

Christian P. Hoepfner, CEO of Wessels Marine shares insights into their new multi-fuel bunker vessel (MFBV) design concept and how they will positively impact the use of LNG as fuel.

Wessels Marine (WESMAR) is a marine project management and development consultancy based in Hamburg. The company specialises in next-generation fuels that facilitate the transition to lower emissions and climate-neutral transportation.

The company has built unique expertise in the fields of LNG conversions and newbuilds as well as midstream infrastructure. WESMAR's founder was responsible for first conversion of a container feeder vessel – Wes Amelie, owned by Wessels Reederei – for the use of LNG.

WESMAR's latest innovation is a new design concept for an advanced, highly versatile multi-fuel bunker supply vessel in two capacity versions which will provide flexible delivery (volumes of up to 3,500cbm or 4,600cbm) of LNG, bio-LNG and synthetic liquefied gas (SLG). These vessels can also be set up easily for ammonia and methanol as marine fuel.

How did the MFBV concept evolve from idea to reality?

At the start of the project in 2019 we conducted a comprehensive study of the LNG bunkering market. This included a technical and commercial analysis of first- and second-generation LNG bunkering vessels, as well as a forecast of demand for LNG and potential alternatives including methanol, ammonia and hydrogen. We also conducted interviews with LNG suppliers and a broad variety of potential and existing LNG off-takers.

Based on the results of this study and continuous conversations with potential stakeholders, the concept evolved through multiple development iterations. Finally, in October 2020, we completed the design work. The MFBV is now ready to be built to charterer requirements in two sizes: 3,800cbm and 5,000cbm.

What were the key considerations when designing the concept?

Fundamentally, the task of a MFBV does not differ from that of a conventional bunker vessel. The big difference lies in the fuel medium and higher handling demands.

An MFBV needs to be compatible with the broadest possible range of LNG receiving vessels. This means the berthing of the bunkering vessel to the receiving vessel, and the connectivity of the LNG transfer facilities (the manifold or connection positions, for example) between the bunkering vessel and the receiving vessel.

The safe and fast transfer of LNG with minimal methane slip requires technical equipment. Finding the balance between technical complexity, wide compatibility and economic viability was crucial for our concept.

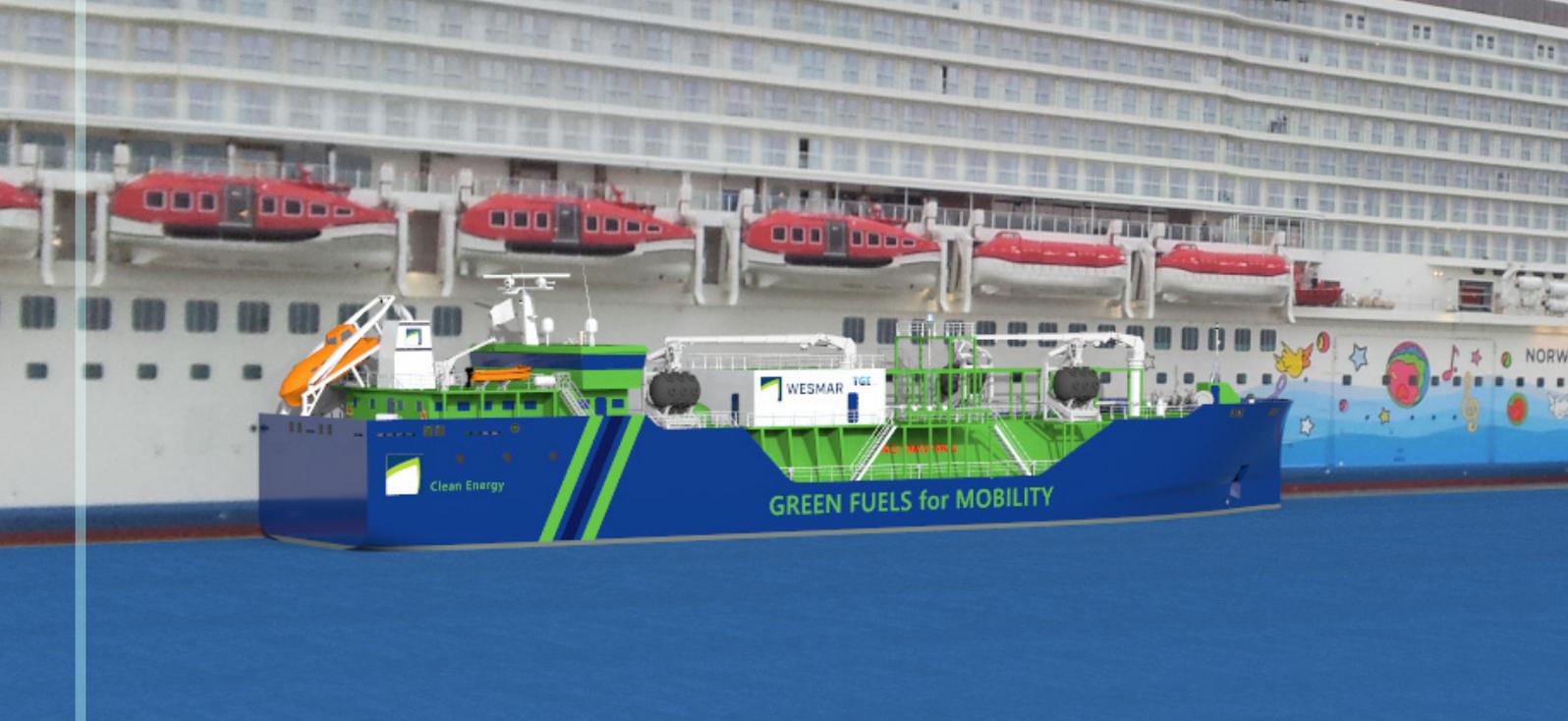
During the design phase we concentrated on key requirements regarding functionality, manoeuvrability, size, cost and sustainability. Ensuring the sustainability and longevity of the MFBV was essential. This means using facilities and equipment that can be repurposed for other fuels in the future.



Christian P. Hoepfner
CEO, Wessels Marine

A first look at the Wessels Marine LNG bunker vessel. Photo credit: Wessels Marine GmbH





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Cost and logistics were also core considerations. For the bunker receiver, a fast, flexible and non-location limited delivery is crucial, as well as the delivery price. For the LNG supplier, the logistics costs must be low and the market coverage must be as wide as possible. The supplier achieves the greatest possible market coverage through functionality and the right size of the bunker vessel. Both factors have an impact on logistics costs. The more complex and higher the functionality and the larger the ship, the more expensive it is and thus the higher the logistics costs. This is why we kept the vessel small and with a limited bunker volume.

Will the MFBVs serve specific ship types?

Our MFBV has been optimised to be compatible with the broadest possible range of off-takers. The limitation of bunker volumes to around 3,500cbm and 4,600cbm guarantees the right compromise between volume and versatility for most receivers. These sizes also allowed us to implement a lowerable bridge deck that gives us the unique selling point of being able to serve cruise vessels without the usual pontoon between the bunker vessel and the cruise vessel.

With the further expansion of LNG infrastructure and wider acceptance of this fuel we expect to see a disproportionate increase in bunkering events in the smaller volume ranges. After analysing ship segments predestined for the use of LNG as a fuel, we took the decision to go smaller. While LNG bunker volumes typically range from 150cbm to 18,500cbm, the majority of bunkering events are in fact in the much lower volume range.

In cases where volumes larger than our MFBV capacity are required, they can still come into play

for the supply of bio-LNG or synthetic LNG as a drop-in to fossil LNG.

When will the first MFBVs enter service?

The next step is to start the newbuild programme, which will initially comprise four vessels. The contracts for those will likely be signed in the second quarter of 2021. We anticipate that the first vessel will enter service by the second quarter of 2023, shortly followed by the other three vessels. There is interest in MFBVs from several LNG suppliers. Looking forward, it is our intention to extend the initial fleet of four by at least another four newbuilds to meet growing demand for flexible, next-generation bunker supply vessels.

How will these vessels positively impact the use of LNG as fuel?

A comprehensive supply of attractively priced LNG is key to the fuel's further spread and acceptance. Our MFBV will be positioned for the last-mile delivery of volumes suitable for small- and mid-sized off-takers that cannot be served by large or long-haul tankers or high-capacity jetties for various reasons. It is therefore a critical building block for the required bunker infrastructure.

One of the concerns frequently raised in relation to LNG is the environmental impact of methane slip from well to wake. We have explicitly addressed this issue with a chiller unit that helps to almost eliminate any boil-off losses and thereby safeguarding consistent fuel quality.

The compact vessels were designed to meet highest efficiency standards while giving charter parties all degrees of freedom they need. Our solution comes with a significantly lower cost structure compared to existing bunker vessels – a groundbreaking development for expanding global LNG bunkering infrastructure.

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