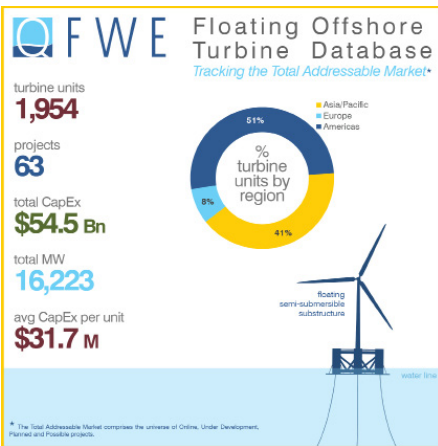
## What are my opportunities?

- 11,462 turbines to be selected
- 6.6 million meters of mooring cable to be awarded
- 1,328 floaters without a firm design type selected
- 8,081 anchor types to design & manufacture
- 19,548 km array cables
- 6,328 km export cables

### Entry-Level Package

Q FWE's Floating Offshore Turbine Database presents nearly 50 data fields for all floating wind energy projects.

Available as an annual subscription delivered monthly for \$595 (single-user)



### Sample Floating Project

Name	Groix & Belle-Ile
Country	France
Region	N Europe
DevType	Pre-Commercial
OnlineYear	2021
Lifetime	20
DecomYear	2041
Status	Under devel
Phase	Design
FirstContractAwarded	Y
StatusNotesExternal	Online and 20, early 21
Developer	EOLFI
Class	Bureau Veritas
Location	Atlantic Ocean
LocAvgWD	62
DistanceToShore	24
ProjectWebsite	http://eolennes-groix-belle-ile.com/
ProjectWebsite2	https://www.eolfi.com/en/marine-renewable-energy/floating-wind-power-france
TotalMW	24
TotalUnits	4
TurbineMfr	GF
TurbineModel	Haliead 150-6MW
MW	6
FloaterWeightEst	3000
FTUHeight	100
HubHeight	150
RotorDia	Naval Energies
Designer	Sea Reed
HullShape	Semisub
SteelOrConcrete	Concrete
FloaterLng	60
FloaterWidth	80
FloaterHeight	35
Draft	10
Engr Contractor	Naval Energies
MoorSystem	Catenary
MoorLinePerUnit	6
MoorTotalLinc	24
MoorDesigner	Naval-Energies
AnchorMfr	
AnchorType	Section
Moor_Contractor	
ExportLng	28
ArrayTotalLng	N
SubstYesNo	N
Export_Mfr	RTE
Array_Mfr	FEFOB

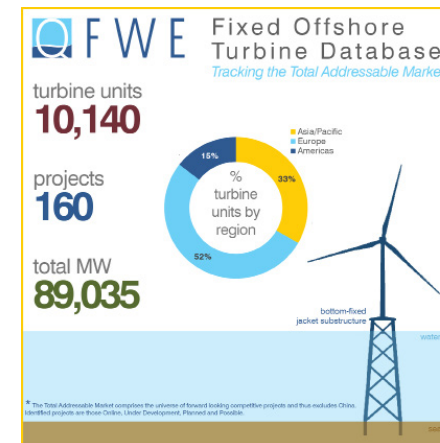
**Fixed / Floating Offshore Turbine Database**

Name	Country	Region	DevType	OnlineYear	Lifetime	DecomYear	Status	Phase	FirstContractAwarded	StatusNotesExternal
11. Diablo Canyon	USA	USA - Pacific	Commercial	2025	25	2050	Possible			2.2 GW replacement of Nuclear plant
12. Donghai TwinWind	South Korea	Asia/Pacific	Commercial	2022	25	2047	Planned	Design		KEPCO selected Hexicon/PP1 for floating offshore wind
13. Downey T11	UK	N Europe	Demonstrator	2022	20	2042	Possible	Design	Y	New owner Highland Floating Wind
14. EFG1 Linatec	France	N Europe	Pre-Commercial	2021	20	2041	Under devel	Design	Y	Tenders for Calde 6000 due in issue
15. Eolink	France	N Europe	Demonstrator	2021	10	2031	Possible	Design	Y	Tagging a demonstrator at SEM REV
16. EolMed (Gruissan)	France	S Europe	Pre-Commercial	2021	20	2041	Under devel	Design	Y	Tender 2022: Quarian started forms
17. EolMed Full scale	France	S Europe	Commercial	2025	25	2050	Possible	Design	N	Fast track by Government
18. Equinox Canarias	Spain	S Europe	Commercial	2024	20	2044	Possible	Design	Y	MOU with KNOC. Developed around
19. Equinox KNOC	South Korea	Asia/Pacific	Commercial	2025	25	2050	Planned	Design	Y	Installed on location April 2018
20. Floatergen	France	N Europe	Demonstrator	2018	2	2020	Online	Design	Y	Permit declined in 2017. Will have to
21. Flocea S Canary	Spain	S Europe	Demonstrator	2021	20	2041	Possible	Design	Y	
22. Fukushima P13	Japan	Asia/Pacific	Demonstrator	2013	5	2018	Online	Design	Y	

### Entry-Level Package

Q FWE's Fixed Offshore Turbine Database presents nearly 40 data fields for all possible, planned and under development bottom-fixed offshore wind energy projects.

Available as an annual subscription delivered monthly for \$795 (single-user)



### Sample Fixed Project

Country	Belgium
Region	N Europe
DevType	Commercial
OnlineYear	2020
Lifetime	25
DecomYear	2045
Status	Under devel
Phase	Construction
FirstContractAwarded	Y
StatusNotesExternal	First monopile installed
Developer	Northwest
Class	
Location	North Sea
LocAvgWD	30
DistanceToShore	49
ProjectWebsite	
ProjectWebsite2	
TotalMW	216.5
TotalUnits	23
TurbineMfr	MHI Vestas
TurbineModel	V164-9.5
MW	9.5
FTUHeight	157
HubHeight	135
RotorDia	154
Designer	Fixed
DesignName	Monopile
SteelOrConcrete	Steel
SubstructureWeight	000
PilesWeight	
Engr_Contractor	
ExportLng	31
ArrayTotalLng	25
SubstYesNo	Y
Export_Mfr	
Array_Mfr	