Floating Wind *Solutions*
Agenda

Monday - June 28, 2021

Time	Event
7:00 - 5:30	**Registration & Badge Pick-up** (in exhibiton area) Sponsored by Technip Energies
7:00 - 8:00	**Continental Breakfast** (in exhibiton area)
8:00 - 9:30	**Early Morning Session** **Keynote Session: State of Industry and the Path Forward**
9:30 - 10:15	**Coffee Break** (in exhibiton area) sponsored by Vryhof Group
10:15 - 11:45	**Late Morning Session** **Cost Reducing Scenarios**
11:45 - 1:15	**Lunch followed by Coffee** (exhibit area) sponsored by Acteon Group
1:15 - 3:00	**Early Afternoon Session** **Mooring Systems & Technology**
3:00 - 3:45	**Coffee Break** (exhibit area) sponsored by Vryhof Group
3:45 - 5:15	**Late Afternoon Session** **Floater Production for Commercial Scale**
5:15 - 6:00	**Special Session** **Presentations and Discussion on ESG-related Subjects**
6:00 - 7:30	**Reception** (exhibit area) sponsored by Aker Offshore Wind

Tuesday - June 29, 2021

Time	Event
7:00 - 5:30	**Registration & Badge Pick-up** (in exhibiton area)
7:00 - 8:00	**Continental Breakfast** (in exhibiton area)
8:00 - 9:30	**Early Morning Session** **Power Cable Systems & Substations**
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10:15 - 11:45	**Late Morning Session** **De-Risking Projects. Management & Controls**
11:45 - 1:15	**Lunch followed by Coffee** (exhibit area) Sponsored by Huisman
1:15 - 3:00	**Early Afternoon Session** **Assembly & Installation**
3:00 - 3:45	**Coffee Break** (exhibit area)
3:45 - 5:15	**Late Afternoon Session** **Operations & O&M Scenarios**

Floating Wind *Solutions*
Technical Program

Monday - June 28

7:00 — **Registration** (in exhibiton area) Sponsored by Technip Energies

7:00 - 8:00 — **Breakfast** (in exhibiton area)

8:00 - 9:30 Keynote Session: State of Industry and the Path Forward

Session Chair: **Paul Hillegeist**, Q FWE - **Alla Weinstein**, Trident Winds

Welcome & Introduction
By *Paul Hillegeist, Quest FWE*

Keynote : ***Advancements in Digital Wind Energy Technology***
Presenter *Jonah Margulis, Aker Offshore wind*

Floating wind technology is developing at a rapid pace and digital solutions are a significant contributor to driving down the levelized cost of energy (LCOE). This presentation will provide a brief overview of where we are as a floating offshore industry, where the significant cost reductions are expected to come from, and provide a real world example of how digital solutions are providing real value and driving down costs today.

Keynote : ***Going from Technology to Commercialisation***
Presenter *Leif Delp, Equinor*

The presentation will provide an overview of what will it take going from rather novel floating concepts and technology, which means going from floating wind demos/demo parks and move to commercial scale parks 500MW+ within a decade.
Topics to be covered will be: Floating LCOE & cost reduction potential – optimized floater solutions for mass production including mooring and dynamic cables solutions – how to mobilize supply chain and meeting the demand beyond 2030 - what will it take to industrialize floating offshore wind?

Keynote : ***The importance of Return on Experience when Dealing with Interface Management and Responsibility Transfer among Project Stakehol***
Presenter *Bruno Geschier, BW Ideol*

As highlighted on numerous occasions by the European Investment Bank as well as other key financial institutions across the globe, the bankability / insureability of commercial-scale floating offshore wind projects is still highly – if not exclsuively - dependant on the proven track record of floating wind technologies benefiting from several years of operation of full-scale assets. Beyond the obvious seakeeping, power production and O&M track records as well as scale-up and cost-reduction capabilities, financial institutions (incl. insurers) will also gauge the maturity and experience of the interface management, risk transfer and contractual set-ups between all key stakeholders including grid operators, EPCI contractors, wind turbine supplier, floating technology provider, O&M specialists, etc. Consequently, full-scale demonstrators operating for several years are a tremendous source of learning and are on the critcial path of commercial-scale readiness. Learnings, issues, challenges and solutions that need to be openly addressed when sitting down with the people looking at financing and insuring commercial-scale projects in the billions of USD and who will need to be particularly

Keynote : ***A Systems Engineering Vision for Floating Offshore Wind Cost Optimization***
Presenter *Dr. Amy Robertson, National Renewable Energy Laboratory*

While great progress has been made with innovations related to individual components and tools, only a comprehensive systems-based approach can allow floating wind technology to fully mature in commercial markets. A multidisciplinary effort makes it possible to simultaneously focus on a wide range of factors and then optimize designs to achieve a minimum system cost. This presentation will provide an overview of the current design methodology for floating wind systems, and then provide a vision for a fully integrated systems-engineering and techno-economic design approach to capture the complex interactions between the physics, manufacturing, installation, and operation of

Panel Discussion

9:30 - 10:15 — **Coffee Break** (in exhibiton area) sponsored by Vryhof Group

10:15 -11:45 Cost Reducing Scenarios

Session Chair: **Henrik Baltscheffsky**, Hexicon - **Denis Matha**, Ramboll

Translate O&G Cost-saving Experiences into Floating Wind
Presenter *Alan Whooley, Wood Group*

The results of a series of cross discipline workshops are presented that identify how to translate Total Expenditure (TOTEX) cost saving lessons from 40 years of oil and gas floating facilities operating in hostile environments across to economic, safe and reliable floating wind facilities. The changes in culture, technology, installation methods and operating strategy that would be needed to deliver floating wind energy at the same or lower cost as fixed wind. The impact on CAPEX and OPEX of designing floating wind farms with high reliability, high automation and maximum onshore operations.

Financing Climate in Floating Wind
Presenter *Randy Male, Director, Green Giraffe*

The presentation will provide an overview of the current state of the floating offshore wind market, anticipated growth of the market, current state of floating wind project development financing and observations on expected construction financing for floating wind projects. Topics covered: The current status of floating wind development globally, Anticipated growth of floating wind, Expectations for cost competitiveness of floating wind - Current state of development financing for floating wind, including players and structures - Expectations for construction financing for floating wind, including characteristics of initial projects likely to secure financing.

Analyses of 18 Floater Designs. Steel and Concrete
Presenter *Ignacio Pantojo, Iberdrola*

This presentation shows a Developer's reasoning behind floating wind and the internal approach to reviewing and weighing different technology. It provides an overview of floating wind designs in steel, concrete and hybrid, looking at each typical design's characteristics, Technology Readiness Levels (TRL) and evaluation of projects' CapEX in which these designs have been applied. The presentation provides an insight of the available technology and potential markets in various regions. It also compares floating wind to bottom fixed applied technology

Panel Discussion

11:45 - 1:15 — **Lunch** (exhibit area) sponsored by Acteon Group

1:15 - 3:00 Mooring Systems & Technology

Session Chair: **Nicolas MacFerran**, SBM

Cross-over from O&G Mooring Experience to Floating Wind
Presenter *Thomas Agnevall, Strana Offshore*

The presentation will briefly illustrate the evolution of oil & gas mooring systems from the early eighties into present time, with focus on various anchor types in varying soil conditions and water depths. The technology developed over the years is now applicable to floating wind mooring systems as well, although some key differences need special attention. Delegates, new to floating wind moorings, and without any oil & gas mooring system experience will benefit from this general overview on shallow and deep water moorings and anchors.

Transition Site Opportunities for Early FOWT Deployments
Presenter *Paul McEvoy, TFI Marine*

FOWT deployment in shallow waters where existing fixed bottom wind farms could be expanded. The presentation will discuss solutions for mooring of FOWT platforms in 30 to 50m water depths, using the latest mooring technologies. Suitable sites will selected using GIS analysis with mooring systems modelled. How new mooring solutions enable the deployment of FOWT platforms in shallow waters. What environmental conditions FOWT platforms can be moored in. The type of mooring components which are required. And how to identify and investigate transition site opportunities.

Mooring System Redundancies & Maintenance Considerations
Presenter *Anil Sablok, Technip Energies*

The design margin and redundancies of critical elements of the mooring system required for different types of FOWT to ensure appropriate system reliability and certainty for commercial wind farms development and operations. Predictive analysis and maintenance of the mooring system using response based life cycle loading analysis and smart monitoring using Artificial Neural Network will also be presented. Design of the mooring line components and anchors for different FOWT platforms using response based life cycle loading and smart monitoring methods. Will help design a robust mooring system for strength and fatigue along with reduced maintenance.

Mooring Options and Total Installed Cost for a Commercial Scale Wind Farm
Presenter *Tom Fulton, Acteon Group*

Mooring options and total installed costs will be presented for a commercial scale wind farm utilizing 12MW turbines in 200m water depth. Pros and cons of the various mooring systems will be presented including stationkeeping performance, mooring footprint, cost of components and cost of installation. Attendees will gain a better understanding of the various mooring options available as well as the economics for a commercial scale wind farm broken down by mooring components, prelay operations, and tow and hookup operations.

Mooring Solutions Evolution Towards Commercial Scale Deployment
Presenter *Leopoldo Bello, Vryhof Group*

Introduce Key Mooring Challenges on Commercial scale development (not seen Demonstrators) and present potential approach to design codes and maintenance philosophy as solutions. Commercial Scale development mooring design and integrity management won't be similar to those on current demonstrators or small farms. New approaches are needed.

Panel Discussion

3:00 - 3:45 — **Tea Break** (in exhibiton area) Sponsored by Vryhof Group

3:45 - 5:00 Floater Production for Commercial Scale

Session Chair: **Lars Samuelsson,** ABS, **Jerica Nolten**, EnBW

Influence of Floater Design Aspects on Serial Production, Logistics and Project Development
Presenter *Denis Matha, Ramboll*

Presentation of floater design aspects and their influence on the serial production process e.g. related to the choice of material (steel and concrete) and the structural floater arrangement (e.g. pre-fabricated modular slender structures or large volume in-situ fabricated designs). The influence of design choices on the logistics and infrastructure requirements during project development, particularly in the fabrication and T&I phases, will be presented. The presentation will provide an overview how floater design aspects influence serial production, logistics and project development.

Delivery of Floating Units in Low Infrastructure Areas
Presenter *Stephanie De Decker and Jamie Lescinski, Boskalis*

Floating wind foundations are getting ready for commercialization but local infrastructure will not always allow for local fabrication. This presentation looks deeper into which transportation solutions the industry can bring to optimize the local assembly and integration process. Transportation impact on the supply chain. The importance of tailormade transport solutions in order to benefit in terms of cost, quality and safety.

Floating Wind Solution Serial Fabrication
Presenter *Matthew Paulonis, Saipem*

This is a brief presentation on a floating wind solution focusing on the serial fabrication process of a floater, including final assembly and loadout. This features a fabrication yard in Indonesia with over 780,000 square meters of fabrication area and is currently in serial production of wind jacket foundations. Attendees will get an idea of fabrication capabilities and the steps required for the construction of a floating wind structure from plate rolling, through module fabrication and painting, and finally assembly.

Panel Discussion

5:15- 6:00 ESG Session

Three Presentations and Discussion on ESG-related Subjects - Chair : Shadi Awwad, Oceaneering, Jon Halliburton, Ensearch
Presenters: **Jason Stanley**, *VP ESG Tidewater,* **Katherine Warren**, *Sr. Managing Director ESG-Lynk,* **William Fox**, *Chief Product Officer, Data Gumbo*

6:00 - 7:30 — AKER OFFSHORE WIND **Reception** (in exhibiton area) sponsored by Aker Offshore Wind

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7:00 — **Registration** (in exhibiton area) Sponsored by Technip Energies

7:00 - 8:00 — **Breakfast** (in exhibiton area)

8:00 - 9:30 Power Cable Systems & Substations

Session Chair: **Steve Rampton**, Vesper Marine, **Shadi Awwad**, Oceaneering

High Voltage Dynamic Export Cables for Floating Wind
Presenter *Audun Johanso and Emmanuel Martin Lauzer, Nexans*

Dynamic subsea export cables represent a significant challenge for realization of cost efficient floating wind substations. We here present the underlying technology gaps, qualified solutions and their constraints. We specifically benchmark solutions at multiple localizations and water depths. Topics: Basic understanding of the gap between traditional export cable technology and future dynamic cables, TRL level and outlook on dynamic export cables, Limitations, knowledge-, and technology gaps.

Dynamic Power Cable Layout Solutions for FOW
Presenter *Chris Patton, 2H Offshore (Acteon Group)*

The feasibility of power cable solutions for floating offshore wind turbines in a dynamic shallow water environment (~50m water depth, high floater motions and large waves/offsets) will be demonstrated. Will also give highlights and additional challenges of power cable configurations as FOW moves into deeper water. Attendees should get an understanding of the challenges and design drivers for FOW power cables.

Two Decades of Experience with Dynamic Power Cables & Substations
Presenter *Ricardo Serafim, Aker Solutions*

With the expansion of the Offshore Wind industry, going to deeper waters, increased power and distance from shore, Floating Wind becomes the offshore wind farm of the future. But with that, new challenges arise and, in particular, how to transfer energy and ensure long-life reliability. Can the industry do that with the same type cable design approach? Aker Solutions proposes new designs and alternatives for the future of Floating Offshore Wind – we invite you to learn more about our products and how they deliver the responses to the challenges of dynamic applications.

Selecting the Optimal Location for Substations in Floating Wind Projects
Presenter *Dr. Bader Diab, OWC (AqualisBraemar LOC)*

We analyze the main factors that influence the location of offshore substations (OSP). We present some of the technical challenges associated with ground fixed and floating OSPs. The presentation will cover the cost and technical drivers for OSP positioning and provide examples for context. Attendees will learn of the main electrical cost drivers in terms of placement of fixed and floating OSP types, as well as the benefits, costs and risks of the substructure, cables and installation.

Panel Discussion

9:30 - 10:15 — **Coffee Break** (in exhibiton area)

10:15 -11:45 De-Risking Projects. Management & Controls

Session Chair: **Jonah Margulis**, Aker Offshore Wind, **Chris Barton**, Wood

Keynote: Optimizing the Supply Chain to De-risk Project Execution
Presenter *James Cotter and Andrew Burke, Shell Renewables and Energy Solutions*

Taking a whole systems approach to right sizing project execution. Key factors in creating and delivery value in project execution, extending beyond standalone component cost reductions.

Business Models Reducing LCoE
Presenter *Henrik Baltscheffsky, Hexicon*

Collaboration with service providers and EPC companies willing to engage and invest ahead of commercial arrays will contribute to skill development and risk reduction paths attracting large scale wind farm constructions, including substation and high voltage dynamic cables. The permitting skills are local and the engineering skills are generic. Leading the combination will enhance results. Several jurisdictions cannot afford to wait and test "pre-commercial" test arrays for several years to construct the large scale windfarms in deeper waters. Shortening the calendar time to reach several GWs in operation will win.

Crane Vessels, Alternative for Floating Wind?
Presenter *Torben van Wyk , Maersk Supply Service*

Today, installations and maintenance on bottom-fixed windfarms are made possible by jack-ups and large floating crane vessels. But what will we do on commercial floating wind farms? How will the transition and impact be on craned vessel market when entering the floating wind industry, both during development and operational phases. Operation & Maintenance: craned vessel vs. towing floaters to port. How synergies between design of floaters, mooring and cable impacts the need for craned vessels in floating wind market. How can craned vessel technologies support the development of commercial floating windfarms. Why industry leaders need to come together and innovate new crane technologies.

Supply Chain Management to De-Risk Project Execution
Presenter *Von Thompson, Xodus Group*

The presentation will address the challenges of ensuring cost and schedule certainty when executing floating wind projects offshore USA. This will be a requirement for attracting investment and securing commercial success of future developments, yet there remains a disconnect between OEM technologies and the supply chain capabilities to set, handle and install such equipment at scale. The presentation discusses this disconnect and highlights the challenges floating developers will face in managing cost and schedule certainty risks. Attendees will gain an appreciation of the potential supply chain limitations on the East and West Coasts of the USA for future floating offshore wind developments and high-level strategies to overcome the risks these limitations raise.

Panel Discussion

11:45 - 1:15 — **Lunch** (in exhibition area) Sponsored by Huisman

1:15 - 2:45 Assembly & Installation

Session Chair: **Bruno Geschier**, BW Ideol, **Von Thompson**, Xodus

An Outlook on Floating Wind Projects
Presenter *Tyler Studds, Ocean Winds*

A presentation on Ocean Winds Project Pipeline against the background of the current changing West Coast Development progression.

Floating Wind - Marine O&M Considerations
Presenter *Bo Jardine, Shell*

Discuss the unique challenges facing the renewables and marine industries as it relates to the Operations & Maintenance (O&M) of floating wind farms. Floating wind represents one of the greatest areas for growth in offshore marine sector within the past 100 years. Developers, their Supporting OEMs, and Vessel Owner/Operators will require new vessels, new supporting technologies and new operational paradigms to ensure they can deliver their technical and commercial promises.

Windfloat® Upgrades and Associated Installation Strategies Towards Commercialisation
Presenter *Marco Wiedijk, Principle Power*

Implementation of lessons learnt from experience on the delivered floating windfarm projects of WindFloat Atlantic in Portugal, and Kincardine in Scotland and EFGL project under way in France in the 3rd generation of WindFloat design. The presentation will provide insight how the implementation of Principle Power's design, fabrication and installation experience with the delivered projects and project in execution will support solutions in the delivery of large commercial scale project that shall meet targets in terms of cost effectiveness, logistics and local content creation.

An Innovative Approach to Install Offshore Windfarms in an Efficient and Safe Way.
Presenter *Robert Thompson, Huisman*

The Windfarm Installation Vessel (WIV), an integrated solution for large floating (and fixed) offshore windfarms – slashing installation time, costs and emissions.

Panel Discussion

2:45 - 3:30 — **Tea Break** (in exhibiton area)

3: 30 - 5:00 Operations - O&M Scenarios

Session Chair: **Bo Jardine**, Shell, **Anil Sablok**, Genesis, Technip Energies

Comparison of Different O&M Scenarios for Large Floating Wind Farm Arrays
Presenter *Denis Matha, Ramboll*

We will compare different scenarios for O&M for large floating wind farms, based on studies performed in the EU COREWIND project. Special focus will be on -tow-in to port and heavy lift operations for the exchange of large components at sea. Further, a time-based cost-modelling of the operation phase will be presented which compares floating-wind specific scenarios regarding availability and OPEX. Attendees will obtain an overview on different O&M scenarios and challenges, limitations and opportunities related to the scenarios. The audience will also learn about expected relative motions occurring between crane vessels and floaters, providing insights on compensation requirements. The cost scenario analysis will show cost-driving factors of the operation phase and give recommendations for the optimal strategy selection of commercial scale floating wind farms.

A Cost Effective O&M Strategy for Floating Wind Farms
Presenter *Jonathan Boutrot, Bureau Veritas*

The presentation will describe the global approach we have developed to manage the Asset Structural Integrity of Offshore Wind Farms (fixed and floating), making use of new technologies to enhance the efficiency and cost of the inspection & maintenance strategy. The presentation will give food-for-thought on how the In-Service phase could be approached in term of Structural Integrity Management: notions of Risk-Based Inspections, Structural Health Monitoring, Remote Inspection Techniques and obviously digital twin will be developed.

Operations & IMR: The WindFloat® Way
Presenter *Clara de Moura Santos, Principle Power*

This presentation will start with presenting the drivers for LCOE cost Reduction and the specific role of OPEX. Principle Power will then explain how we take this consideration in the design of the WindFloat. Further on Principle Power will focus on the importance of a lifestyle approach to cost and risk management during the Project's Operations phase. The floating offshore wind Industry has captured the undeniable interest for the global offshore energy industry players given its well acknowledged potential. This presentation will bring insights around some of the aspects where the industry is showing huge interest to further understand – how to operate and maintain large scale floating offshore wind projects.

Timeline to Commercial Scale Projects
Presenter *Erik Rijkers, Quest Floating Wind Energy (Q FWE)*

This unique conference is aimed at identifying readily available solutions, best practices and strategies to further Floating Wind to Commercial Scale. This presentation will review the solutions that will have been offered during this conference and attempt to show the influence they may have when applied to the current state of industry and the potential they may offer to the timeline to Commercial Size Floating Project Developments.

Closing Remarks
By Paul Hillegeist & Erik Rijkers, Quest FWE