MITIGATING THE RISKS OF THE OFFSHORE ENERGY TRANSITION

By Robert Clark

Geopolitical instability is affecting global trade patterns, shipping routes, the supply chain and commodity prices. Concerns have also been raised about the supply of energy and the potential for another crisis in what is already a bearish market.

Adapting to these pressures is putting additional strain on the energy transition as the renewable assets industry looks to continue to scale and accelerate.

The rapid advance in emerging offshore wind technology however presents a fresh set of challenges which need to be addressed. A full spectrum of technical and commercial assessment across the offshore wind value chain establishes what these risks are and how they can be mitigated.

As the industry undergoes another significant step change, we consider how stakeholders can progress at pace, investing with confidence but without compromise.

THE SCALE OF THE OPPORTUNITY

Over the past 11 years, the global offshore wind market has grown at an average of 24% per year. By 2020, this rapid development had resulted in a global installation capacity of almost 35 GW. While this may appear limited compared to other renewable energies, the sector's exponential growth in a relatively short amount of time is forecast to continue.

Offshore wind and in particular floating is expected to see expansion into new regional markets. According to a Bureau Veritas report released in 2023 "Europe will remain the market leader for the foreseeable future in terms of installations numbers, however the USA and Asia have been fast developing as well. For instance, in the Republic of Korea, off the coast of Ulsan, two floating wind projects will start in 2024, with a total of 6GW to be started by 2030. Over in the USA – California, five leases have been awarded for a total of approximately 4.6GW and $757 million in winning bids."

The share of floating installations in the offshore wind market however currently remains limited. In 2023, out of Europe's total offshore wind capacity of 60 GW, the largest regional capacity worldwide, floating wind represented 0.3% (approximately 200 MW) compared to bottom-fixed installations. This is still a part of the offshore energy industry which is very much in its infancy.

COMBATING EMERGING RISK

Nascent technologies come with new risks and challenges which inevitably has implications for the sector.

Floating offshore wind (FOW) is complex, costly and currently carries with it a significant burden of uncertainty when compared to its fixed bottomed cousin. To facilitate constructive investment in the sector to drive development and ultimately commercialisation to GW scale, the technology, operational and project risks must be recognised, mitigated and where possible designed out. The speed with which the sector and associated technologies is developing also brings with it additional challenges when it comes to planning for large scale commercial projects. For one thing, no one has done this before.

Evaluating the technical risks of FOW in particular, requires a practical, pragmatic approach. The primary objective is to establish whether the technologies being developed and associated operations are robust and suitable for the offshore environments in which they are intended to operate.

Undergoing a structured period of due diligence from a technical perspective ensures that the investment risks are recognised and allows for the flow of crucial information between all stakeholders – investors, their advisors and project partners.

GLOBAL OFFSHORE WIND MARKET HAS GROWN AT AN AVERAGE OF 24% PER YEAR

KEY AREAS OF CONSIDERATION

The objective of the due diligence process is to provide a detailed understanding of the key technical risks associated with new technologies, assets and organisations.

TECHNOLOGY

The identification of novel elements, interfaces, systems and their maturity.

ORGANISATION

Focusing on technical competencies, organisational structure and proposed delivery mechanisms.

KEY PROJECTS

Project delivery including certification and supply chain assessments.

BANKABILITY

The assessment of CAPEX and OPEX estimates for projects.

COMMERCIAL ADVANTAGES

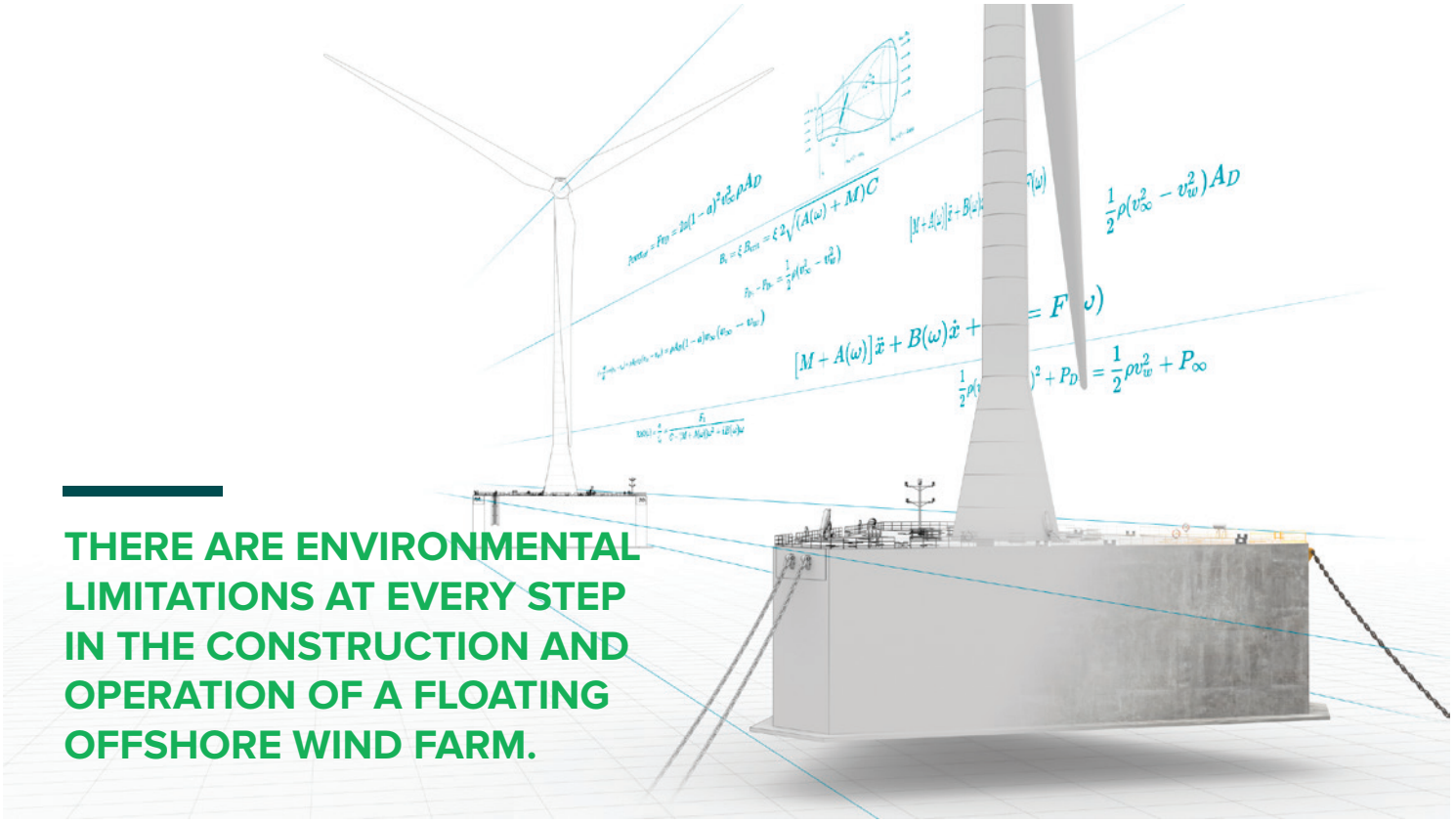
Advantages the technology has over competitors.

YIELD

Predicted power generation over the lifetime of the asset.

INFRASTRUCTURE

key infrastructure requirements underpinning the development and roll out of the technology



THERE ARE ENVIRONMENTAL LIMITATIONS AT EVERY STEP IN THE CONSTRUCTION AND OPERATION OF A FLOATING OFFSHORE WIND FARM.

SPOTLIGHT ON WEATHER RESTRICTIONS

We build windfarms to harness the power of the natural environment. As these offshore installations move ever further from the shore, the impact of this same environment on our ability to install and operate increases. .

This in turn has the potential to impact project schedules, CAPEX and OPEX throughout the life of the projects and assets.

A thorough understanding of the weather limitations and operability limits associated with the full project lifecycle is fundamental to successful project delivery and operation. There are environmental limitations at every step in the construction and operation of a FOW farm.

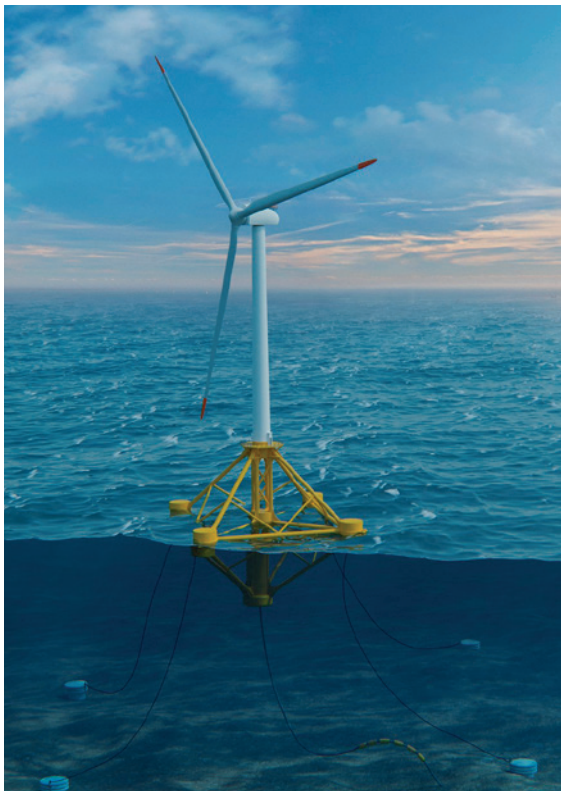
The delivery of FOW at scale will require the development of efficient and effective production lines which are able to “churn out” tens of foundations and fully integrated floating offshore wind turbines per year. The efficiency of this production line will be ultimately constrained by the ability to install the assets offshore. In some regions (in particular the northern North Sea) the statistical weather window to tow and install these floating assets is approximately 3-4 months in each calendar year. It is therefore imperative that project planning and scheduling accounts for this from an early stage in the development of the project.

When it comes to considering the through life operations of the assets, currently major component replacement is only possible in port. This means that in the event of a major component failure, the asset will need to be disconnected and towed to location with suitable infrastructure to undertake the work. The disconnection and tow is subject to similar limitations as the original installation meaning that there is a risk of considerable asset down time depending on when the failure was to

occur. We have already seen this to be the case on Kincardine and will follow with interest the progress of Hywind Tampen, in which all five floating turbines are due to be taken off station and towed to shore this summer for repairs.

A weather restricted operation is one in which the operational limitations are selected independent of the statistical environmental data. These limitations may be driven by aspects such as:

- Environmental design criteria
- Crew transfer / safe working
- Equipment restrictions
- Position keeping
- Vessel limitations
- Contingency plans



A BESPOKE APPROACH

Marine consultancies have a significant role as a partner in the offshore energy transition industry through the development and delivery of personalised risk consulting services.

With 45 years' experience in legacy offshore activities and marine innovation, TMC Marine has a commitment to providing teams of skilled technical and engineering expertise to assist our clients in the delivery of new and novel offshore technologies.

In the next article we will address the challenges of clean shipping and decarbonisation.

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