



# MAN-powered battery hybrid wellboat

**MAN Energy Solutions**  
Future in the making

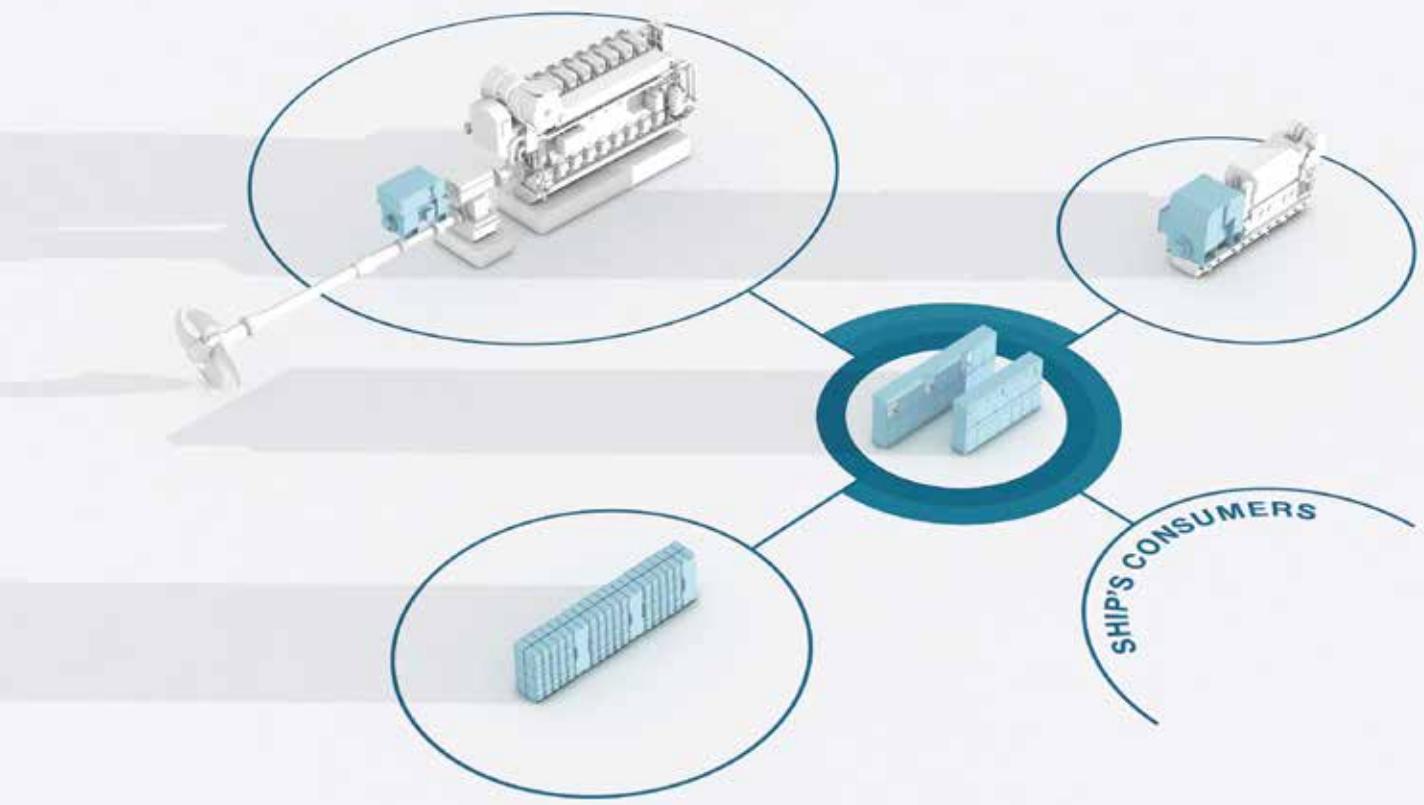
**Brønnbåt Nord AS, based in Egenes, Norway, has selected MAN Energy Solutions to provide propulsion and auxiliary power systems for its state-of-the-art battery hybrid wellboat design. The 2,800 m<sup>3</sup> live fish carrier is a complete design solution from NSK Ship Design, Norway – developed and optimized in close cooperation with Brønnbåt Nord. The vessel will be built by Sefine Shipyard, Turkey, for delivery in the second quarter of 2023.**

## **Environment and energy efficiency**

Brønnbåt Nord took a proactive approach to this vessel design with demands and important progress in a more sustainable direction for the aquaculture industry in general. The overall target for the shipowner and the designer is to reduce the vessel's carbon footprint and ensure clean and careful handling of live fish resources. The innovative new MAN-powered battery hybrid power, propulsion, and propeller system is fundamental for this.



*Rendering of the new 2,800 m<sup>3</sup> – 79.3 x 16m battery hybrid wellboat (image courtesy of NSK Ship Design)*



### Complete MAN power solution

The following equipment has been specified for efficiently powering and propelling the wellboat:

- MAN 8L27/38 propulsion engine delivering 2,920 kW at 800 rpm
- RENK two-speed gearbox with PTH and hybrid modes
- MAN Alpha VBS790 CP propeller with nozzle and rudder bulb
- MAN Alphatronic 3000 propulsion control system with Speed Pilot and adaptable combinator curves
- MAN 12V175D GenSet, 1,800 kW
- LIAG/MAN auxiliary GenSet, 800 kW

The vessel is equipped with a 1,000 kWh battery package (2c; up to 2,000 kWh), fully hybrid system integrated for use in hybrid maneuvering combinator mode, peak shaving, and PTH modes – together with a dynamic positioning system.

Main and auxiliary engines are approved for future operation with HVO (hydrotreated vegetable oil) biofuels which, together with energy recovery features and further hull, aft ship, and propulsion system measures, minimize the vessel's overall greenhouse gas emissions.

### Propeller and aft ship optimization

Due to the proficient teamwork with NSK Ship Design and Brønnbåt Nord at an early stage, MAN Energy Solutions was able to exploit some optimization parameters in relation to design integration, such as the final location, angle, and fixation of the propeller nozzle in the aft ship structure.

Furthermore, the hull lines in the vessel's aft ship region were slightly modified for an improved inflow pattern to the propeller. The cooperation with NSK gave rise to a new optimized balance between the increased hull resistance, reduced suction resistance, and a better flow to the propeller, which proved to be beneficial overall with additional suppression of vibrations and noise. The calculated power reductions and corresponding fuel consumption savings were 13.4%.

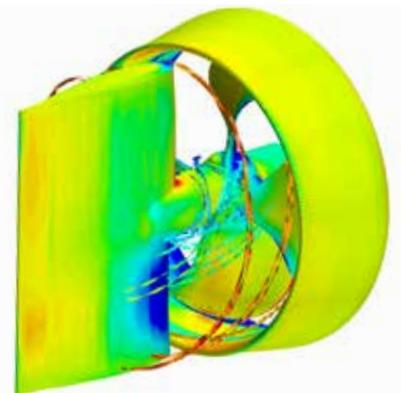
### Tank testing – rudder bulb design

CFD optimization with and without rudder bulb demonstrated a noticeably better propulsion performance around the design point, and the addition of the rudder bulb further increased efficiency up to 2% at 10–11 kn free sailing, while also resulting in an improved bollard pull capacity by up to 1%. Very good results were confirmed in tank testing.

### Perfect partnership cooperation

Our close dialog and exchange of knowledge with Brønnbåt Nord and NSK Ship Design resulted in the precise definition of needs and design criteria for the optimal propulsion and power system for the vessel's operational pattern.

CFD simulation, free sailing condition:  
Surface pressure and streamlines on  
ducted propeller and rudder bulb



# Propulsion workhorse

## Core of the hybrid system

The robust MAN 8L27/38 medium-speed engine specified for a TBO of 32,000 hours delivers 2,920 kW at Tier III SCR operation.



MAN L27/38 propulsion engine

### PrimeServ Assist monitoring

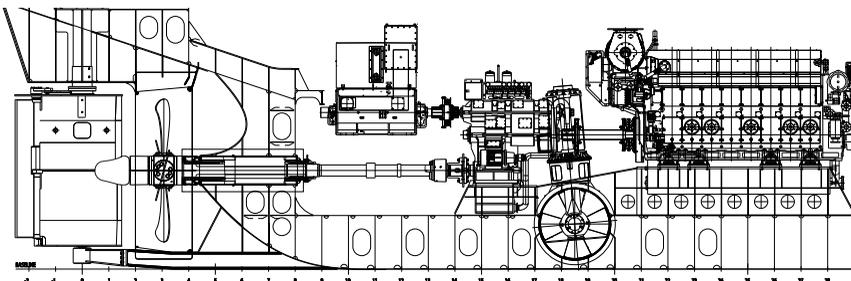
As part of the package supplied, a PrimeServ Assist 'basic service solution' has been specified for activation in the warranty period. The PrimeServ Assist remote monitoring and optimization combines the latest digital technologies with MAN's expertise – for maximized equipment availability, safety, and efficiency. MAN experts connected via a global network ensure the proactive PrimeServ Assist services around the clock.

### Adaptive combinator curves

Performance optimization and fuel savings: The Alphatronic 3000 propulsion control system's adaptive combinator curves ensure optimal operational performance in all conditions – by continuously adapting the combination of revolutions per minute and pitch to ensure maximum efficiency and always enabling sufficient power to both propeller and shaft generator. Other factors which can influence the adaption are ship loading, draft, and hull and wave resistance.

### All in all – reductions and savings

Flexibility and high energy efficiency in all operational modes have been achieved – resulting in radical fuel savings, reduced emissions, fewer running hours on auxiliary equipment, lower consumption, and a reduced environmental footprint in general.



Aft ship arrangement showing the MAN 8L27/38 main propulsion installation with nozzle and rudder bulb



Alphatronic 3000 propulsion control with Speed Pilot

**MAN Energy Solutions**

9900 Frederikshavn,  
Denmark  
P + 45 96 20 41 00  
F + 45 96 20 40 30  
info-frh@man-es.com  
www.man-es.com

All data provided in this document is non-binding. This data serves informational purposes only and is not guaranteed in any way. Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

Copyright © MAN Energy Solutions. Printed in Denmark GKM-FRH: 3010-0434-00 - Jan 2022.