

# US offshore wind energy

Combining European expertise and US content



Developing offshore wind energy production facilities presents interesting operational requirements and logistical challenges, especially along the US Northeast Coast. Environmental conditions in the Northeastern US are challenging, harsh and some areas have relatively deep water for production of offshore wind energy.



However, GustoMSC does not foresee any insurmountable problems. Their maritime experience with harsh environmental conditions began when their company started in the 1860s. They have operated worldwide in the offshore wind energy industry since 2002. Also, this innovative Netherlands-based company has been learning since 2008 what is required by local

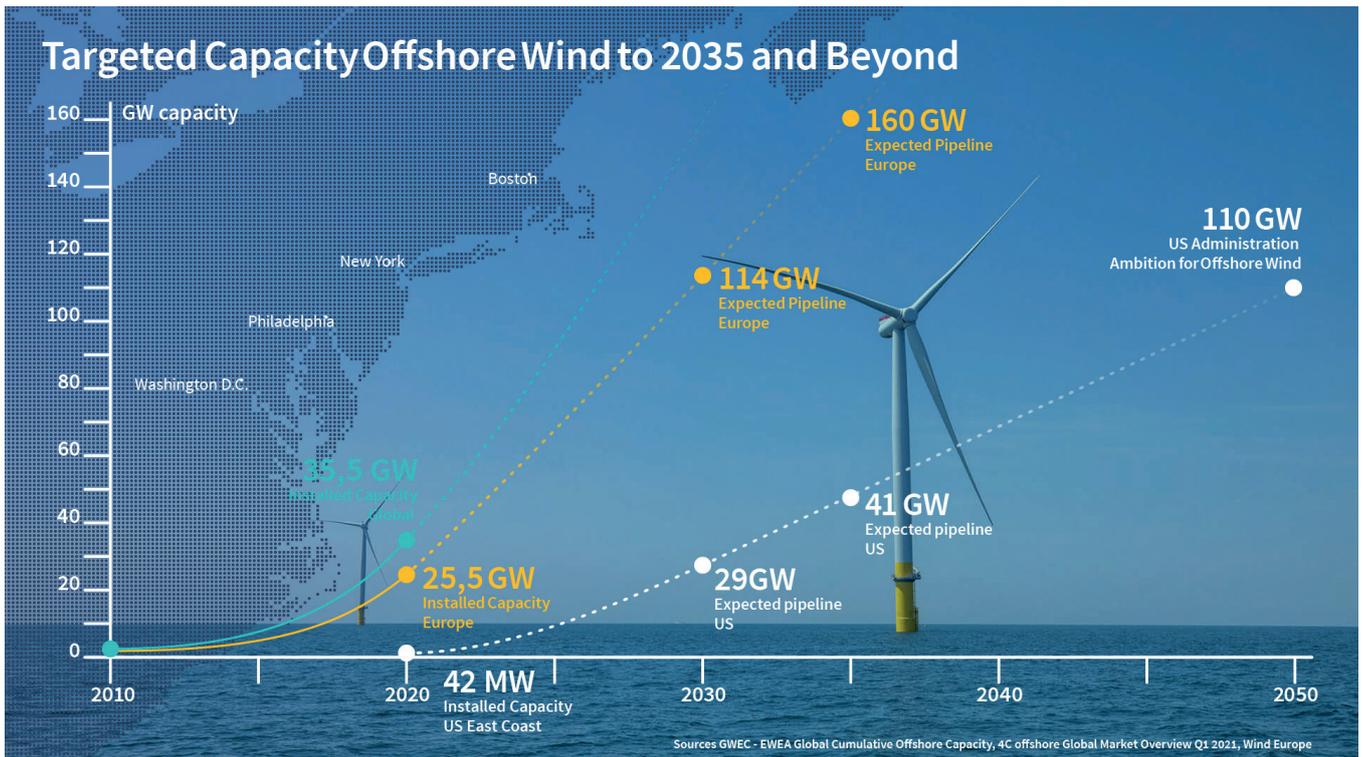
specifics of US projects like Cape Wind. And they are helping develop robust transport and installation solutions.

The new US regime has set an ambitious goal for the expansion of offshore wind energy. It aims to expand production of offshore wind energy to 30 GW by 2030, and 110 GW by 2050.

Building up a new industry and its supply

chain in the US will take time. To meet the required timeline, the US offshore wind energy industry will have to expand quickly. It is also teaming up with European players to kickstart the process.

For the first projects, the US is relying on EU expertise and companies to install foundations and turbines. Over recent years, investments have begun in the



infrastructure, assets and supply chain required for long-term development of US offshore wind energy. Many of these developments and investments rely strongly on US – EU partnerships built upon European offshore wind expertise and US content. And development is required on a massive scale: the 95,500 mile US coastline dwarfs the 41,000 mile European coastline.

Thus, there is immense potential for the US offshore wind energy industry. Initial investments in the US offshore include developing EEW's foundation manufacturing facility in Paulsboro, NJ; a staging port in New London, CT; and Dominion Energy's NG 16000X SJ installation jack-up vessel, 'Charybdis'.

**A robust supply chain for the Jones Act**

The Jones Act requires vessels that transport merchandise between US ports to be US-built, -flagged, -crewed and -owned. This merchandise includes offshore wind turbine components and other production equipment and supplies.

The specialized vessels required to develop offshore wind energy along the US East Coast do not exist in the US. So, at first, foreign vessels will be used within the restrictions of the Jones Act. But a wide variety of dedicated, fit-for-purpose US built and Jones Act compliant vessels will eventually be required to develop the US offshore wind energy industry over the long haul. This creates a strong demand for the US shipbuilding and operating industry to build and operate these required vessels.

**US East Coast offshore wind energy industry**

Currently, development in the US is focused on bottom fixed wind energy along the US East Coast. The Northeast has very good wind resources and population centers with demand for renewable energy located close to offshore areas with acceptable water depth conditions. Also, northeastern states tend to see offshore wind energy as a promising new industry with economic benefits for them.

This ideal combination is currently leading development of the US offshore wind energy industry. And individual states along the East Coast are competing to persuade portions of the supply chain to base their associated economic activity from their state. Healthy competition will help develop an efficient infrastructure and supply chain for the long term.

Different dynamics on the US South (Gulf of Mexico) and West Coasts will create different trajectories in offshore wind energy production there. Deeper water along the West Coast will focus development on floating wind technology. But currently West Coast development is lagging that along the East Coast.

**Huge logistics challenge**

The Jones Act and the port infrastructure are two key differences between the development of wind energy production in the US and Europe. In Europe, the mature North Sea offshore oil and gas industry provided ports, infrastructure, assets, and experience

for the fledgling offshore wind energy industry. This has helped promote faster growth of offshore wind energy in Europe.

However, development of offshore wind energy on the US Northeast Coast presents a huge logistics challenge. Unlike Europe, most of the port infrastructure is missing. And the US is starting the rollout of offshore wind energy with massive turbines 12 MW and larger — versus the 2- to 3 MW turbines being initially installed in Europe. So, the industry has been putting the pieces of this transportation and installation puzzle together for the last few years, devising new solutions for the first US offshore wind farms.

**Transforming the US offshore wind energy industry**

GustoMSC has been very active in supporting the market with offshore wind energy production concepts and solutions over the years. They have designed large Jones Act compliant installation jack-ups such as the NG-8000X, NG-14000X and NG-16000X. And they produced feeder and maintenance jack-ups.

They also explored floating feeder alternatives. Recently, this included evolving a dedicated steady top feeder vessel. This vessel has an integrated design comprising proven skidding and a proven 3D motion compensation platform on a DP2 vessel. This supports the safe lift off of wind turbine components from a floating feeder vessel onto an in-field installation jack up.

Deploying motion-compensated floating feeder vessels allows use of more ports on

the East Coast that are not accessible by large jack-ups. The development and construction of these vessels has the potential of transforming the US offshore wind energy industry as logistical solutions and associated assets are adapted to best suit local requirements.

### Reducing the cost of offshore wind energy

At GustoMSC, they look closely and address the maximum portion of the leveled cost of energy that can be influenced. GustoMSC also continually enlarges the envelope of their expertise as an integrated jack-up vessel designer and equipment supplier.

In Europe, they started designing the first dedicated wind turbine jack up vessels in 2008. These vessels shortened turbine installation time to one set a day. This was a game changer: GustoMSC not only installed wind turbines at a faster pace, but also reduced installation costs and significantly lowered a portion of the leveled cost of energy.

Dominion Energy has granted concessions for about 700 wind turbines, totaling 5 GW. However, offshore wind energy is still in the pioneering phase in the USA. And owner/operators are collaborating with experienced partners in these projects to reduce risk and expedite the process.

### Dominion, teamed up

Dominion has formed some ideal partnerships that help provide the right installation vessel and the right assistance — from beginning to end of their installation, operations and maintenance work. By teaming up with Seajacks and GustoMSC, they have overcome two major offshore wind hurdles: having experience in constructing and operating jack up vessels; and having adequate jack up vessel capacity available for their projects.

By securing the Charybdis/NG-16000X-SJ installation jack-up vessel, Dominion helped ensure the safe and on-time construction of

their project. And, by working with Keppel AmFELS on wind turbine installation equipment, Dominion has also ensured timely delivery of key resources for the vessel.

### GustoMSC and NOV paving the way

GustoMSC began presenting at the early AWEA Offshore Wind conferences and advising solutions to US players about the Cape Wind project in 2008. They delivered nine proprietary vessel designs in 2009, with 30 more in production. And they designed the Seajacks Scylla, which was the world's largest turbine installation jack up vessel in 2016.

When NOV acquired GustoMSC in 2018, the sixth Seajacks project was well underway. Together, they are creating even more success in the renewable energy sector. The US offshore wind energy market is evolving into a robust renewable industry requiring robust transport and installation solutions. And GustoMSC is ready to show you the way.

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### STFV: Fast, flexible, safe

Current trends and developments in the offshore wind energy industry are shaping the installation fleet of the future. Current installation concepts are being challenged by ever larger offshore wind turbines and expansion to new areas such as the US, Japan and Taiwan. GustoMSC is widely involved in these developments through designing ever

larger wind turbine installation vessels, jacking systems and cranes.

At the same time, GustoMSC has been developing solutions for feeder options including the latest version of the steady top feeder vessel (STFV). This specially designed transport vessel will be able to load wind turbine generator components in port and transport them directly to the field.

The STFV provides an attractive alternative or complement to the traditional self transiting installation jack up concept. This is especially true in the US, where the Jones Act requires US flagged vessels to be used for the transportation of wind turbine components, and where there are limited ports which can be accessed by large jack-ups.