## Client Presentation | Q3 2020

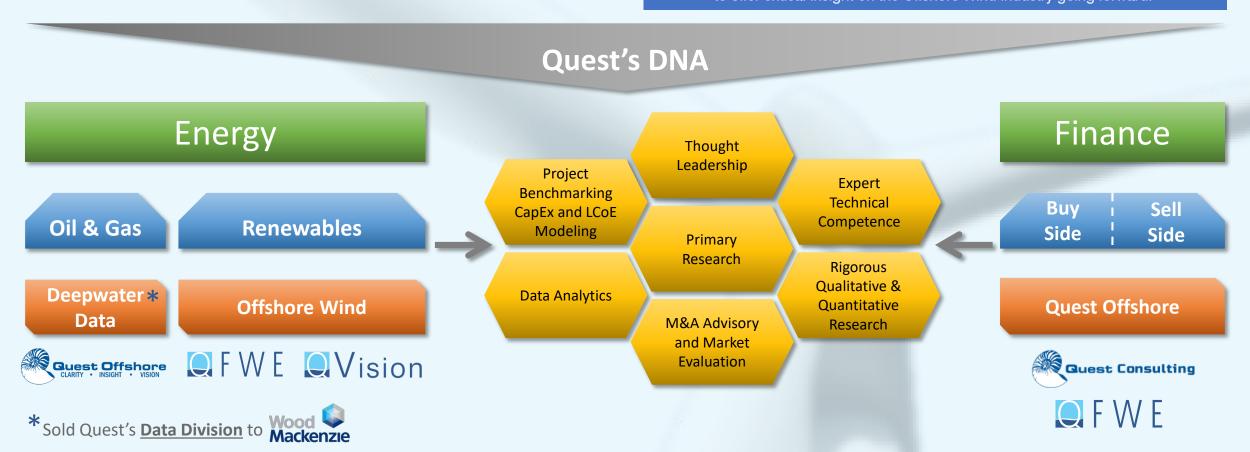


## Our Industry Is Evolving to Encompass Sustainable Energy

Quest Offshore's Evolution – Decades of Empowering Our Clients with Clarity, Insight and Vision.

Twenty-years of expertise in predictive analytics, technical market analysis and the

Twenty-years of expertise in predictive analytics, technical market analysis and the development of offshore floating projects provides us with the means and the network to offer critical insight on the Offshore Wind industry going forward.





## Who We Are

#### **About Us**

Expert knowledge of the entire Energy Value Chain. Quest has decades of experience empowering our clients with Clarity, Insight and Vision.

#### Mission

We actively develop strategic relationships with management teams of prospective clients initiating with major power developers and leading designers to tier-one and tier-two global supply chain companies and across the financial sector.

#### **Market Focus**

Quest provides strategic advisory and consulting to end-clients within the Energy and Financial sectors.

Quest serves the entire global supply chain for offshore wind and possesses expert knowledge across multiple focused technical areas.

#### **Products and Subscription Services**

**Quest Offshore Wind Turbine Index - QOWTI** analyzes key economics indicators and provides an overview of supply chain opportunities by segment plus benchmarking of key metrics and CapEx trends

Q Vision - Robust Suite of Data Analytics and Market Analysis

Project Data - the Offshore Turbine Locator details sales opportunities, timelines and key project specifics in Excel

Consulting - Supporting clients with strategic data-driven decisions. Primary research, project benchmarking, CapEx & LCoE modeling and supply chain analysis



## Q FWE Consulting Advisory

## Supporting Clients with Strategic Data-Driven Decisions

#### **Representative Projects**





#### intertek

BLACKARCH Investment Bank



M&A Advisory and Due Diligence Support to

J.F. Lehman & Company during their Exclusive Rights period

SIMMONS & COMPANY

Investment Bank

#### Sumitomo Corporation

Industrial Conglomerate

M&A Advisory Target identification and scoping study of specialty Brazilian machine shops in support of their steel tubulars business.

Composites Study -Technology Applications Strategy

## Client Directed Inquiries Supply Chain Analysis **Primary Research** M&A Advisory

Q FWE delivers highly focused market intelligence tools, products and services to the entirety of the Renewables Supply Chain related to Offshore (Fixed and Floating) wind.

- Project benchmarking, CapEx & LCoE modeling
- Expert and technical market analysis utilizing a bottoms-up / top-down approach
- Rigorous quantitative and qualitative research
- 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)

## RANGER OFFSHORE

International Oilfield Services Company

Due diligence to support Refinancing for the Acquisition of DSV's from Technip





Super Majors

Business Advisory for Procurement Strategy Benchmarking Analysis across SURF and Development of Marine Construction Costing Model

## LDG

Independent Oil & Gas Operator

Supported

#### Blackstone

in a Benchmarking and Costing exercise in their phased funding of Beacon Offshore Energy

#### ExonMobil

Energy lives here

Super Major

Benchmarking study and market review on the adaption rate of new subsea technology applications amongst their peers.

## Offshore Wind Developers/Owners

## Key Supply Chain Participants

## Entrance of Leading Players from Oil & Gas Sector



































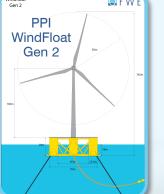
































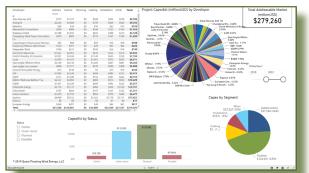
## Vision - Robust Analytics and Market Analysis

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. Our Subscription Products provide timely and actionable, strategic market information. The Q Vision database subscription includes an Excel data download containing over 120 attributes.

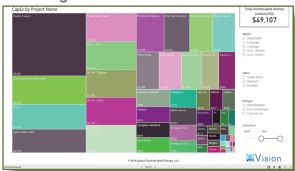
CapEx / LCoE Analyze the Total Addressable Market in CapEx by segment including LCoE across projects.

**Project Economics** 

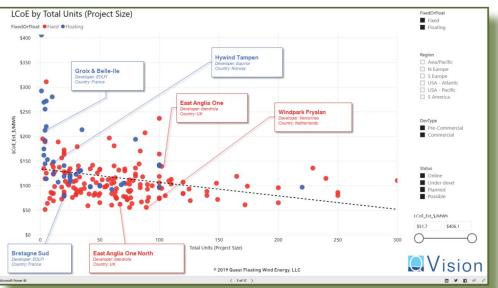
#### Fixed



#### **Floating**



#### LCoE



An example of 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.

Also shown are the relationships between select pre-commercial and commercial projects.

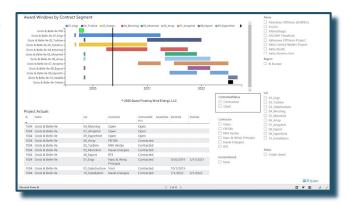


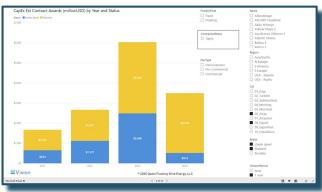
## Vision

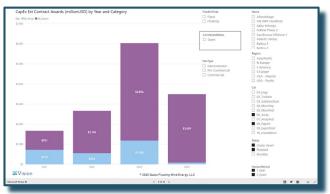
# Offshore Wind Turbine Supply Chain Opportunities, Contract Awards and Open Demand

The Q Vision Module Offshore Wind Turbine Supply Chain Opportunities, Contract Awards and Open Demand (SCO) contains project details on Fixed and Floating wind globally. Analysis is focused on Contract Award Opportunities by Award Date covering the known universe of Under Development, Planned and Possible projects.

- Market Overview of the Forecast Contracts Awards Opportunities over the next 3to-4-years. Contains details of pertinent Volumes and contract awards in CapEx by major segment.
- Project details by Supply Chain Segment for Turbines, Substructures, Subsea Power Cables, Mooring Systems Hardware, and related Installation activities.
- The main filter page contains filters for Status, Region, Fixed or Floating, Supply Chain Category, Project Name, Contractor, Contract Award Year and time Horizon. Includes backing data in tabular format and an MS Excel download.
  - Once parameters have been set, the user can view a data table of all projects contained in the results through the Full Project Data lens.
- Including KM of Export and Array Cables, Meters of Mooring line, Number of Mooring lines, Number of Anchors, Tons of Steel or Concrete, etc.
- · Real-time access via weblink.
  - User-friendly client interface with continually updated data feeds.
- Full Excel Data download of 70-plus data attributes.
  - Excel Data Download capability delivers monthly updated data streams accessed via secure client profile.







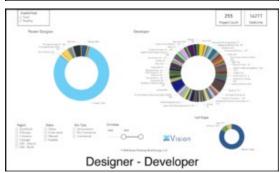
			HDGute Actual											Coun
Affandshage	Fixed	6/1/2022	N	7/1/2024	05,Array	512	38	km	Open	Open	Award window	1/1/2022	10/1/2022	Denr
Akita Wihonjo	Fixed	4/1/2023	N	7/1/2026	06_Array	\$36	114	km	Open	Open	Award window	10/1/2022	11/1/2023	Japai
Asa Branca Offshore 1	Fixed	11/1/2022	N	7/1/2025	05_Array	542	135	km	Open	Open	Award window	5/1/2022	4/1/2023	Brazi
Atlantic Shores	Fixed	4/1/2022	N	7/1/2026	06_Array	599	315	km	Open	Open	Award window	11/1/2021	2/1/2023	USA
Baltica 2	Fixed	7/1/2023	Y	7/1/2025	06_Array	\$60	194	km	Open	Open	Award window	1/1/2022	4/2/2023	Polar
Baltica 3	Fixed	12/1/2021	N	7/1/2025	06_Array	\$43	137	km	Open	Open	Award window	6/1/2021	8/1/2022	Polar
Baltyk III - phase 1	Fixed	9/1/2021	N	7/1/2025	06_Array	549	156	km	Open	Open	Award window	3/1/2021	5/1/2022	Polar
Boardwalk Wind	Fixed	10/1/2022	N	10/1/2026	06_Array	\$68	217	km	Open	Open	Award window	5/1/2022	7/1/2023	USA
Borkum Riffgrund West I (now BR3)	Fixed	1/1/2021	Y	7/1/2024	06_Array	\$26	84	km	Open	Open	Award window	10/1/2021	8/1/2022	Gern
Changfang Phase 1	Fixed	2/20/2020	Y	12/1/2022	06_Array	\$5	15	km	Open	Open	Award window	4/2/2021	10/1/2021	Tolar
Changfang Phase 2	fixed	2/20/2020	Y	12/1/2023	06_Array	\$25	81	km	Open	Open	Award window	12/1/2020	10/1/2021	Taiws
Donghae 1	Floating	7/1/2022	N	7/1/2024	06_Array	\$21	41	km	Open	Open	Award window	3/1/2022	10/1/2022	Sout
Donghae TwinWind	floating	7/1/2022	γ	7/1/2024	06_Array	\$15	25	km	Open	Open	Award window	4/1/2022	11/1/2022	Sout
Dunkirk	Fixed	1/1/2023	N	7/1/2025	06_Array	\$20	64	km	Open	Open	Award window	8/1/2022	6/1/2023	Franc
East Anglia Three	Fixed	7/1/2020	Y	7/1/2026	06,Array	\$81	260	km	Open	Open	Award window	7/1/2022	9/1/2023	UK
Greater Changhua 2b - South West	Fixed	5/1/2023	N	7/1/2025	06,Array	\$20	63	km	Open	Open	Award window	11/1/2022	8/1/2023	Taiws
Greater Changhua 4 - North West	Fixed	8/1/2022	N	7/1/2025	06_Array	\$30	96	km	Open	Open	Award window	1/1/2022	2/1/2023	Talwi
Hai Long 2A	Fixed	6/1/2022	N	7/1/2024	06_Array	\$16	50	km	Open	Open	Award window	1/1/2022	10/1/2022	Talwi
Hai Long 28	Fixed	8/1/2023	N	7/1/2025	05_Array	\$12	40	km	Open	Open	Award window	3/1/2023	11/1/2023	Taiwi
Hai Long 3	Fixed	7/1/2022	N	7/1/2025	06_Array	\$41	133	km	Open	Open	Award window	12/1/2021	1/1/2023	Taiws
Haiding 1 - Formora III	Fixed	2/1/2023	N	7/1/2025	06_Array	\$18	59	km	Open	Open	Award window	9/1/2022	7/1/2023	Taiws
Haiding 2 - Formosa III	Fixed	10/1/2023	N	7/1/2026	06,Array	\$25	81	km	Open	Open	Award window	4/1/2023	4/1/2024	Taiws
Hbiki-Nada	Fixed	6/1/2022	N	7/1/2024	06_Array	\$13	40	km	Open	Open	Award window	3/1/2022	11/1/2022	Japan
He Dreiht	Fixed	7/1/2020	γ	7/1/2025	06_Array	\$56	180	km	Open	Open	Award window	9/1/2021	11/1/2022	Gern
Hollandse Kust Noord Holland I and II	Fixed		N	7/1/2024	06,Array	544	140		Open	Open	Award window		2/1/2022	Neth
			81	7/1/2005	Of Asses	\$2.534	10.1	No.	Const	Core	Laured mindage	0/3/3030	13/1/2021	1100



## Vision - Offshore Turbine Locator

The Offshore Turbine Locator tracks both Bottom-Fixed and Floating Offshore Wind Projects by total MW bubble size on a world map, cumulative total MW to 2033 and beyond, and cumulative Total MW by country. Each page has filters for Status, Region, Fixed or Floating, Development Type and Startup Year range. Includes backing data in tabular format on Page 9 and an MS Excel download.

# Offshore Turbine Locator Units Map



#### **Offshore Turbine Locator Excel Database**

Subscribers have 24/7 access to the complete universe of projects in MS Excel. This unrestricted Excel spreadsheet allows subscribers to access data, build tables, as well as export into any system supporting Excel.

#### **Data Fields Include:**

- **Project Name**
- FixedOrFloat
- Country
- Region
- DevTvpe
- OnlineYear
- Lifetime
- DecomYear
- Status
- Phase
- StatusNotesExternal
- Developer
- Class
- Location
- LocAvgWD
- DistanceToShore
- **ProjectWebsite**

- TotalMW
- TotalUnits
- TurbineMfr
- TurbineModel
- TotalSubstrWtEst
- FTUheight
- HubHeight
- RotorDia
- Designer FirstContractAwarded • DesignName
  - HullShape
    - SteelOrConcrete
    - SubstructureWeight
    - PilesWeight
    - FloaterLng FloaterWidth
  - FloaterHeight

- Draft
- **Engr Contractor**

**Annual Subscription Includes** 

- MoorSystem
- MoorLinesPerUnit
- MoorTotalLines
- MoorDesigner
- AnchorMfr
- AnchorType
- Moor Contractor
- ExportLng
- ArrayTotalLng
- SubstYesNo
- Export Mfr
- Array Mfr

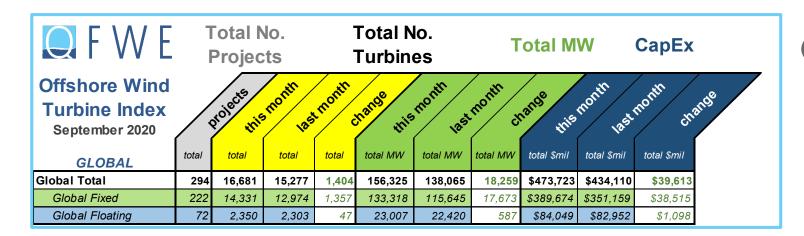
#### Offshore Turbine Locator Power BI Modules:

Subscribers may wish to utilize our custom created Microsoft PowerBi visualization modules. With a few clicks of options users can create maps, charts and tables that analyze future installation year, MW capacity, developers, plus much more. Click the demo below to see how PowerBI puts the power of data visualization in your hands.

- Offshore Turbine Locator Total Units Map
- Designer Developer
- Total Turbine Units Installed by Year
- Total Units by Project Name
- Offshore Wind Total MW Map
- Cumulative Offshore Wind Total MW by Status
- Cumulative Offshore Wind Total MW by Country
- Offshore Wind Total MW by Region
- Data Table



## Quest Offshore Wind Turbine Index - September 2020



Quest Offshore Wind Turbine Index (QOWTI) analyzes key Economic Indicators and provides an overview of Supply Chain opportunities by segment.

**27**Data Attributes

**2,430**Total Values

4

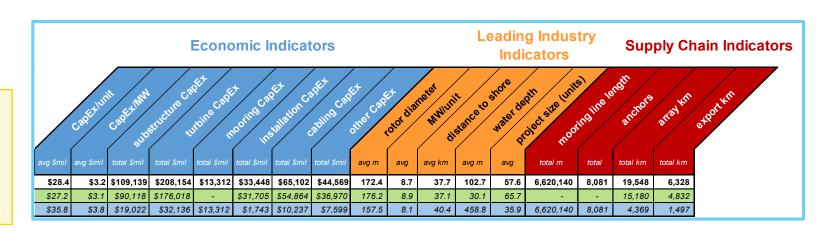
-Region

**24** 

**QOWTI** spots important Leading Indicators such as average rotor diameter, average distance to shore, average MW per unit, and benchmarking of key metrics.

#### What are my supply chain opportunities?

- 14,635 turbines to be selected
- 8.8 million meters of mooring cable to be awarded
- 1,328 floaters without a firm design type selected
- 8,081 anchor types to design & manufacture
- 23,917 km array cables
- 7,787 km export cables



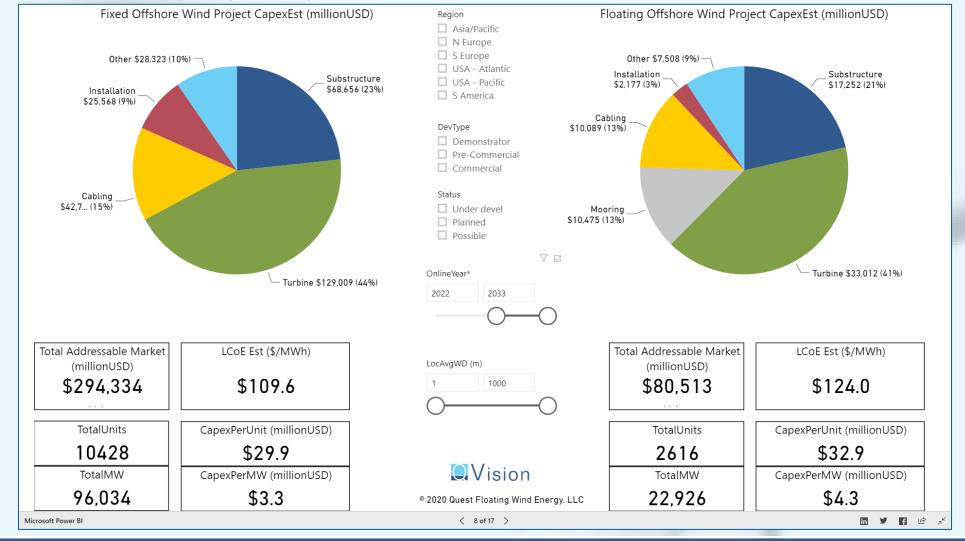
Source: Q FWE (QOWTI)



## Offshore Wind Project CapEx - Outlook to 2033



## Fixed and Floating by Segment

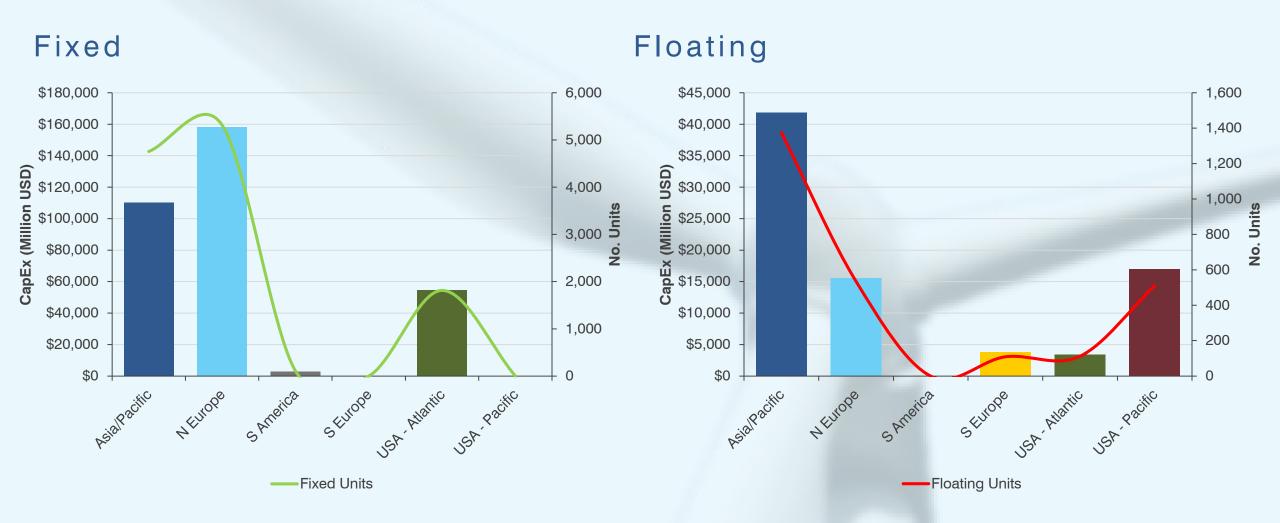


Q F W E

Source: Q FWE Power BI

## Offshore Wind Project CapEx - Outlook to 2033

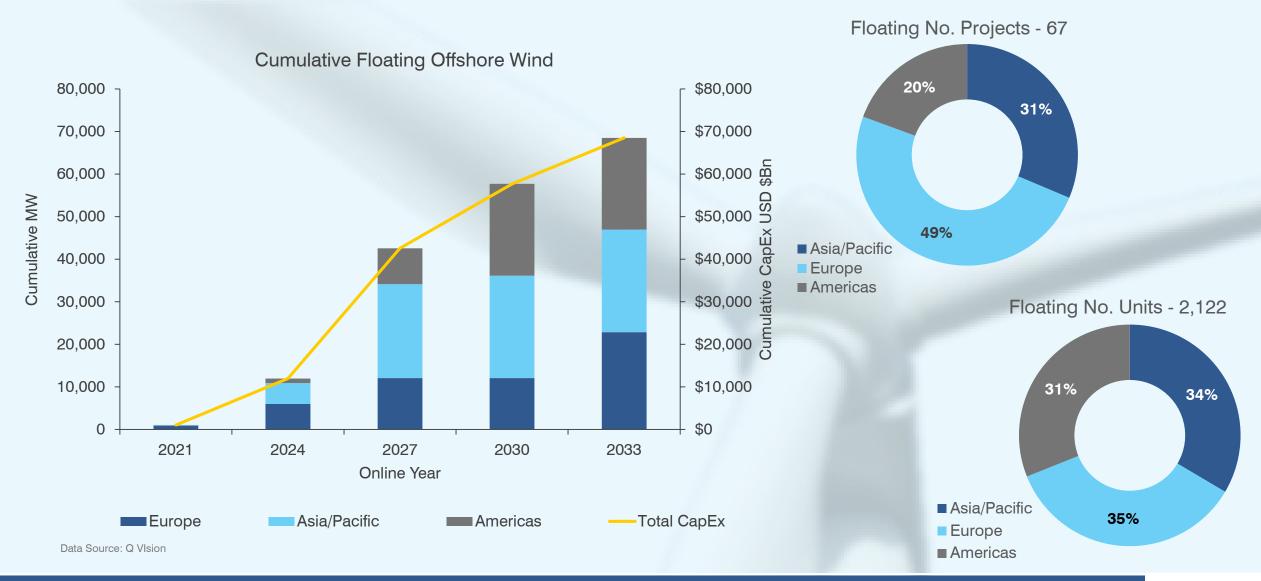




Source: Q FWE Power BI



## Cumulative Floating Offshore Wind

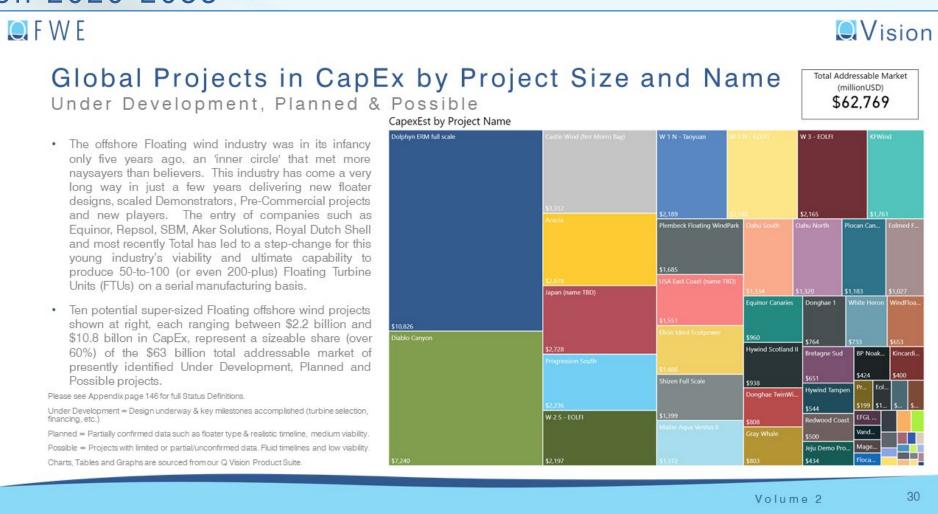


## Highlights of Key Floating Project Opportunities



## By Region 2020-2033

Quest Floating Wind Energy, LLC

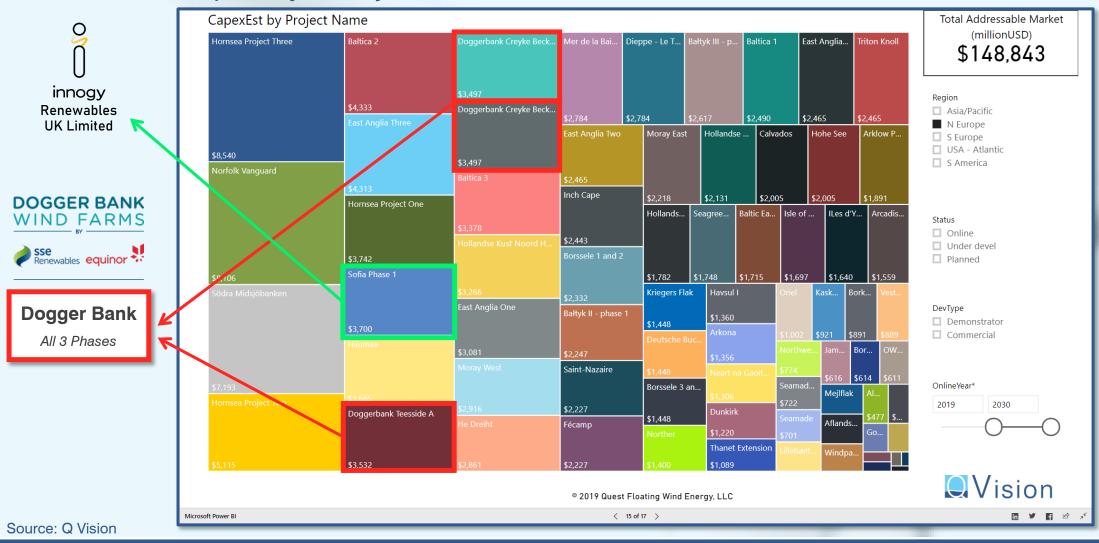


© 2019 Quest FWE

www.QuestFWE.com

## Fixed Offshore Wind Activity by Project in CapEx

## North Europe by Project Size



## Q Vision Methodology - Bottom Up Approach



Our Proprietary CapEx/LCoE Model Building Blocks

High-Level Online Year Life Time Lat/Long **Project Details** Possible Commercial Location/Sea Viability Indicators Shore connect Planned Shore distance Probability Indicators Shore base UnderDev. Phases Technology Budget Consent √ Turbine Bidding ✓ Grid Conn/ Substructure 2 Pre-Constructist Contract Finance Mooring Construction Strike/CfD/ Cabling Assembly Installation 5 Commission'q Installation Fin. Close √ Economics Online Decomm'd Project cost 7 LCoE Supply Chain **Supply Chain** 1 Turbine 2 Substructur 3 Mooring 4 Cabling / Gri 5 Installation **Segment Analysis** Export Cables Export Qty Reported/PSR/Spec Hull shape Mooring type Substructure Qty # Columns M Designer Reported/PSR/Spec. VoltageKV Turbine Qty Wind speed Capacity Factor SubStr. material Steel/Concrete # M Lines AC/DC Mooring Qty SubStr. weight Steel/Concr./Ballast M Contractor Reported/PSR/Spec. Cabling Qty Rotor Dia # Blades Length Hub height Des. Water Depth Cores / Dia FTU Assembly Yard/Location FTU height Array Cables Array Qty Trans. piece Water Depth Line type A Chain/Steel/Rope FTU Towing Nacelle weight Direct drive Y/N VoltageKV T. Installation AC / DC Shore distance Min. Oper. Depth Make A Oper. Draft Line length A Dynamic connect/s/N FTU Installation Critical path overrun Certif. body Line dia A # of Buoyancy Shore distance Influences Installation Fl. Installation Line type B Chain/Steel/Rope Lazy S length Type select, opens dataset Make B Array length Influences economics Substations Onshore Qty Y/N Line length B # Flotation Offshore Qty Float Y/N Capacity PSR = Preferred Supplier Relationship S Installation Anchor point Type / Size / Weight Connectors



Source: Q FWE Power BI

Ballast / Deadw

M Installation

# Contact Us

Quest Floating Wind Energy, LLC
Houston | Amsterdam | Rio de Janeiro | New York

Paul Hillegeist, President and Director Paul.Hillegeist@QuestFWE.com +1 713 569 9987 Andrew Chadderdon, Sales & Business Development Manager
Andrew.Chadderdon@QuestFWE.com
+1 281 725 7664

77 Sugar Creek Center Blvd. | Suite 310 | Sugar Land | Texas | 77478 | U.S.A.



Quest Floating Wind Energy

a Quest Offshore Resources company