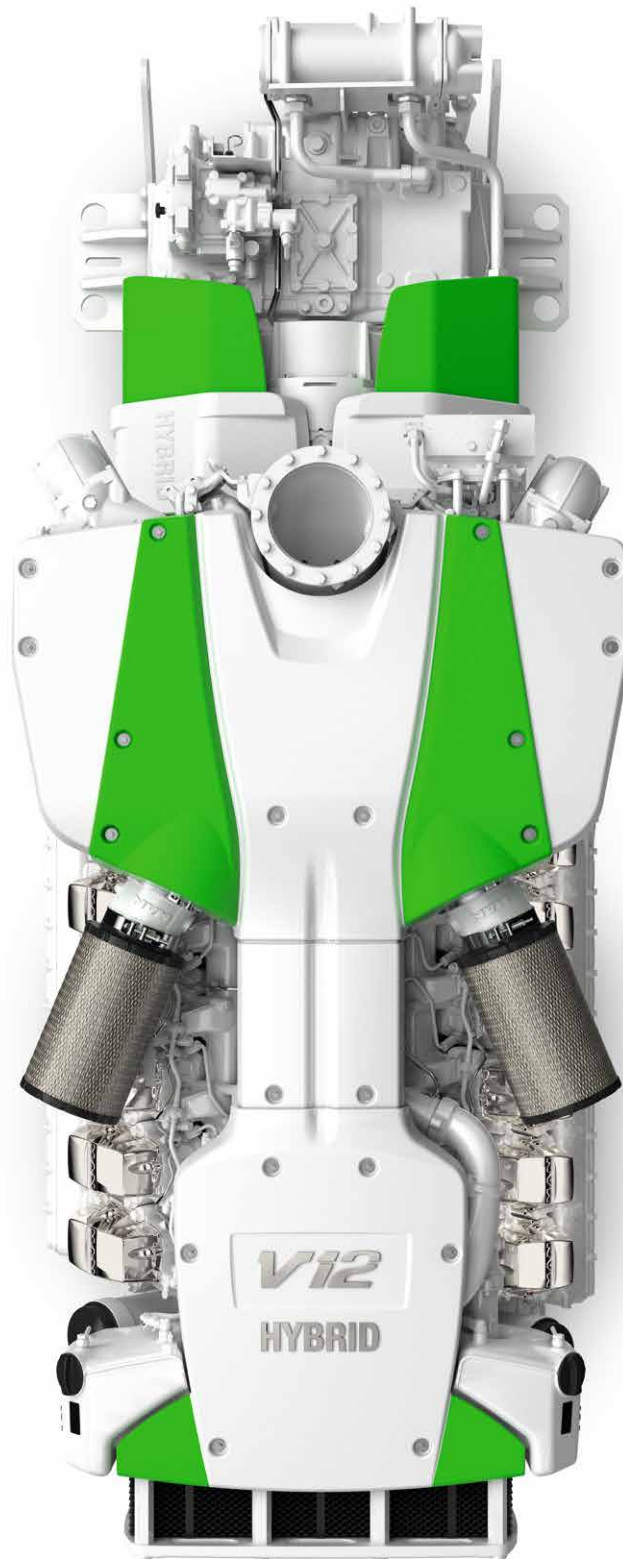


# MAN SMART HYBRID EXPERIENCE.

Change of mobility on the water.



MAN Engines



# **LOW EMISSIONS AND ULTRAQUIET: MAN SMART HYBRID EXPERIENCE.**

# MAN SMART HYBRID EXPERIENCE.

Tailored to your needs.

Every yacht is a statement and every working boat is the expression of an individual requirements profile. This makes it all the more important for the beating heart of a yacht or boat – the drive system – to perfectly match your personal needs and wishes. With the innovative, modular hybrid systems from MAN Engines, we meet your specific demands and can always offer you the ideal solution. This is because, in addition to choosing the important and necessary operating modes for your application, you can also individually adapt the overall system to your needs.

# WHAT IS IMPORTANT TO YOU?

You decide which characteristic is most appropriate for your MAN Engines hybrid system. The system configurations at a glance:

## PERFORMANCE



## COMFORT

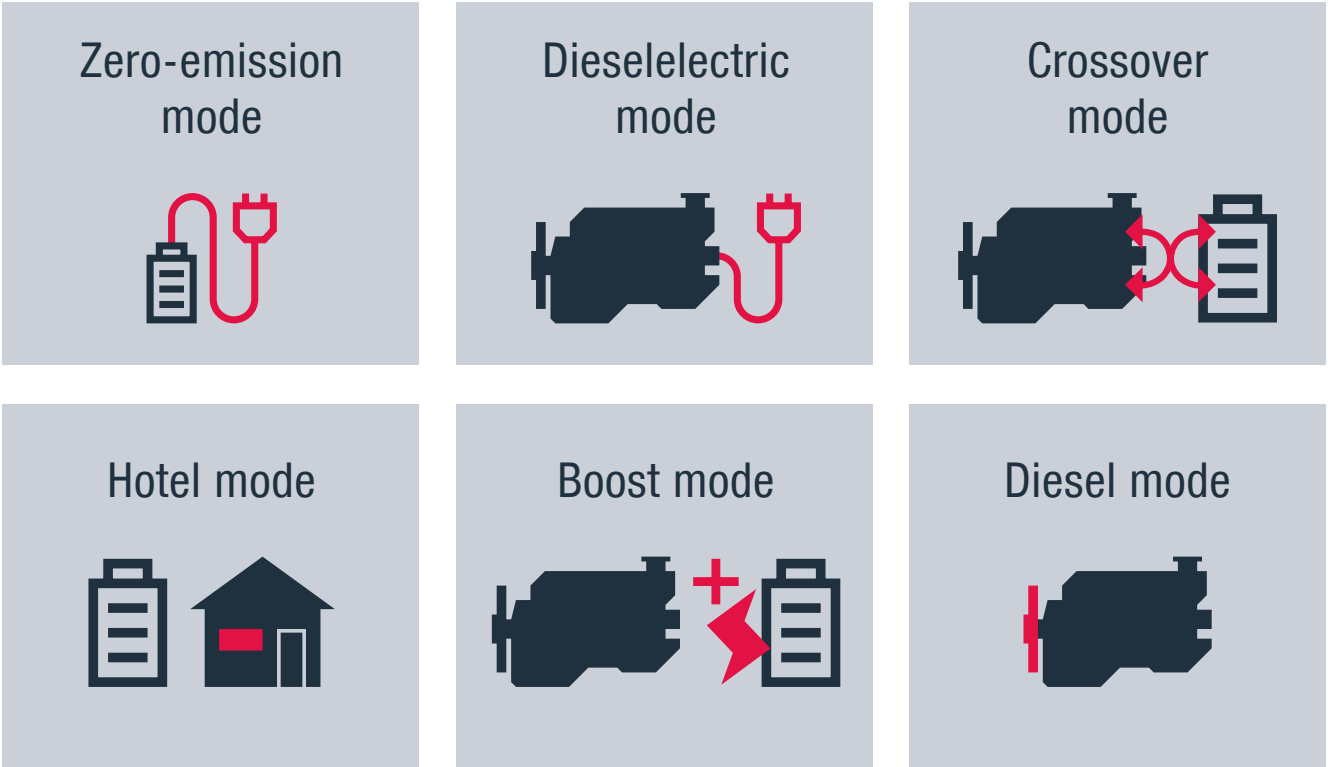


## EFFICIENCY



# MAXIMUM FREEDOM EX-WORKS.

There is a suitable hybrid solution for every requirement and every driving experience.



Is efficiency particularly important to you? Or do you place more emphasis on comfort? Or perhaps performance is closer to your heart? No matter which characteristic is the most relevant for you, the flexible diesel engine and electric motor combinations offered by the MAN Engines hybrid system mean that you will always find the perfect solution for your needs. The components for the drive system and onboard power supply are modular and scalable. This allows the level of hybridization to be individually customized for your requirements.

**All benefits at a glance:**

- Individually configured operating modes
- Components matched to the respective mode
- High operating convenience thanks to ergonomic user interfaces





# UNIQUE HYBRID DRIVE SOLUTIONS FOR YACHTS.

Quiet, with low vibrations and emissions – and maximum power and agility.

The innovative hybrid systems from MAN Engines allow you to experience unlimited freedom on the oceans and enjoy the advantages offered by the optimal combination of powerful combustion-engine technology with quiet and highly efficient electric drive systems. No matter which configuration you finally choose, whether Performance, Comfort, or Efficiency, you always benefit from reduced emissions, lower vibrations, ultraquiet operation, and sustainably increased efficiency and dynamic response together with plenty of comfort.

# PERFORMANCE.

Pure emotion and untamed power.

Would you like a little more? No other 12-ccylinder engine offers a higher power density than the MAN V12-2000. With the Performance system configuration, you increase the maximum output to an unrivaled 1,838 kW per driveline in combination with the electric drive. Thanks to the modular design, in addition to the V12 it is also possible to combine all V8 and i6 engines with the electric drive without any problems. In the Performance configuration, the compact overall systems are designed to offer the perfect balance between power and hybrid capabilities. This means that you benefit at all times from a flexible driving style, from economical through to extremely sporty.

- All benefits at a glance:**
- Powerful acceleration
  - Sporty driving style
  - High torque plateau

	Performance
Modes	Boost
	Dieselelectric
	Zero-emission
	Crossover
	Hotel



# COMFORT.

First-class and practically silent driving experiences.

Our Comfort system configuration offers quiet and zero-emission driving, precise maneuvering, and onboard power without any noise or exhaust emissions. These characteristics are accompanied by minimum vibrations at a level that sets new benchmarks compared with conventional drive systems. Glide gently over the water in zero-emission mode – this mode is practically silent and is without emissions and vibrations. In Harbor mode, you can drop anchor in a completely relaxed way, enjoy the peace and quiet, and still have full electric power available.

- All benefits at a glance:**
- Lownoise
  - Lowvibration

	Comfort
Modes	Hotel
	Zero-emission
	Dieselelectric
	Crossover







# HYBRID DRIVE SOLUTION FOR COMMERCIAL VESSELS.

With the innovative and modular hybrid drive systems from MAN Engines, you can sustainably reduce your emissions and achieve lower operating costs while at the same time benefiting from maximum operating convenience. Depending on your application needs, you can individually configure your MAN Engines hybrid system with the focus on efficiency or performance.

# PERFORMANCE.

Maximum power when it is needed.

Higher performance, lower emissions. The compact MAN Engines hybrid system combines the advantages of a conventional diesel engine with the additional power reserves of the electric motors. That means absolute power exactly when it is needed as well as a dynamic driving style that is gentle on the engine.

**All benefits at a glance:**

- Powerful acceleration
- High torque plateau

	<b>Performance</b>
	Boost
<b>Modes</b>	Dieselelectric
	Zero-emission
	Crossover



# EFFICIENCY.

Greater efficiency, lower costs.

Efficiency is part of the DNA of the marine engines from MAN Engines. This is more evident than ever before in our compact hybrid systems. In the Efficiency system configuration, for example, the complete driveline is consistently modified to achieve long ranges and economical operation. In the diesel or crossover driving modes, the efficient diesel engine always runs at its optimum operating point and is automatically supported by the electric motor when needed. This does not just save fuel, but also permits low-load and low-wear operation of the driveline, which in turn makes it possible to extend the service intervals. The high torque plateau ensures efficient operation in all three operating modes available in the Efficiency system configuration.

**All benefits at a glance:**

- Very economical operation (low fuel consumption)
- Low operating costs and long service intervals

	<b>Efficiency</b>
	Dieselelectric
<b>Modes</b>	Zero-emission
	Crossover







**OPERATING MODES –  
PERFECTLY MATCHED  
TO YOUR NEEDS.**

# ALL OPERATING MODES IN COMPARISON.

## Zero-emission mode



No emissions and ultraquiet – in zero-emission mode, the energy for propulsion and electrical power consumption is provided exclusively by the battery. The battery can be charged in three ways:

- Land connection in the harbor
- Onboard generator sets
- Main drive engines

### All benefits at a glance:

- No noise or exhaust gas emissions
- No vibrations
- Access to emission control areas

## Diselelectric mode

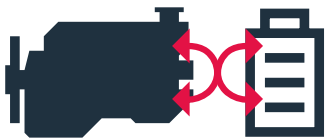


In diselelectric mode, the electrical power supply and drive power are provided by the battery and/or the available onboard generator sets. This saves fuel and reduces the load on the engine.

### All benefits at a glance:

- Low noise and exhaust gas emissions
- Low vibrations
- Efficient operation (low fuel consumption)

## Crossover mode



In crossover mode, both drivelines are operated in different operating modes in a two-engine system. Here, one driveline operates in diesel mode, while the electric motor functions as a generator and supplies the electric power for the ship. In the second driveline, the diesel engine is disengaged so that the electric machine receives its energy from the first diesel engine. It operates in motor mode in this case and provides the drive energy.

### All benefits at a glance:

- Very economical operation
- Long range
- Low vibrations
- Extended operating time before service (TBO)

## Hotel mode

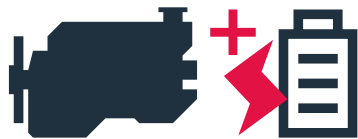


In comfortable hotel mode, the power supply is provided only by the battery, and the diesel engines are switched off. The innovative technology ensures that power consumption is possible for an extended period without diesel engines. Independently of this, the batteries can be charged in parallel via a charging connection.

### All benefits at a glance:

- No noise or exhaust gas emissions
- No vibrations
- Full operational readiness without engines

## Boost mode



In boost mode, the combustion engines and battery-operated electric motors work together and complement each other. If power is needed, the electric motor provides energy from its power reserves. Boost mode therefore offers the highest power density and permits maximum power output. Combined operation of the 12-cylinder diesel engine and actuator thus makes it possible to achieve an output that corresponds to that of a pure 16-cylinder engine.

### All benefits at a glance:

- Combination of maximum power with the advantages of a hybrid and zero-emission drive system
- Increase in power by up to 20% compared with a conventional drive

## Diesel mode



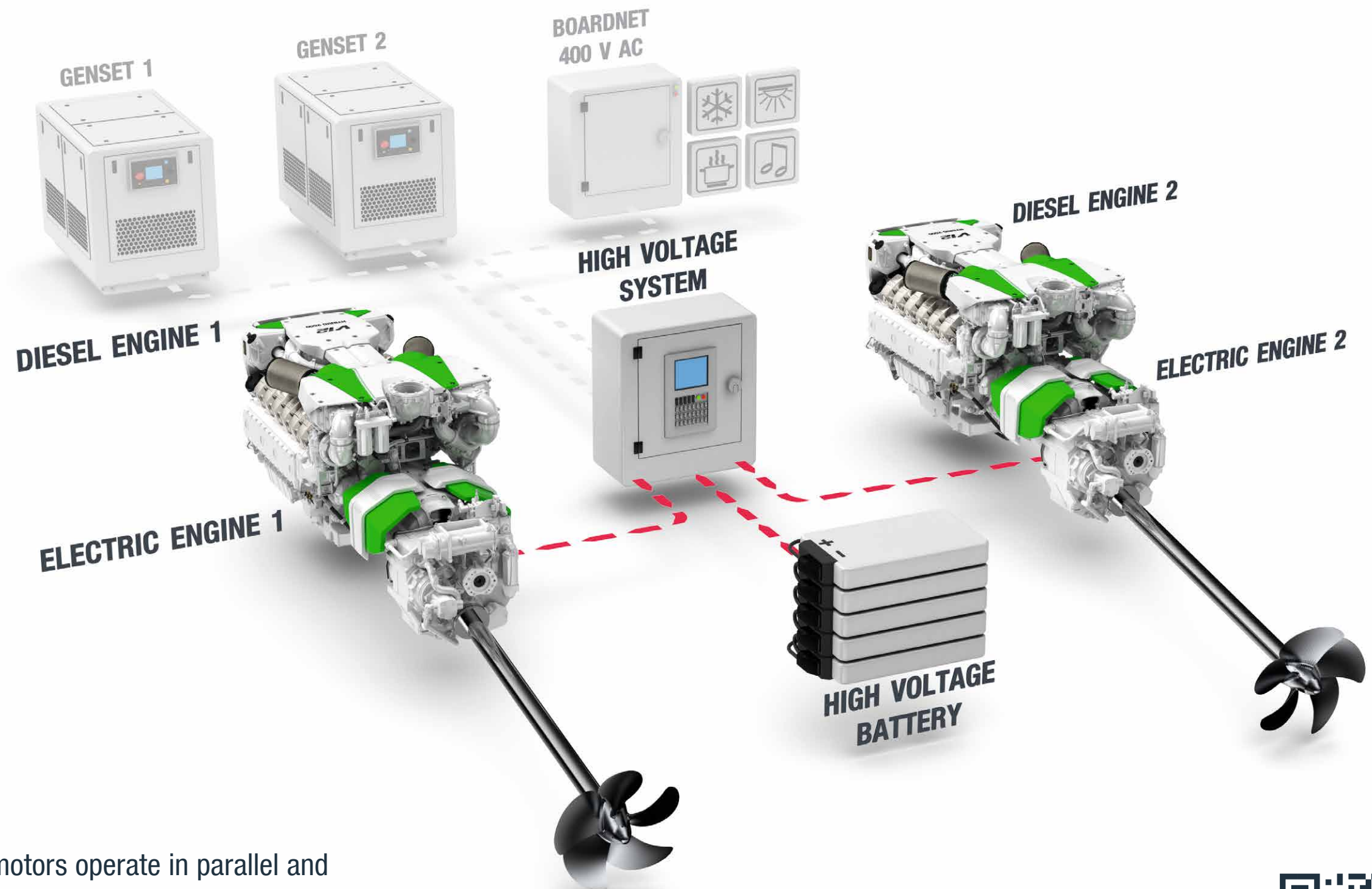
In classic diesel mode, the drive energy is provided by the conventional diesel engine or diesel engines in multi-engine systems. In this mode, the electric motor runs without any function and no power is generated.

### All benefits at a glance:

- Established drive system
- Long range
- Accustomed flexible driving styles ranging from economical to sporty



# BOOST MODE.



#### All benefits at a glance:

- Combination of maximum power of the compact overall system with the advantages of a hybrid and zero-emission drive system
- Increase in power by up to 20% compared with a conventional drive

**Visible:** All components for power generation

**Partly visible:** Optional components for power generation

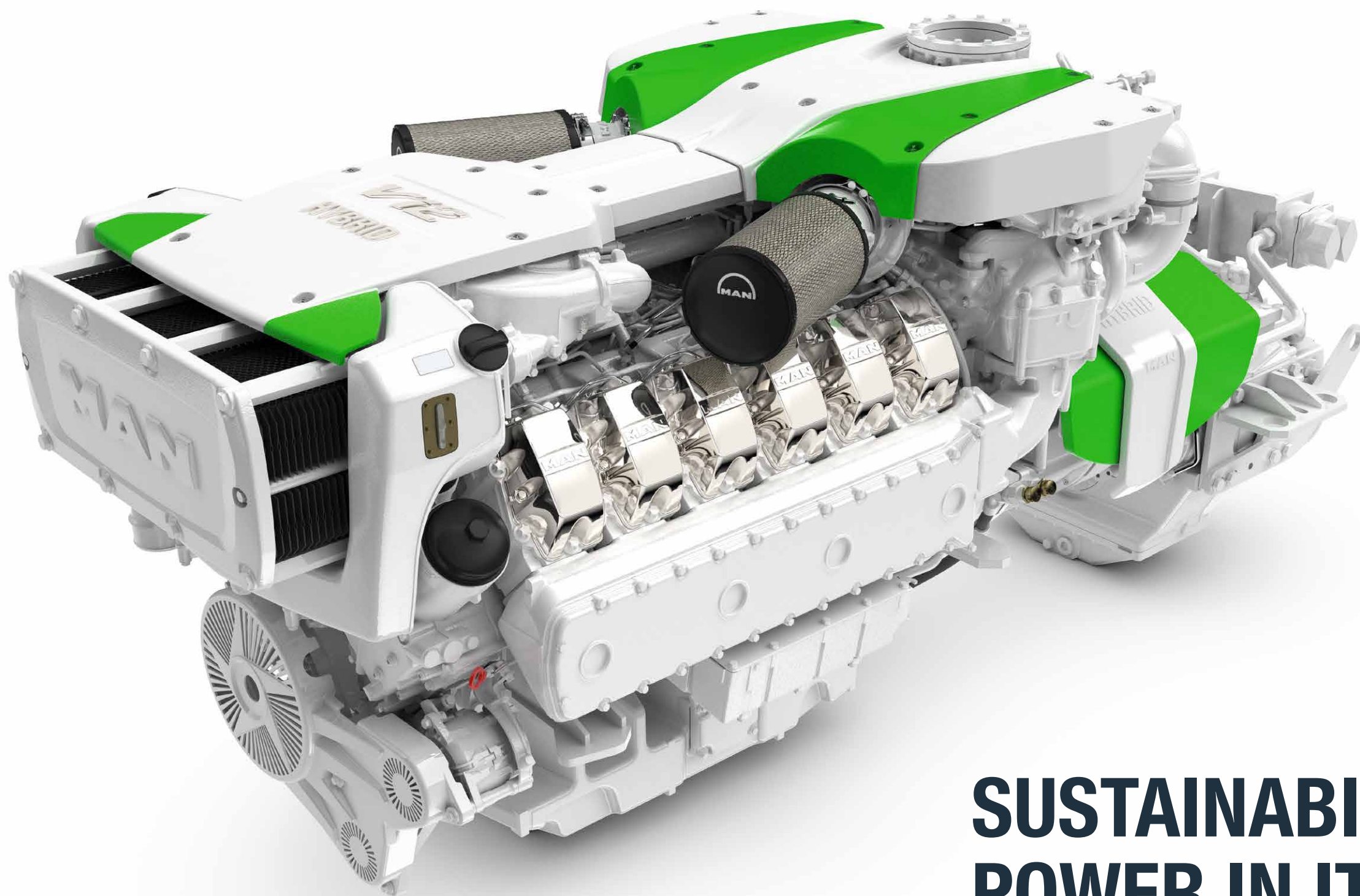
**Not visible:** All components that are not needed for power generation

The combustion engines and electric motors operate in parallel and therefore complement each other. The latter obtain their energy from the batteries. The interaction of both energy sources means that the absolute maximum power output can be achieved in this operating mode.

[man-engines.com/hybrid-en](http://man-engines.com/hybrid-en)



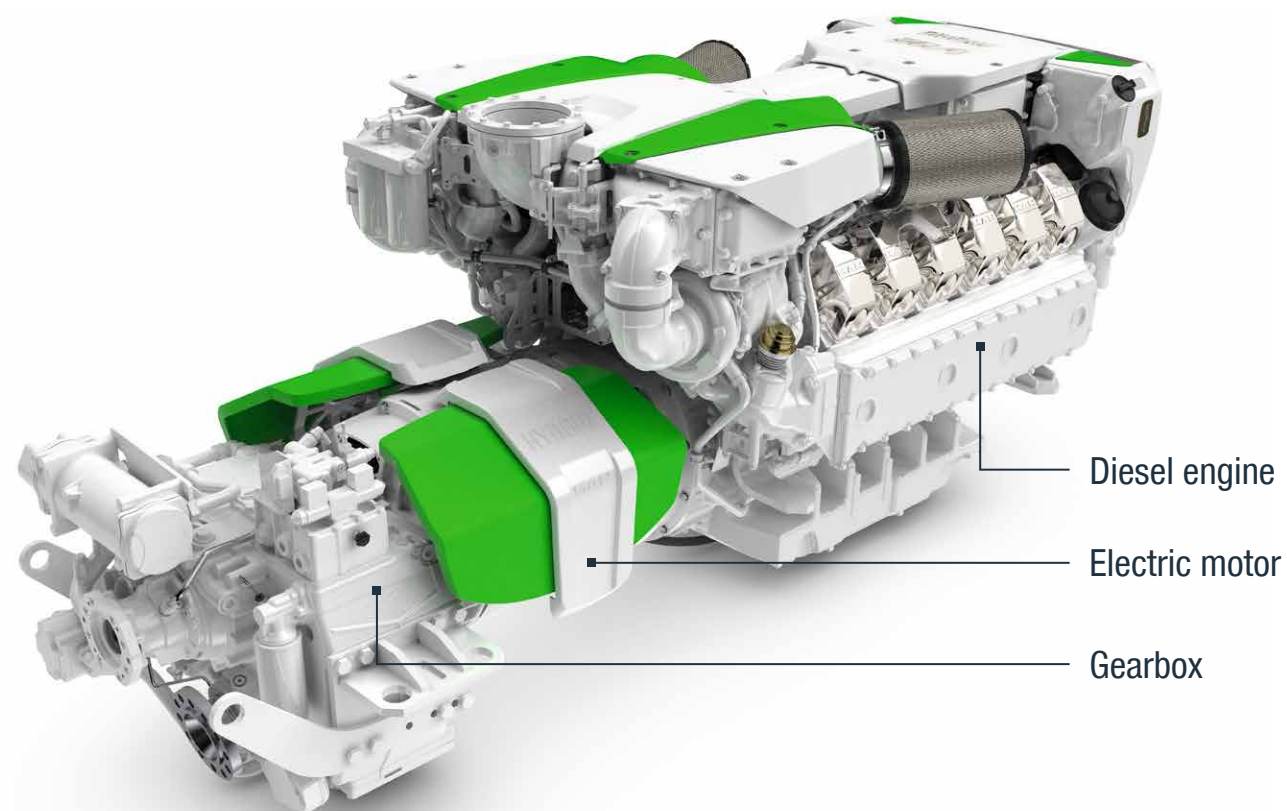




**SUSTAINABILITY AND  
POWER IN ITS MOST  
ATTRACTIVE FORM.**

# MAN HYBRIDSYSTEM.

The drive system of the future.

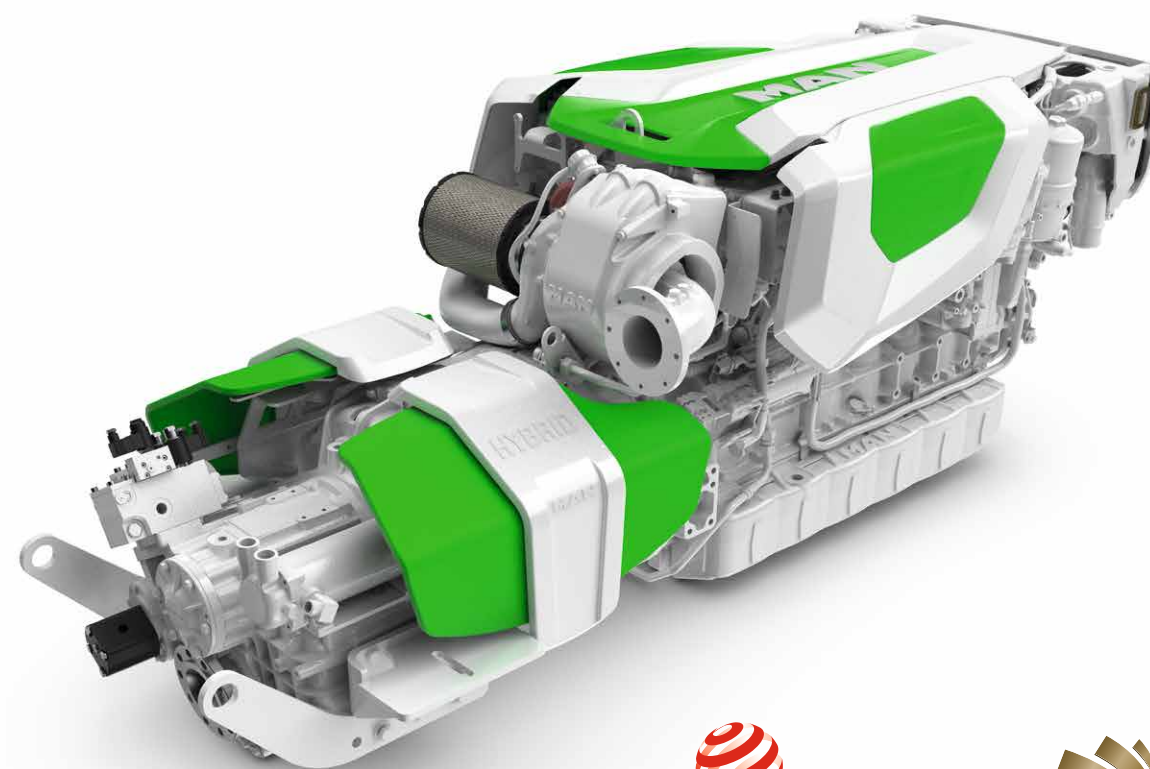


## V12 HYBRID

The MAN marine hybrid systems are based on a modular concept. Its versatility makes it possible to combine the MAN main drive engines from all V12, V8, and i6 (D2862, D2868, and D2676) series with high-torque electric motors so that the power outputs are added together. Depending on the combination options ranging from smallest diesel engine with lowest electric motor power through to the most powerful V12 engine with two electric motors, this permits realization of power outputs of up to 1,838 kW.

# A PRIZEWINNING SYSTEM.

A unique combination of aesthetic design and progress.



reddot winner 2021



## i6 HYBRID

The MAN Smart Hybrid Experience system from MAN Engines represents the perfect combination of outstanding design and innovative concept. In recognition of this, the system won the renowned Red Dot Award in the Product Design category in 2021 as well as the German Innovation Award 2021.





**THE DRIVING  
EXPERIENCE OF  
THE FUTURE – LOW  
EMISSIONS, QUIET,  
AND SUSTAINABLE.**



# MAN Engines. YOUR PARTNER FOR INNOVATIVE MARINE HYBRID SYSTEMS.

MAN Engines is the ideal partner when it comes to innovative drive solutions for yachts and working boats. There are three good reasons for this in particular:

1

## Everything from a single source

From the planning and concept phase to development and technical implementation through to service and maintenance – MAN Engines supports shipyards and ship designers from the idea to realization to after-sales service. As a renowned system supplier, our experts at MAN Engines support you in choosing the perfect configuration of complex components such as diesel engines, electric motors, as well as batteries and power electronics.

2

## Scalable solutions

With its traditional diesel engines, MAN Engines already offers a very wide range of solutions for yachts and working boats, ranging from the i6 through to V8 and V12 engines. Innovative electric motors complement the MAN hybrid systems. We also offer you maximum flexibility in designing your drive concepts, so that you always benefit from the choice extending from low power output through to the top-of-the range engine power when equipping a product series.

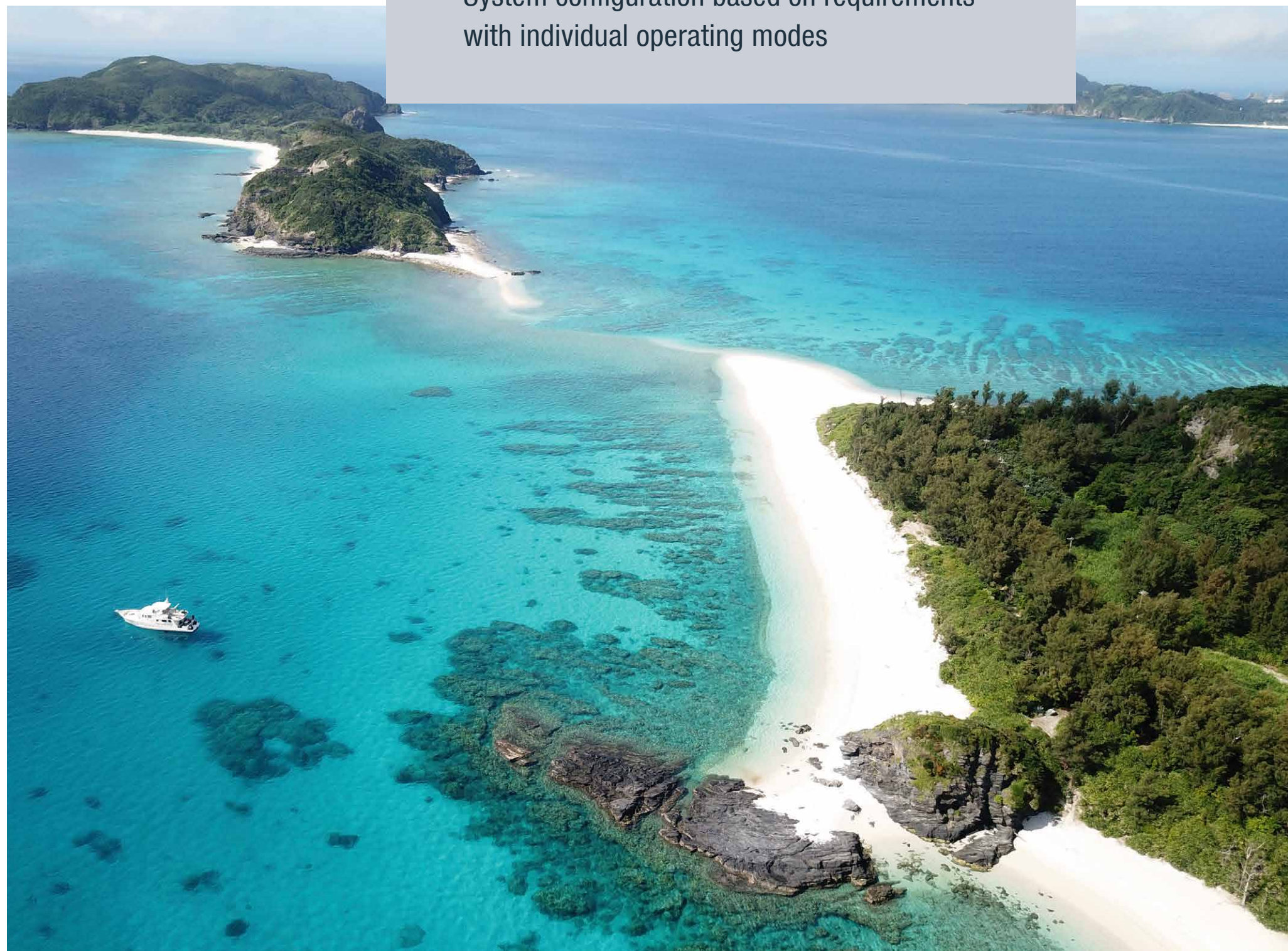
3

## Operating modes based on requirements

Thanks to the flexible combination of diesel engines with electric motors, which are combined in turn with batteries and/or onboard generator sets, it is possible to realize an individual level of hybridization that is optimally tailored to your needs. Depending on the required operating modes, the MAN hybrid system can be configured with the focus on efficiency, comfort, or performance.

## All benefits at a glance:

- Zero-emission cruising and docking
- Top engine power ratings with up to 1,838 kW total output per driveline
- System configuration based on requirements with individual operating modes





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