



Four- stroke marine systems

MAN Energy Solutions
Future in the making

High-performance
product range





Future in the making

Our engineers and digital specialists focus on crosslinking engineering with the possibilities of today's world: We shape the advancement of power generation, marine transport, and industrial engineering with one goal in mind: help to make you business excell while protecting the world we live in. Whether engines, components or complex systems, we aim to deliver intelligent solutions that assure your competitiveness also in the face of tightening environmental regulations.

This mission is reflected in our company name: MAN Energy Solutions. Our products and services utilize the latest technologies. We don't react to trends; we think ahead. As your partner, we connect the dots in an ever-changing world, providing you with long-term solutions that boost your business and help to bring the world a step closer to carbon neutrality.

To follow, or to lead?





The world in which we live is changing more rapidly than ever. A growing population and increasing demand for energy require a shift toward more sustainable forms of energy generation. We are ready to tackle this challenge.

With the invention of the diesel engine, our visionary founder transformed the entire industry by creating a mechanism of – at the time – unknown efficiency. Transformation is in our genes. Today, the setting has changed, yet our pioneering spirit remains. We are leading the industrial world toward a more sustainable future by combining our world-class engines, turbines, turbochargers, compressors, propellers, and reactors with the possibilities of the digital era. And we want you to join us. As your partner, we create customized solutions for your specific needs and support you in this time of change and transition. Together, we can pave the way for a climate-neutral yet economically successful future. Let's get started.





Envisioning tomorrow

The starting point of all our innovation is you. We focus on the individual requirements and goals of our customers and work on solutions to meet even the most specific needs. We benefit from our in-depth knowledge in the sectors of mobility, transport, energy, and industry, and draw from decades of technical and operational experience.

We are known for offering the industry's most advanced products, which boast legendary quality. Closely supporting our customers with expert advice when it comes to developing the best possible solutions is one of our core areas of expertise. When things get tricky, we start to feel at ease.

Converting companies to more environmentally friendly and cost-efficient operation is a key issue for most of our clients. Our goal is to provide our customers with solutions that gradually reduce the consumption of fossil fuels. We don't think "product"; we envision holistic solutions that meet our clients'

requirements and comply with even the most stringent legal regulations.

If you are looking to make your company future-proof, count us in.



Pushing the limits

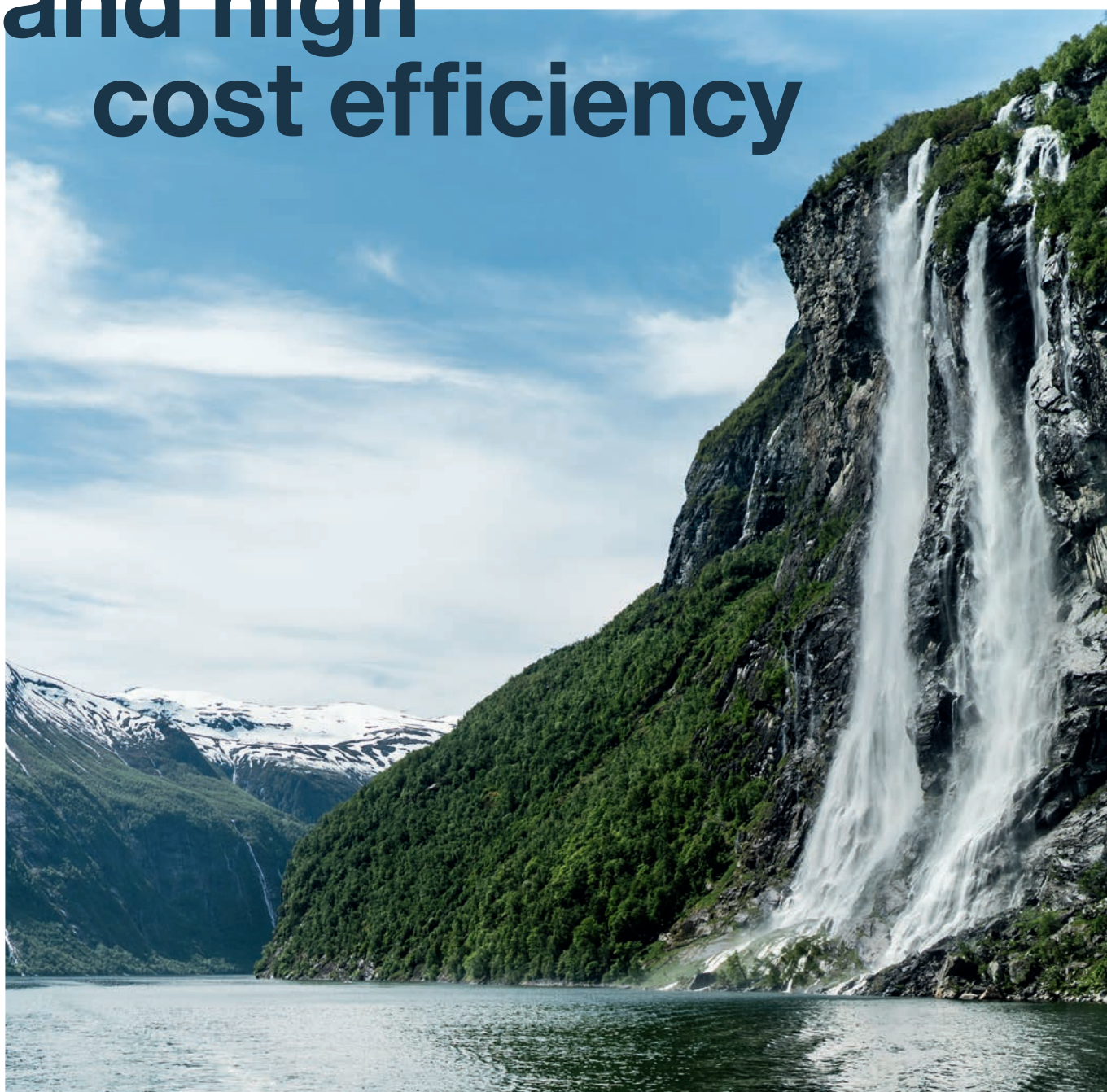
To think ahead means to think holistically. That's why we offer complete systems that are uniquely reliable for lasting performance. We support our clients to help them achieve their goals in rapidly changing environmental and regulatory conditions.

Digital and data-based technologies are the cornerstones of the development of future-proof drive and power generation systems. Take our intelligent energy management solutions, for example. The energy management system in our battery-hybrid propulsion solutions controls the generation, storage, and distribution of power onboard the ship. This optimizes the overall performance, further increases safety and system reliability, and results in maximum efficiency and lower operational costs.

Another application is to improve the availability of renewable energy: Wind and solar power can be made more reliable by storing surplus power and using instant power top-ups from engine and turbine gensets fuelled by gas or biofuels. Renewable energy systems can even be added to power plants to act as fuel savers and hybrid island power systems – digital solutions that will drastically help to reduce the carbon footprint.



Intelligent systems for low emissions and high cost efficiency





Cutting emissions from fossil fuels while maintaining high productivity levels is a complex task. One which requires an extensive skill set, especially when catering to diversified industries with different requirements.

To create environmentally friendly – yet reliable – energy systems, different methods need to be combined and managed. With a close eye on our customers' needs, we develop key components and smart management solutions that interact effortlessly to allow these systems to be operated both sustainably and efficiently – at a very high level.

MAN Energy Solutions is the world's leading provider of large-bore diesel engines, turbomachinery, and integrated power systems. We produce four-stroke and two-stroke engines for marine and stationary applications, turbochargers and propellers, gas and steam turbines, compressors, and chemical reactors. Our four-stroke systems expertise is focused on emission reduction, complete propulsion packages, electric propulsion, dual fuel, LNG, and digitized services.

It is our goal to minimize fuel consumption while complying with the most advanced emission regulations. MAN PrimeServ supports our customers all around the world with a comprehensive range of after-sales services.

When it comes to energy transition at sea, we are here to help: Our latest series of LNG (liquid natural gas) engines significantly reduces emissions. Our hybrid propulsion solutions offer a maximum of efficiency and extremely flexible use of power in all different working modes – whatever you are up to.

With growing concern about the state of our oceans, the marine industries are facing new challenges and increasingly tough regulations. With MAN ECO CONTROL, we provide you with all the key technologies to keep emissions, efficiency, and operation under control – and you one step ahead. Whether you

are operating your fleet in environmentally sensitive areas, under strict safety regulations or working under harsh conditions far out in the ocean; whether you are navigating the continents with valuable freight and changing fuel prices or protecting your homeland – MAN Energy Solutions is your partner of choice when failure is not an option.

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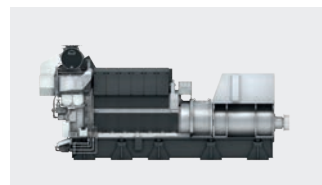
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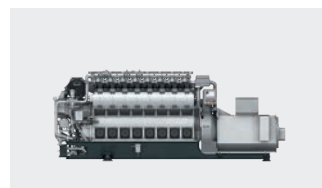
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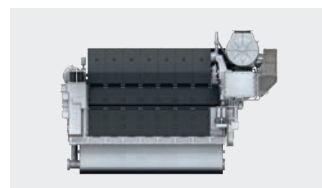
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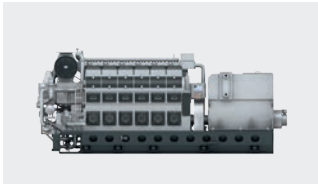
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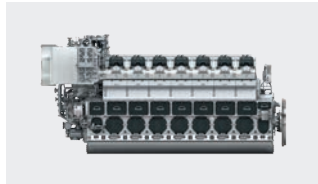


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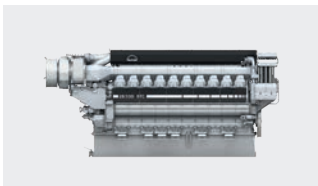
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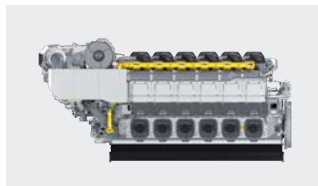
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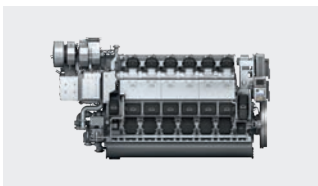
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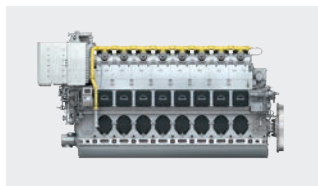
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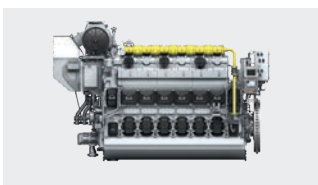
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Turning power into movement

Propulsion optimization

Your ship's operational profile is the determining factor. We adapt our packages to your needs and ensure that all of the components match optimally with the main engines, while you get all components from a single supplier. Moreover, when a ship's profile changes, we can also retrofit propulsion packages.

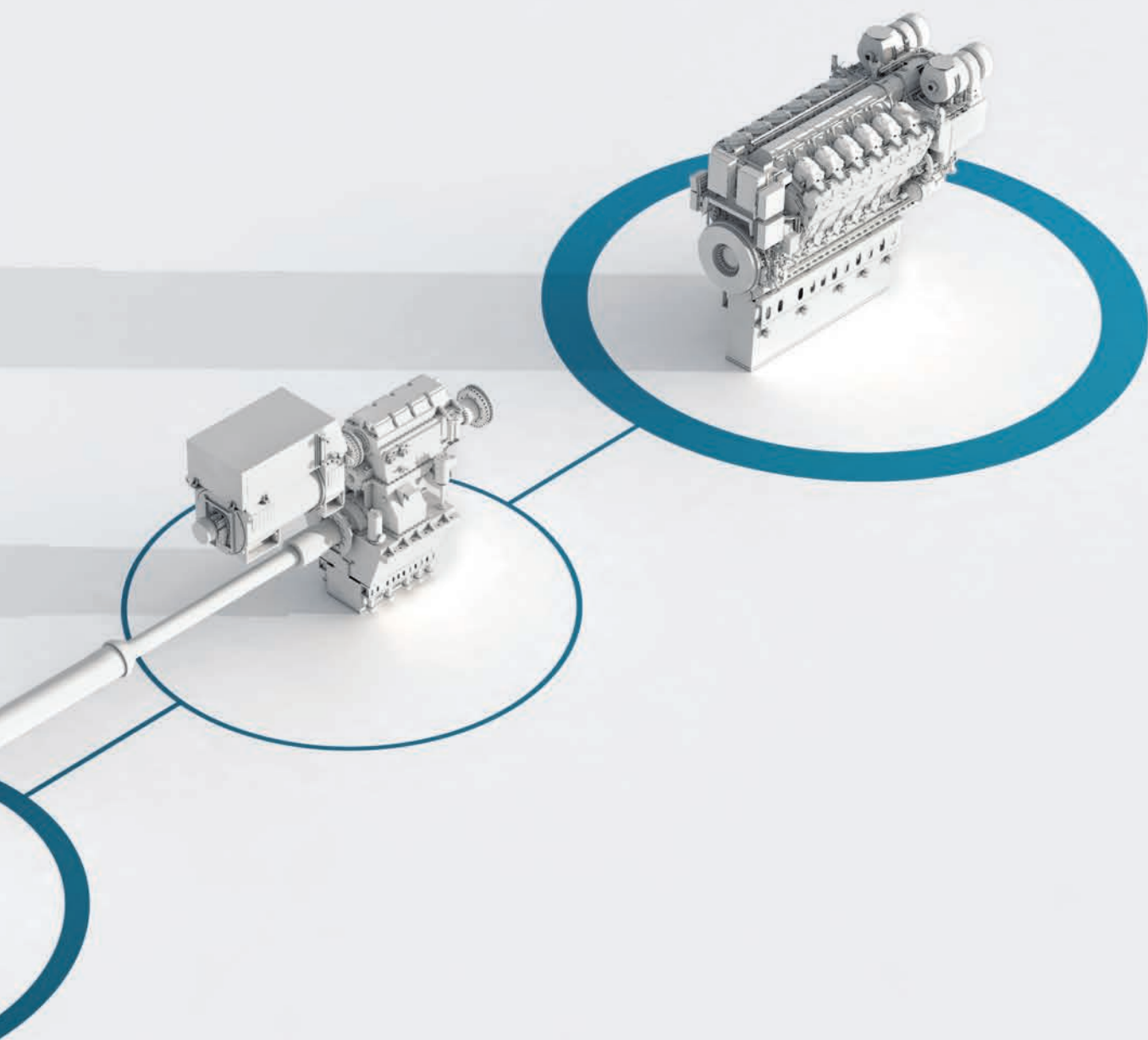
In constant pursuit of energy efficiency

Our expertise in complete propulsion packages goes back to 1902, when we produced the first Alpha controllable pitch propeller. Starting from a complete understanding of the ship's operational profile, we can now optimize all the relevant components: Engine, gearbox, PTO, propeller blades, nozzle, rudder, and propulsion control system – including speed setting, maneuvering, and load control.

Comprehensive expertise

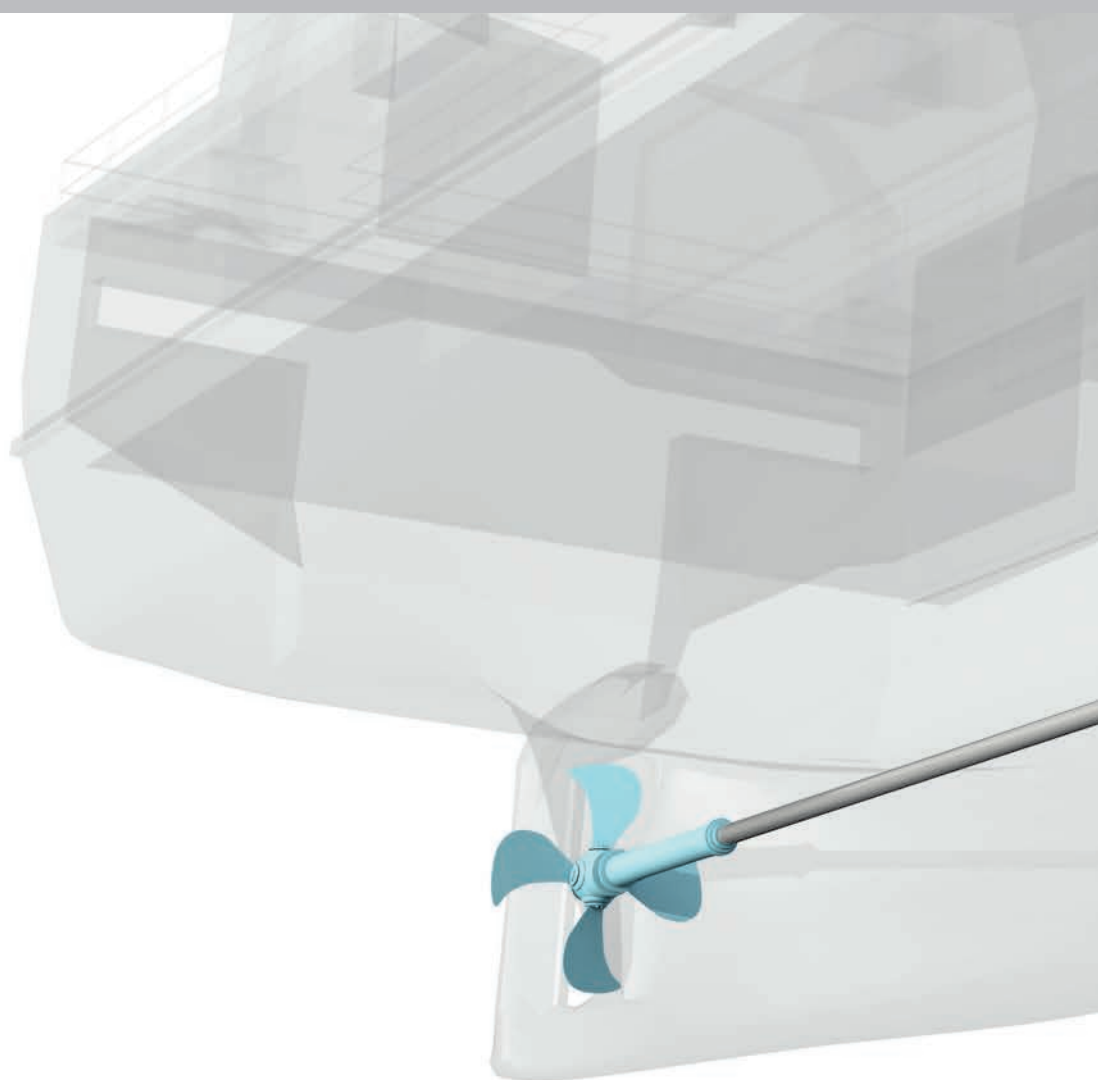
No matter how complex your needs are, we can customize a solution that delivers the best propulsive efficiency and gives your ship a greener profile. Using MAN Alpha shafts and propellers, and hybrid propulsion systems, we lower fuel consumption and emissions while ensuring reliability, durability, and higher output.





Because every ship is different

Propulsion optimization



Quality components for maximum efficiency

The MAN Alphasonic 3000 propulsion control system not only optimizes the function of the propeller but also of the engine in terms of maneuverability and overall economy. Efficient MAN Alpha propellers and propeller shafts result in more energy-efficient transport and a reduced impact on the environment. MAN Alpha nozzles can be customized to adjust the propeller thrust and pulling performance to the vessels' working patterns.

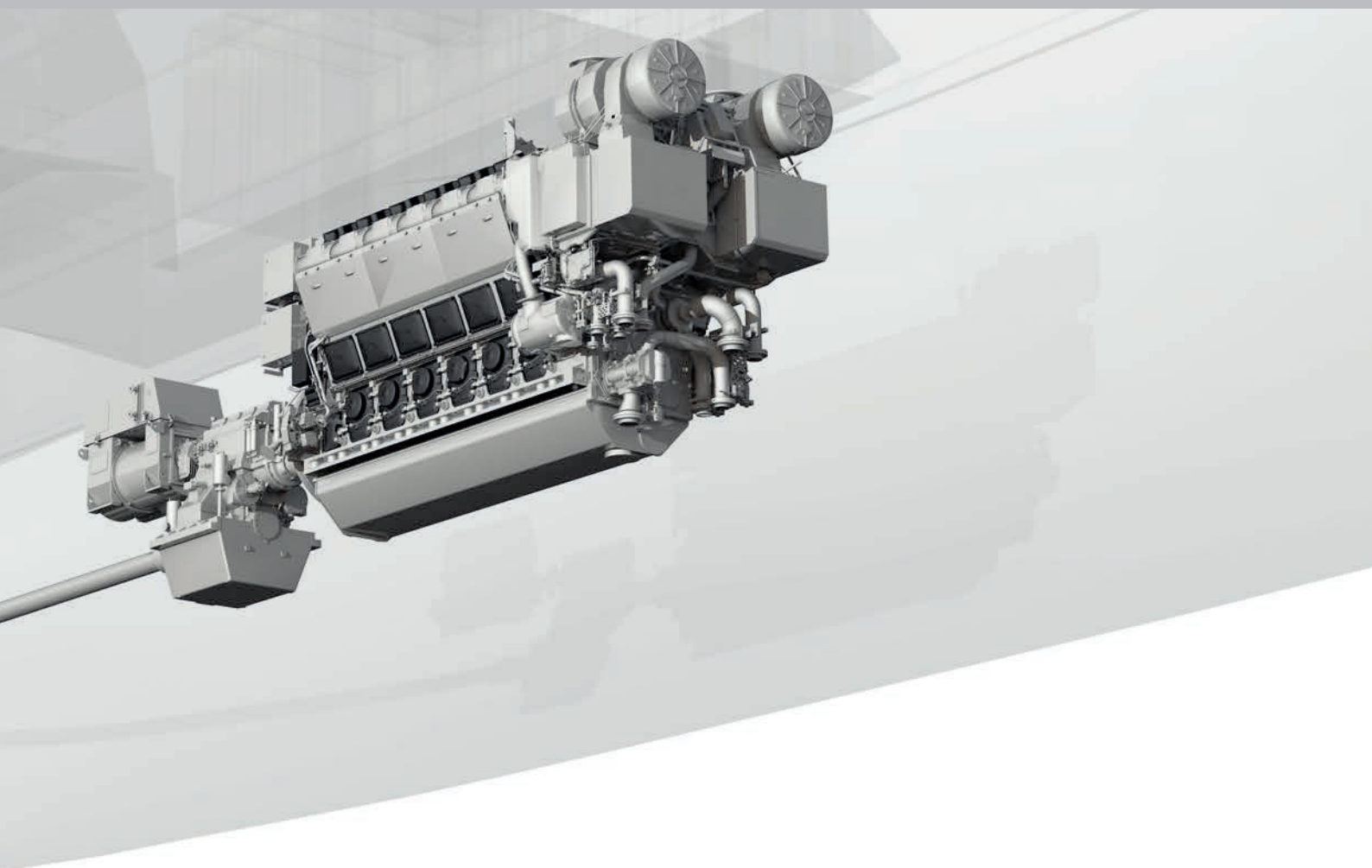
Benefits

All components tailored to your needs

Optimized for your ship's operational profile

All components from one source

One point of contact, and one contract



Alternative routes to cost-effectiveness

Hybrid propulsion

In a hybrid system, mechanical and electric engines work together to provide power for propulsion and hotel loads, optimizing the fuel efficiency of vessels with a flexible power demand.

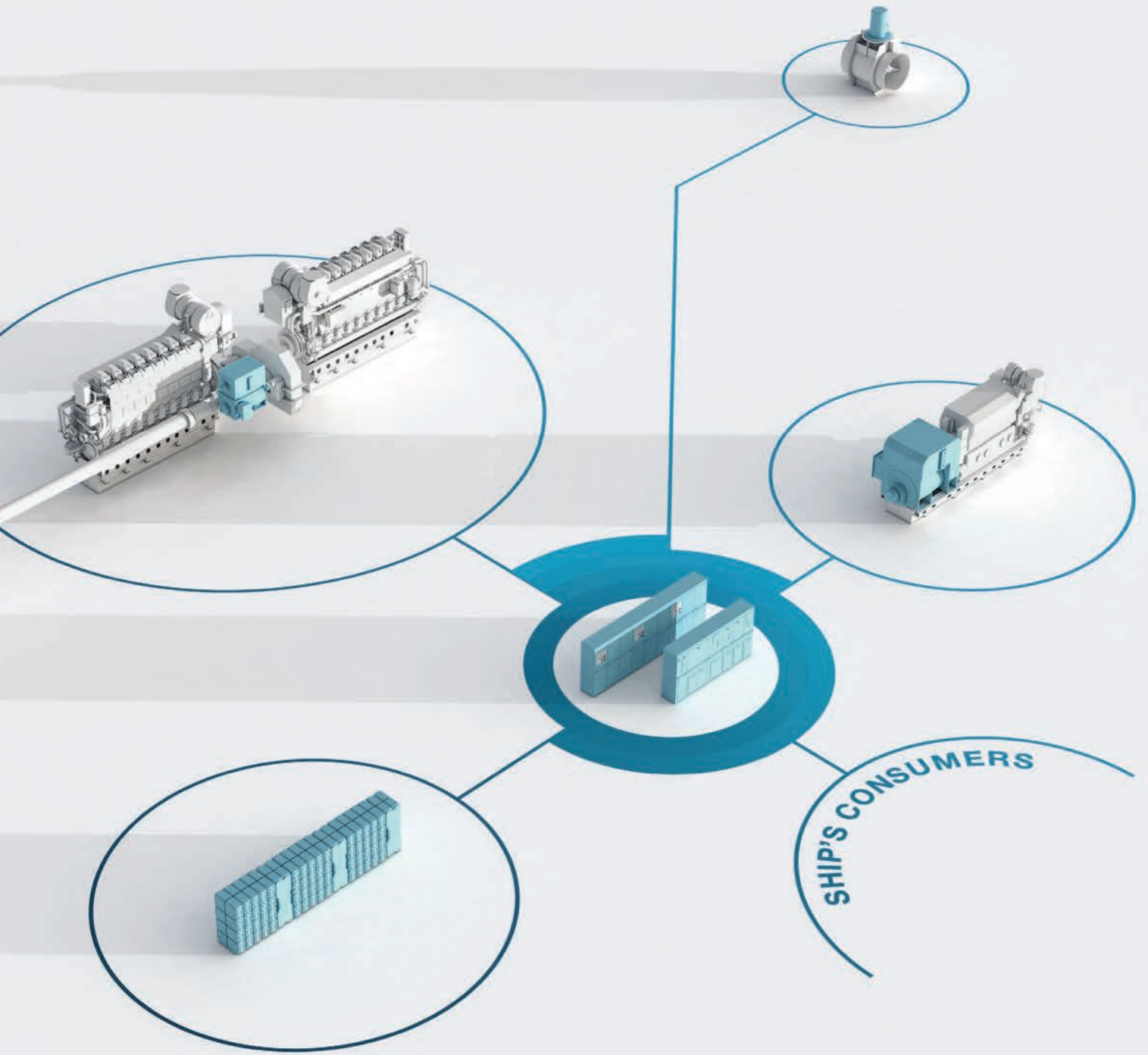
Flexibility and maximum efficiency optimally combined

The combination of mechanical power from diesel engines and electric power from electric motors provides the vessel with a broad operational capability. We offer fully tailor-made hybrid propulsion and power generation solutions, including all components such as main engines, gensets, switchboards, converters, electrical motors, gearboxes, and propellers.

Battery power

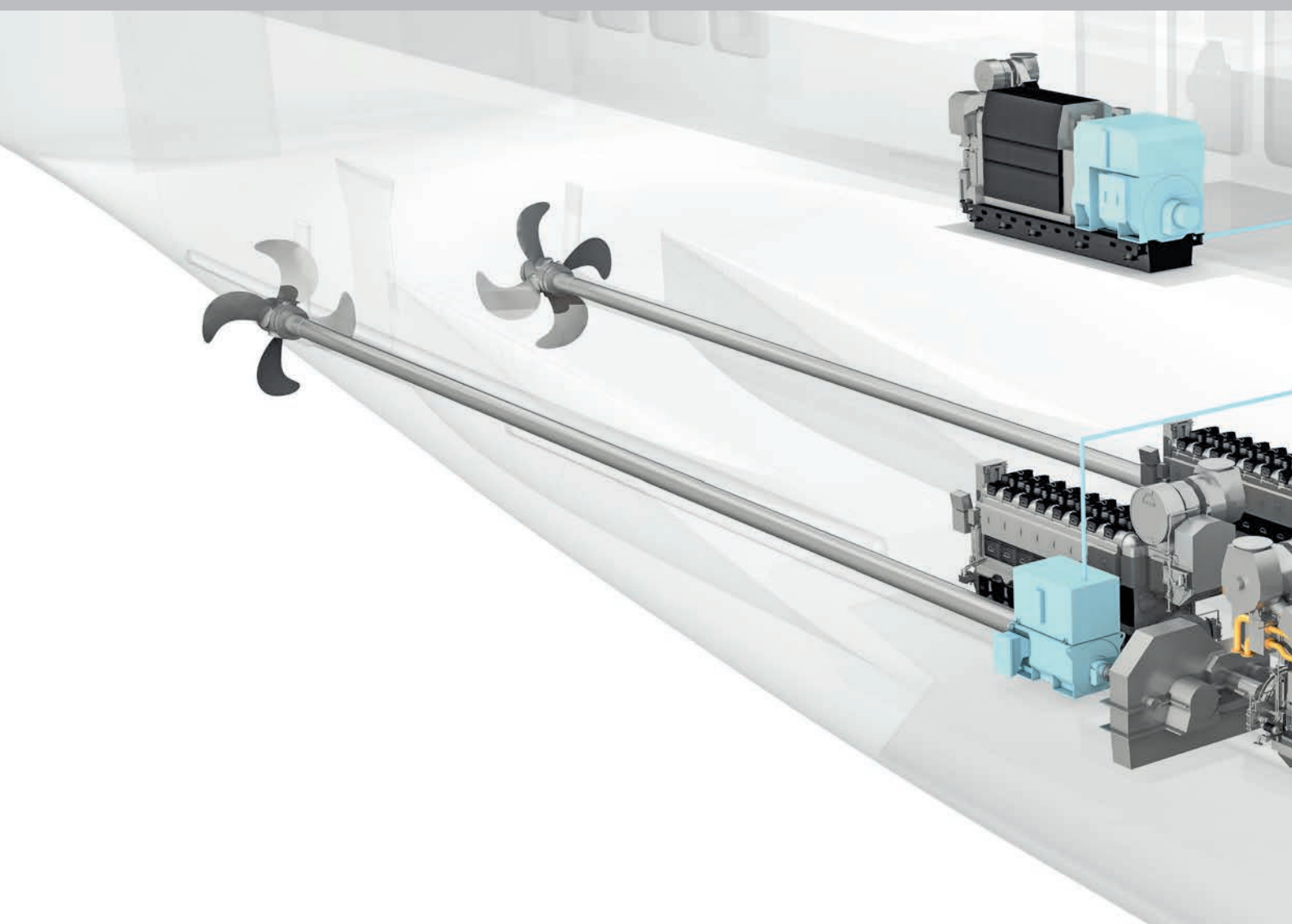
New battery storage solutions further reduce maintenance costs, fuel consumption, greenhouse gas emissions, and noise production, while increasing revenue and technical efficiency. To this end, we have acquired a 40 % share in Aspin Kemp & Associates (AKA), whose specialized expertise links battery storage systems and marine engines.





Flexibility meets reliability

Hybrid propulsion



MAN HyProp ECO: Fuel-efficient flexibility

A hybrid propulsion system is often ideal for vessels with flexible operational profiles and running hours with both high and low power demands. MAN HyProp ECO combines a diesel engine with a frequency-converter-driven shaft alternator/motor to create a highly redundant and reliable propulsion system.

MAN HyProp ECO allows several operating modes, so it is always possible to find the ideal mode in terms of propulsion train performance and fuel oil consumption. There is also the option for shore connection and the integration of energy storage devices or batteries.

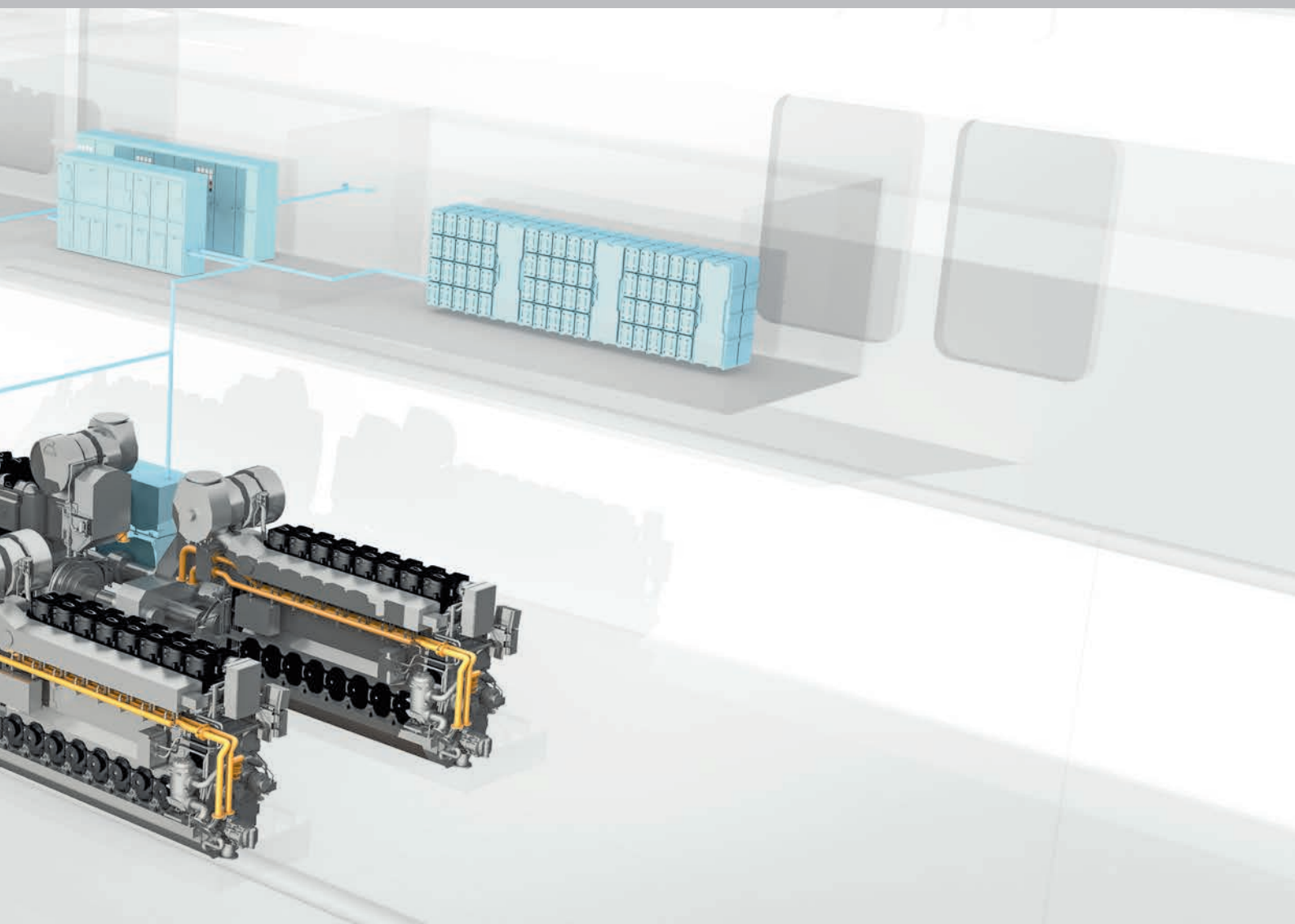
Benefits

Wide range of operating modes

Flexible power demand with fast system responses and high system flexibility

High system efficiency

Fuel oil consumption is lower, and fuel-related emissions such as SO_x and CO_2 are also reduced



Going further with gas

Dual fuel and LNG gas supply

Natural gas is an environmentally friendly power source that contributes to profitability. Our dual fuel systems reduce emissions, increase fuel efficiency and power density, and keep operations economical.

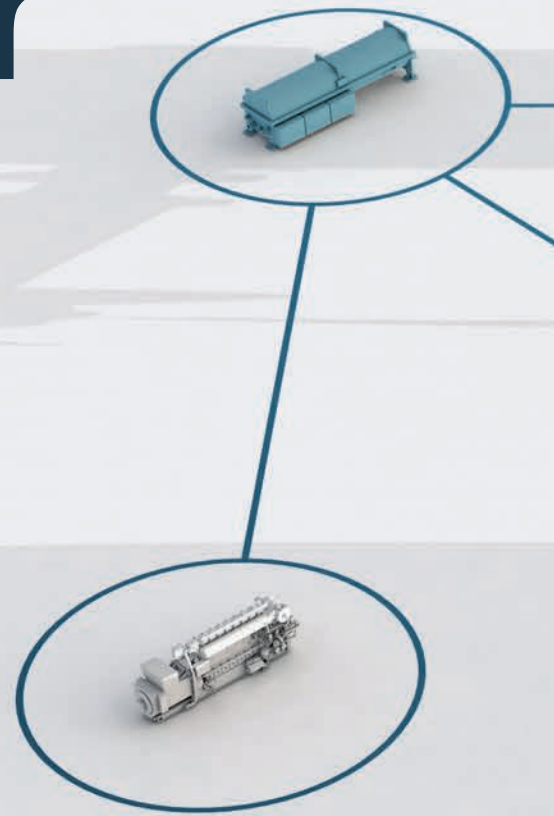
LNG expertise in action

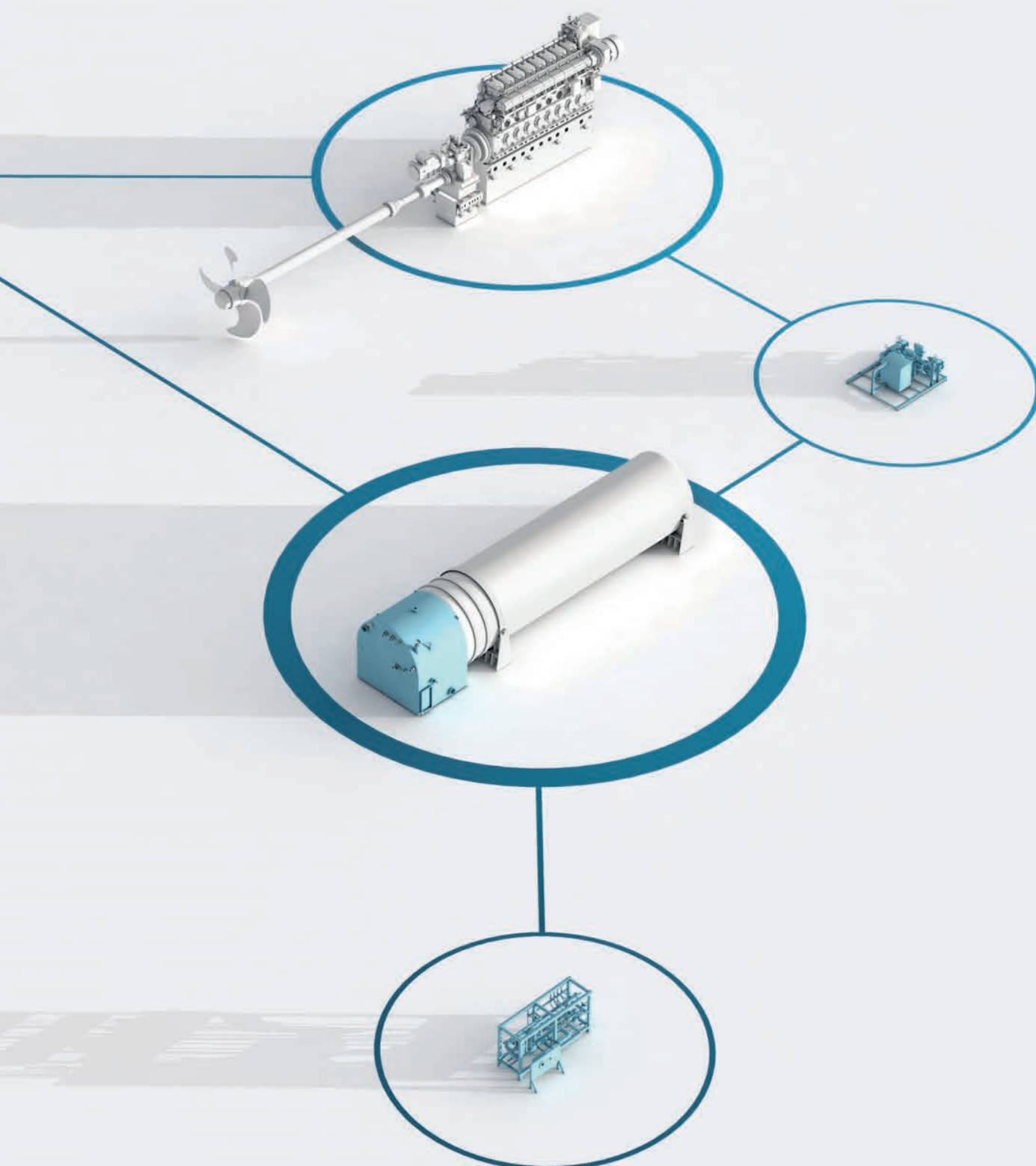
Reliability, flexibility, capital expenditure, operating expenses, and emission regulations are just some of the factors to be taken into account when investing in LNG technology. Our dual fuel propulsion solutions can be tailored to meet every requirement: From LNG technology for dual fuel propulsion to complete LNG handling systems (including carriers, floating storage and regasification units, and feeder and bunker vessels).

Whether it's a new engine, a retrofit or a complete gas system, we provide expert advice and the support of a global service network.

Dual fuel propulsion: Low emissions and costs

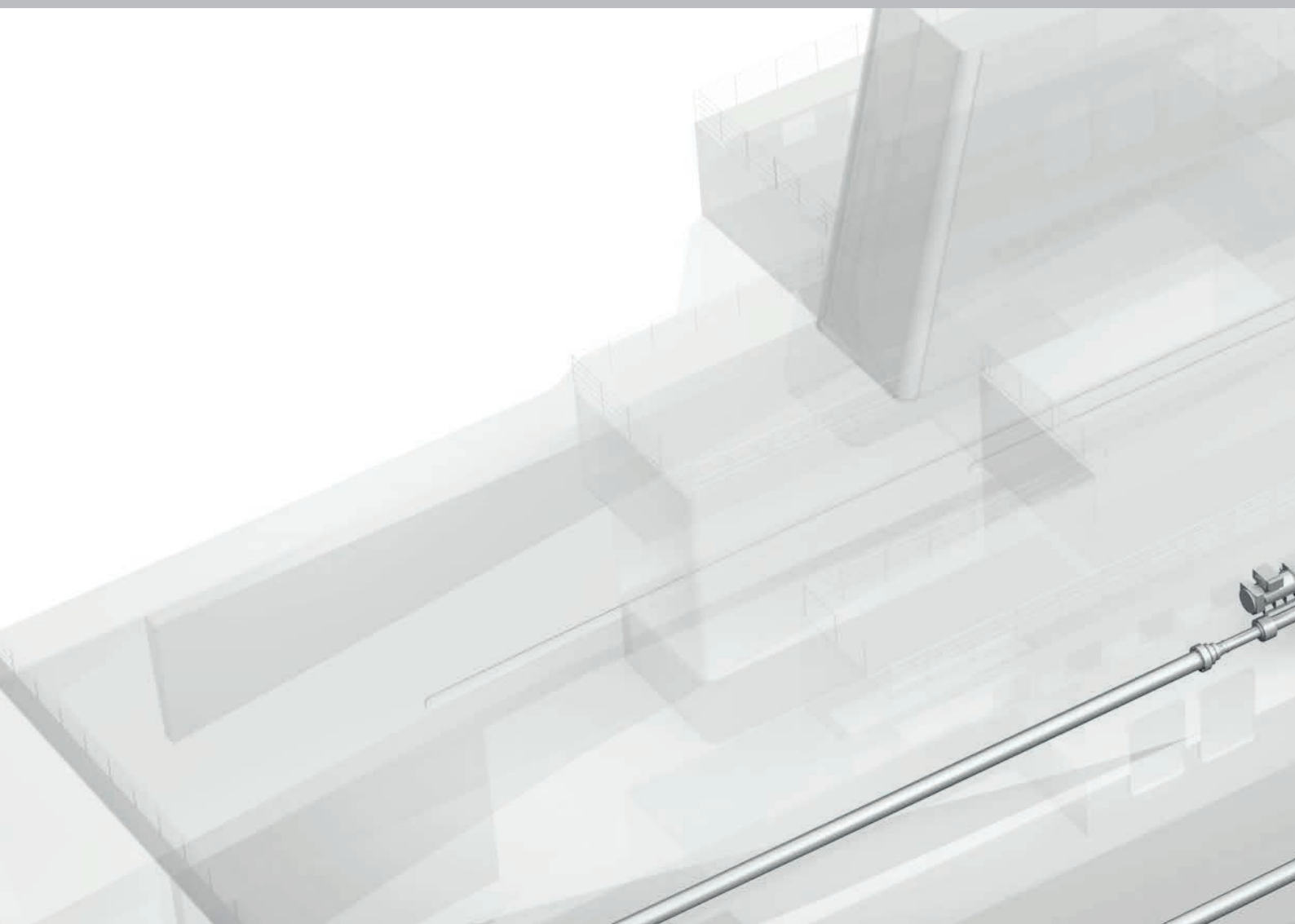
The possibility to switch over seamlessly from gas to diesel operation and vice versa ensures full flexibility. As we now supply both the engines and the complete fuel gas supply system equipment, we can work with ship designers to perfectly integrate the engines, tanks, and systems.





A technology that pays

**Dual fuel and
LNG gas supply**



MAN Cryo LNG fuel gas systems

In 2016, we acquired Cryo AB, a manufacturer of cryogenic equipment with more than 50 years' experience in the storage, distribution, and handling of liquefied natural gas (LNG). We therefore created the product brand MAN Cryo – the perfect complement to our dual fuel engines. We now offer one-stop solutions for comprehensive engine and fuel gas supply systems (FGSS), offshore and onshore bunkering systems, and stationary distribution systems for regasification or fuel filling.

Benefits

Low emissions

Gas burns cleanly and with low NO_x emissions

Low running costs

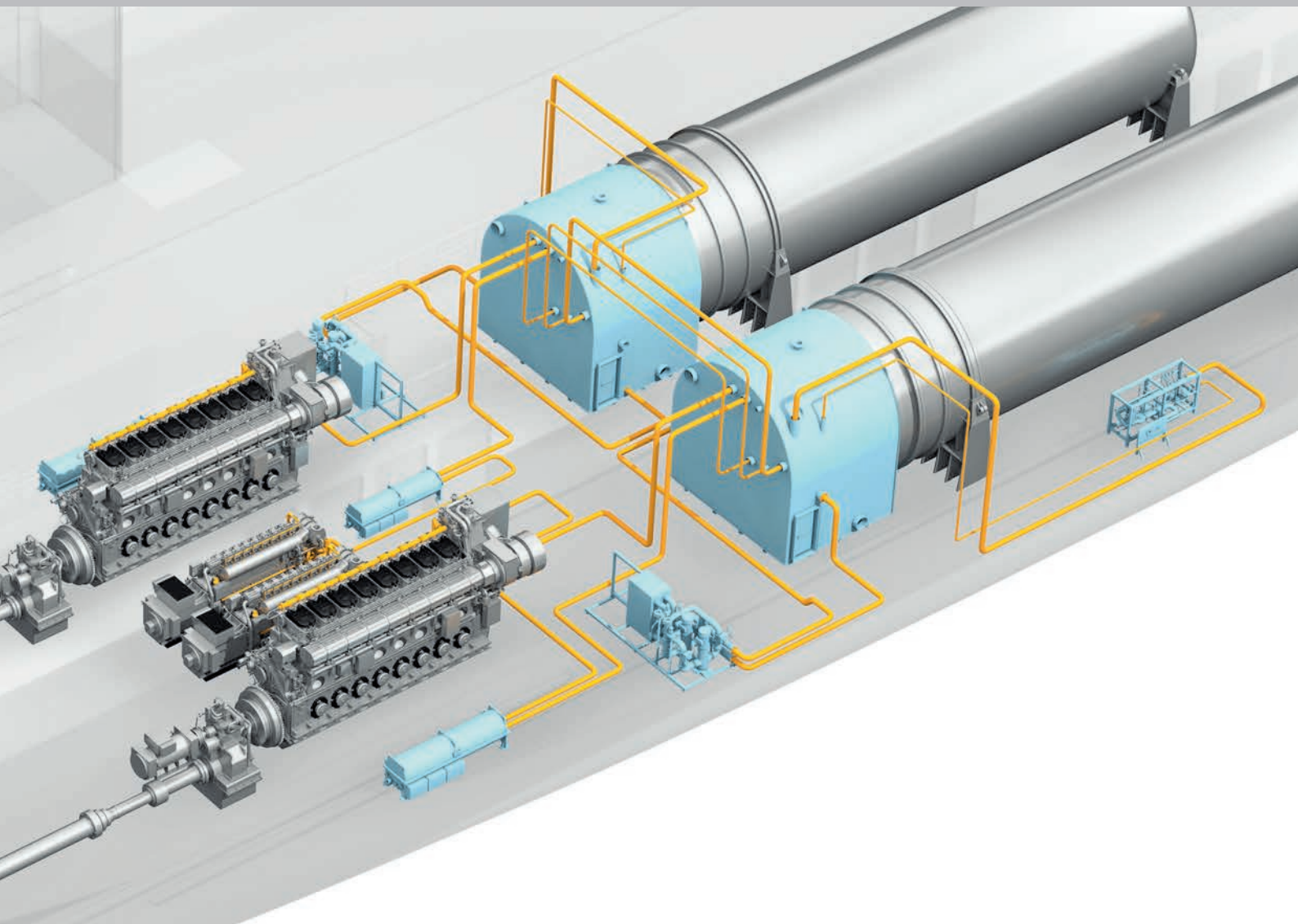
Gas is attractively priced

Fuel independence

Easy switch to diesel if gas is not available or is more expensive than diesel

One-stop provider

All components, training, and support for gas propulsion and supply



The power of clean

Exhaust after-treatment

Selective catalytic reduction (MAN SCR) is the most approved method of NO_x reduction. Our system covers a broad range of engines and is designed for customization.

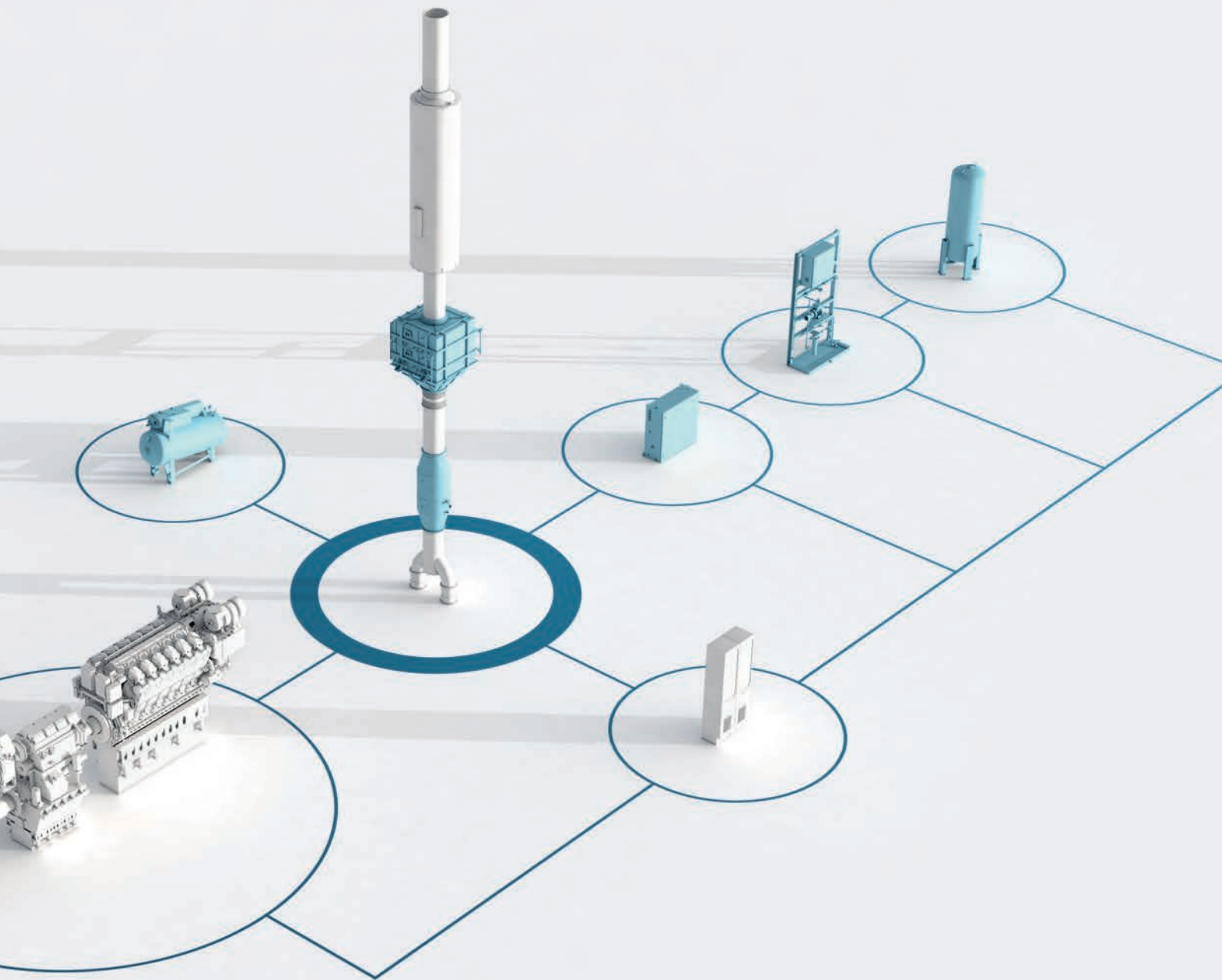
Respecting the environment

The International Maritime Organization sets limits for nitrogen oxide (NO_x) emissions and the sulfur content of fuel. Our proven exhaust gas after-treatment systems easily meet these regulations, even in Emission Control Areas (ECA).

MAN SCR – selective catalytic reduction

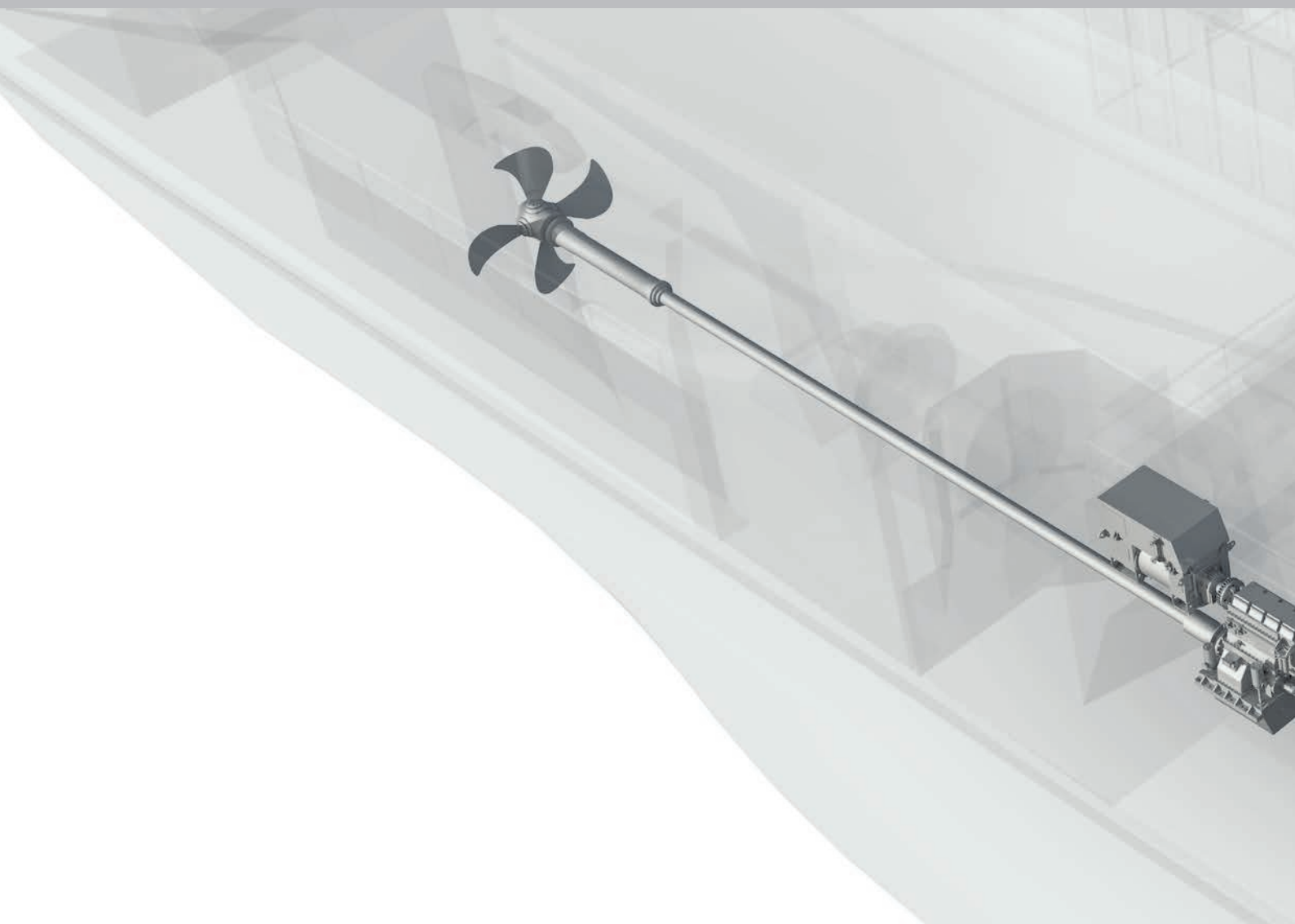
NO_x can be efficiently minimized by using selective catalytic reduction and exhaust gas recirculation. The MAN SCR exhaust after-treatment system provides an integrated and intelligent solution for our entire portfolio of medium-speed engines. With reliable operation and the highest performance, it serves as a standard solution to meet the IMO Tier III emission limits.





A solution for every size

Exhaust after-treatment



The solution for less NO_x

MAN SCR is the most tested and approved system for achieving NO_x reduction rates up to 90 %. By inducing chemical reactions in the engine's exhaust gases, harmful substances are transformed into ecologically benign constituents.

Modular components

The MAN SCR system is available in 14 different sizes as standard. In this way, it fully covers the entire portfolio of our four-stroke medium speed engines. Furthermore, we can offer you customized MAN SCR systems on demand.

Benefits

IMO Tier III compliance

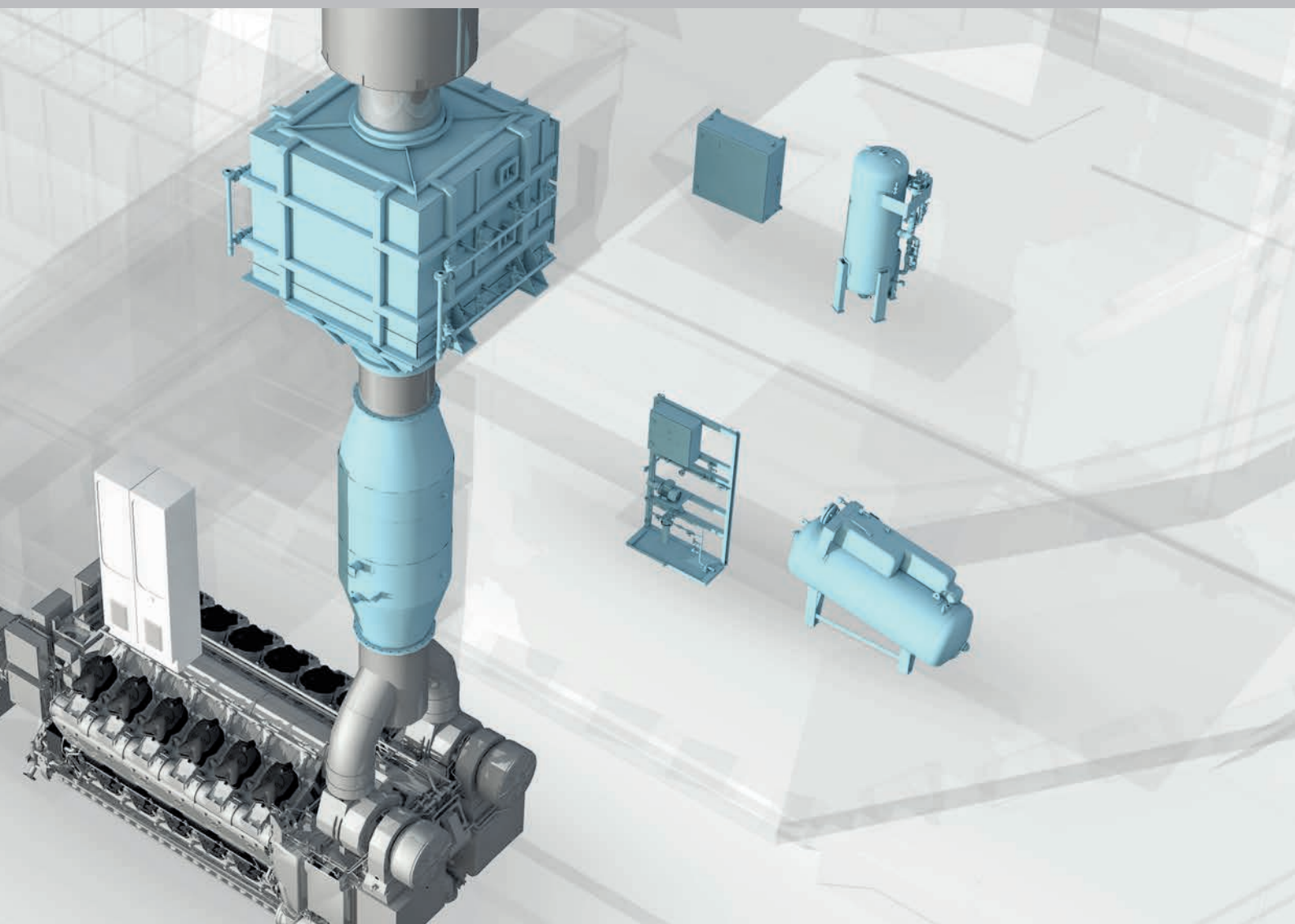
For operation in emission control areas (ECA)

One source, one point of contact

For minimum costs, maximum flexibility, and fast ordering

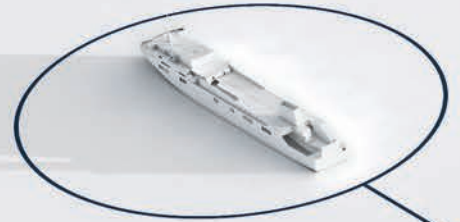
Efficiency and ecology

Reducing emissions while increasing fuel efficiency and power density



Making smart connections

Data & connectivity



Enhanced monitoring and machine analytics, and new standards in security and data privacy are set to lead the way to a better future for your business.

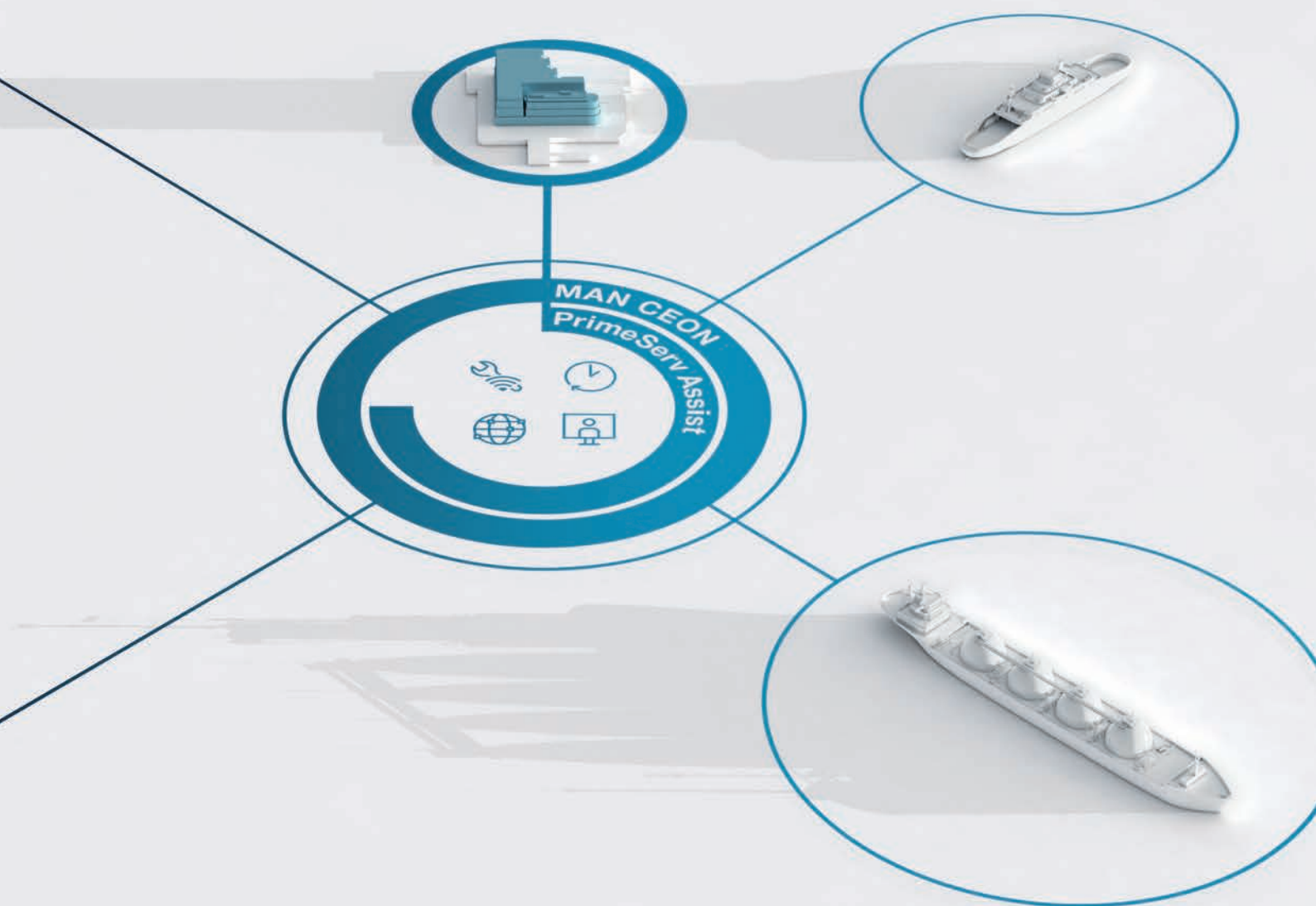
The digital power of MAN

Digital fleet management, remote monitoring, and predictive maintenance are already essential to the marine business. At MAN, we make data work at many levels, connecting engines, ships, services, supply chains, people, and ideas. Our main objective for all marine applications: Greater efficiency.

Making the most of digitization

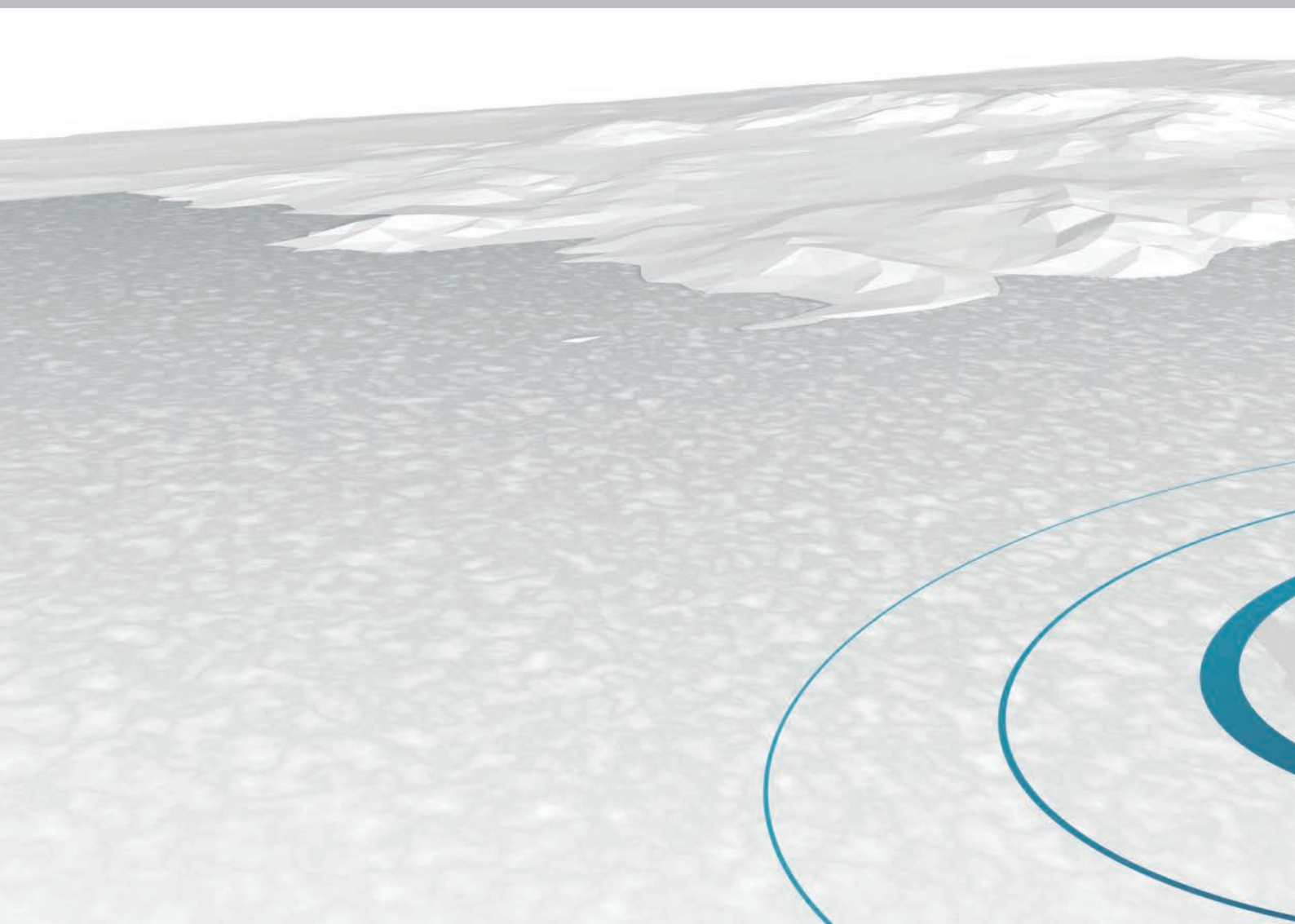
Using cutting-edge digital technology allows us to improve performance and minimize downtimes. Our remote connections enable live data analysis, ensuring quick, effective solutions. Our energy management system for battery-hybrid propulsion controls the generation, storage, and distribution of power onboard the ship, resulting in maximum efficiency. Multiple digitization initiatives are increasing our understanding of our customers and expanding our offering as well as improving our internal processes and your cost base.





Predicting and assisting

Data & connectivity



Secure Connectivity as standard

In order to benefit from data-driven services, a cyber secure and scalable digital infrastructure is key. Since 2000, all of our engines are equipped with the necessary hardware to collect sensor data. This data can be easily transmitted via ship or plant network to our MAN CEON cloud platform that stores and pre-processes the data. Both on-site hardware, the transmission into the cloud storage as well as the data in the cloud are following latest cyber security standards.

Data-driven services as benefit

With the introduction of PrimeServ Assist in 2019, we provide decision makers on customer side a solution to optimize operation and maintenance of vessels and plants. The offerings combine real-time data analysis and human OEM experts to pro-actively assist anywhere, anytime. This service is available for all MAN products including propulsion engines, gensets, propellers, SCR systems, Battery-Energy-Storage-Systems and Fuel Gas Supply Systems.

Benefits

Increased availability

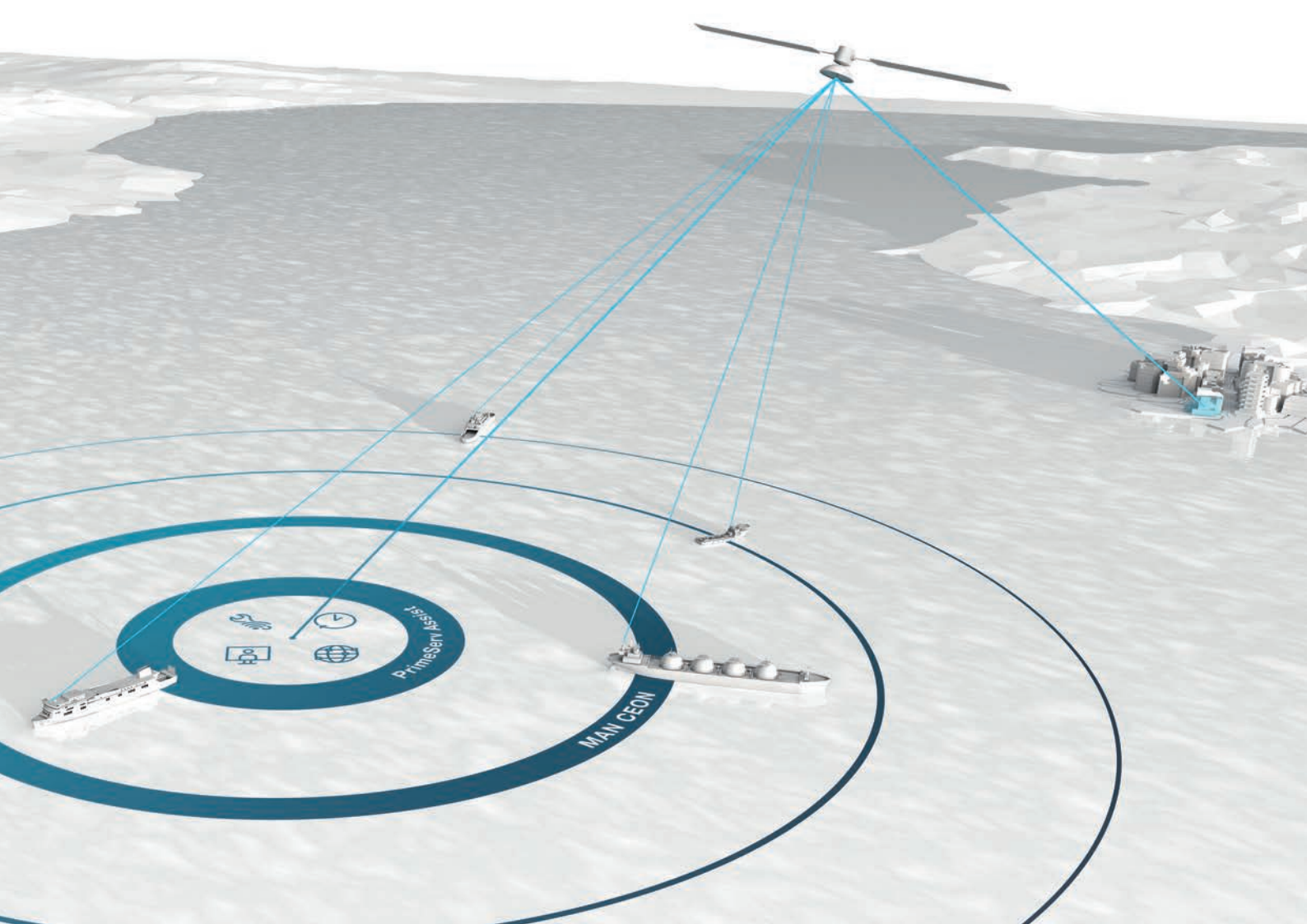
Continuous monitoring to detect degradations before they turn into breakdowns

Increased efficiency

Pro-active OEM expert advice to optimize fuel efficiency and reduce emissions

Optimized maintenance

Component condition monitoring to dynamically plan maintenance tasks



High-speed marine power

MAN 175D

Features

The MAN 175D is a V-type high-speed engine, available with 12, 16 or 20 cylinders for mechanical or electric propulsion and onboard power generation. Running from 1,500 to 2,000 rpm, it features ratings from 1,440 to 4,400 kW. With its advanced common rail fuel injection system, the engine combines maximum fuel efficiency with the lowest possible emissions, making it a perfect investment for the future. The MAN 175D high-performance engine is IMO Tier III-compliant with most compact MAN SCR system.

Benefits

Advanced, powerful, and robust

Peak performance and proven reliability based on cutting-edge technology and successful four-stroke engine tradition

Adaptable to different applications

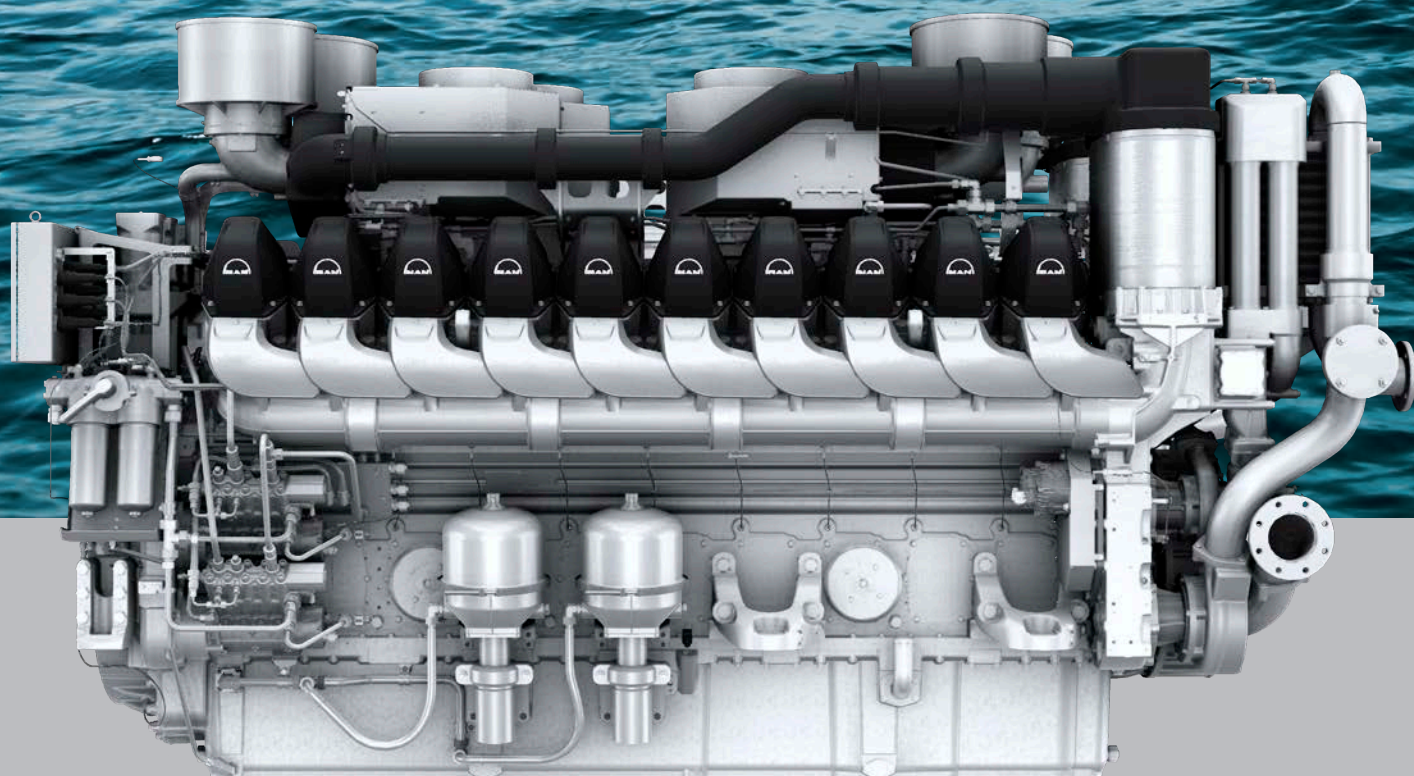
Modular design with easily configurable options and common components utilized across all variants

Environmentally friendly

With best-in-class fuel consumption, lowest CO₂ emissions, and full IMO Tier III compliance in combination with MAN SCR

Easy to commission, operate, and service

Simple design reduces complexity and allows in-situ overhauls, and a long time between overhauls



**Advanced efficiency for business,
security, and leisure**

The MAN 175D is ideal for high cost-effectiveness, as it combines dynamic partial-load operation with economical endurance. With the lowest emission levels being considered from the outset, the MAN 175D is one of the most versatile marine engines able to meet all the challenges of many different applications.

Applications

Ferry
OSV
Workboat
Tug boat
Yacht
Naval defense
Fishing

Reliable and user-friendly operation

MAN 21/31

Features

The MAN L21/31 is an inline diesel engine for propulsion or power generation. It is available with 5 to 9 cylinders with 210 mm bore (5 cylinders only available for genset). It runs on MGO, MDO, and HFO, and has an output of 1,000 to 1,980 kW. When fitted with MAN SCR (selective catalytic reduction), it complies with IMO Tier III regulations.

This engine features a jet assist device that supports the rapid acceleration in partial-load operation of the main

marine engines. This improves the maneuvering characteristics by increasing the charge air pressure of the turbocharger. With its outstanding load pickup capabilities and long time between overhauls (TBO), the MAN L21/31 is ideal for many different applications.

Benefits

Convenient power take-off (PTO)

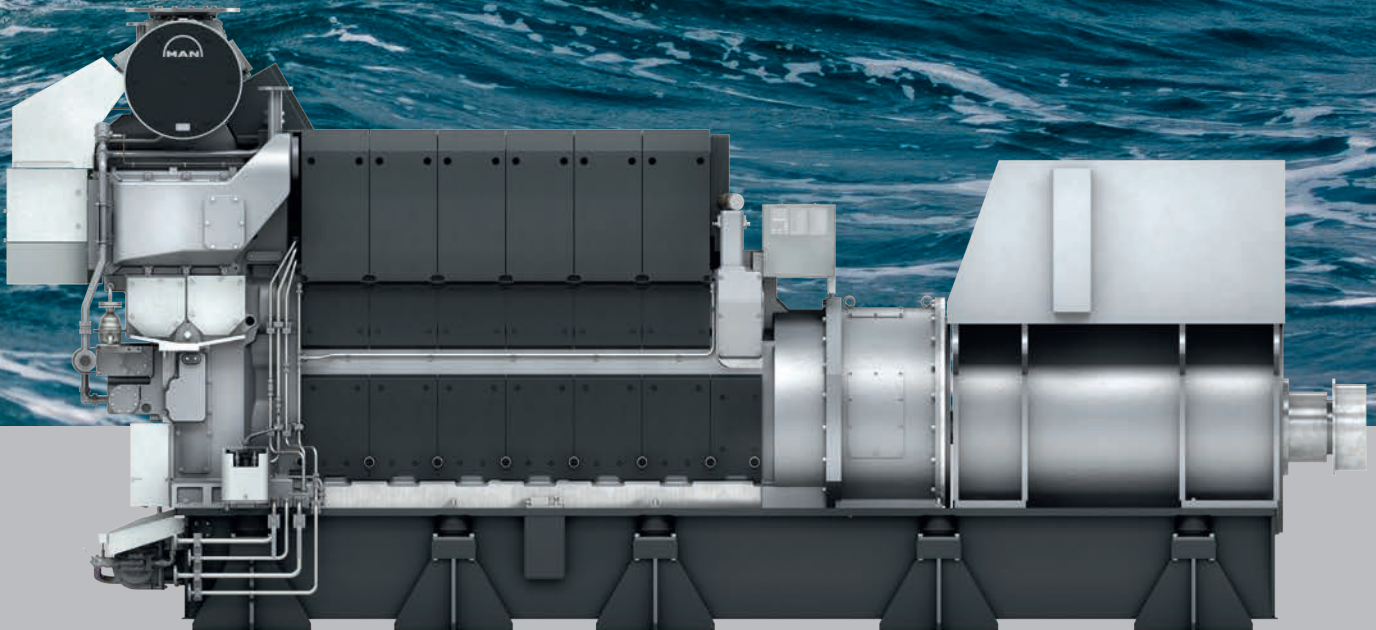
100 % PTO is possible from either end of the engine

Clean engine design

The front-end box incorporates cooling water pumps, thermostatic valves, oil pump, cooler and filter

Very short installation length

The standby pump connection is at the side of the engine



Superior load-change applications and long TBOs

Many years of experience with the propulsion concept, together with customers' requirements for reliability, economy, and technical progress, have resulted in this attractive 1,000 rpm engine with a cylinder output of 220 kW (genset). The MAN L21/31 engine is the ideal power source for small to medium-sized tankers, cargo vessels, ferries, RoRo vessels, large fishing vessels, tugs, workboats, and supply vessels.

Applications

Ferry
OSV
Workboat
Fishing

Lower emissions at lower costs

MAN 23/30DF

Features

The MAN 23/30DF is an inline dual fuel engine for power generation available with 5 to 8 cylinders with 225 mm bore and a stroke of 300 mm; the crankshaft speed is 720, 750 or 900 rpm. It runs on marine gas oil (MGO) and liquefied natural gas (LNG), and has an output of 625 to 1,200 kW.

Based on the popular MAN 23/30 conventional diesel GenSet, the MAN 23/30DF is ideal for many applications requiring economical power, reliability, and full compliance with IMO Tier III regulations.

Benefits

Classic engine design and easy operation

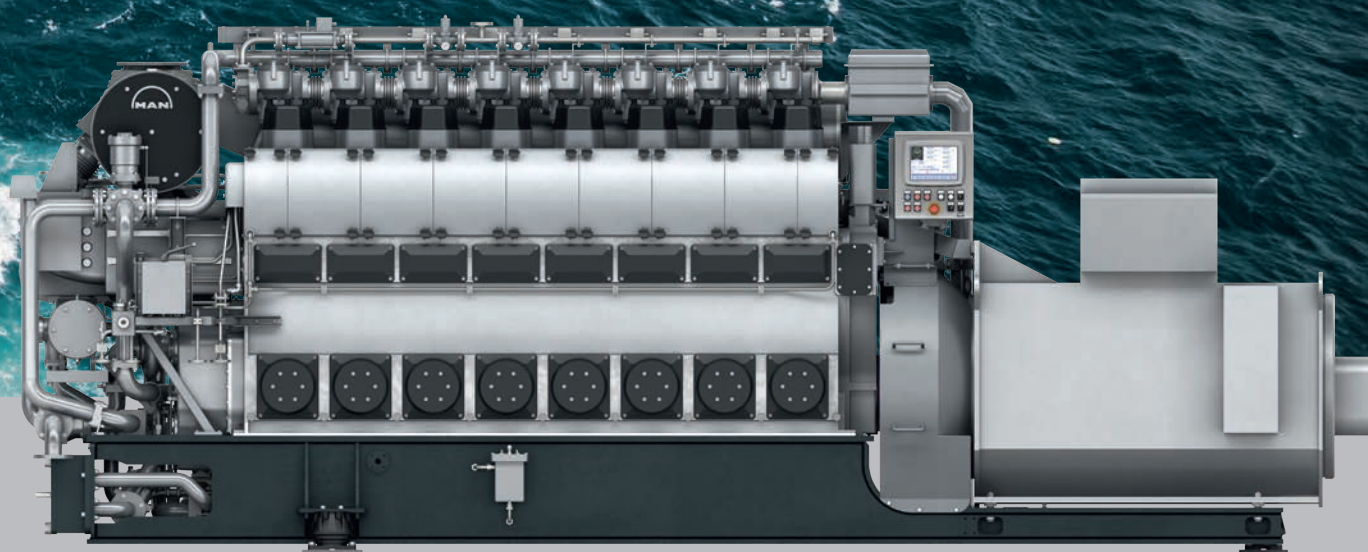
The MAN 23/30DF is based on the successful MAN 23/30 GenSet

Flexible installation

Engine and GVU can be up to 100 m apart

Long time between overhauls

36,000 operational hours



A practical solution available as retrofit

With over 14,000 MAN 23/30 GenSets in service around the world, it makes perfect sense to offer the MAN 23/30DF as an economical retrofit solution. The MAN 23/30DF continues the GenSet's tradition of easy maintenance. The robust monoblock engine is made of cast iron. The engine frame and under-slung crankshaft restrict combustion and inertia forces to within the same component, thereby enhancing reliability, durability, and availability.

Applications

LNG shipping
Cruise
Ferry
Cargo ship
Tanker
Bulk carrier

Ready for business

MAN 27/38

Features

The MAN 27/38 is an inline diesel engine available with 5 to 9 cylinders with 270 mm bore (5 cylinders only available for genset). It runs on MGO, MDO, and HFO, has an output of 1,500 to 3,285 kW, and can be used for propulsion or as auxiliary genset. It features a jet assist device that supports the rapid acceleration in partial-load operation of the main marine engines. This improves the maneuvering characteristics by increasing the charge air pressure of the turbocharger.

Superior load-change applications and long TBOs make the MAN 27/38 engine an ideal power source for many different types of vessels. It offers full IMO Tier III compliance with the addition of MAN SCR (selective catalytic reduction).

Benefits

Clean engine design

The front-end box incorporates cooling water pumps, thermostatic valves, oil pump, cooler and filter

Very short installation length

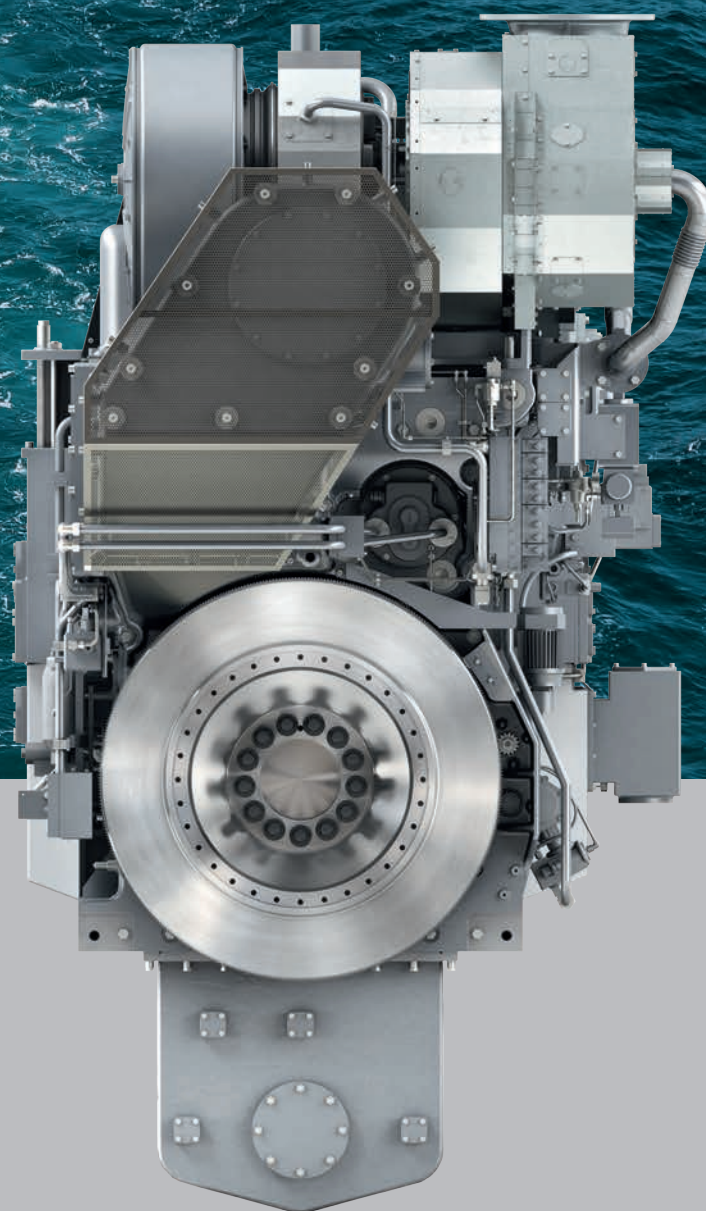
Thanks to pump connection at the side of the engine

Reliability in operation

Long time between overhauls and no unscheduled maintenance

Convenient power take-off (PTO)

100 % PTO from either end of the engine



Reliability and economy in operation

The proven reliability of this engine ensures a long time between overhauls and no unscheduled maintenance or repair work. Additional economic benefits are derived from its low fuel and lube oil consumption – while adhering to legal emission limits. The compact engine is easy to install in a broad range of vessels.

Applications

LNG shipping
Ferry
Cargo ship
OSV
Tug boat
Fishing

Dual fuel for a flexible future

MAN 28/32DF

Features

The MAN L28/32DF is an inline dual fuel engine for power generation available with 5 to 9 cylinders with 280 mm bore and a stroke of 320 mm. It runs on MGO, HFO, and LNG, and has an output of 1,000 to 1,800 kW.

The MAN L28/32DF complies with IMO Tier III regulations (when fitted with MAN SCR) while offering the economic benefits of full fuel flexibility and high efficiency regardless of fluctuations in the fuel market.

Benefits

Classic engine design and easy operation

MAN L28/32DF is based on the successful conventional MAN 28/32H diesel GenSet

Long time between overhauls

20,000 operational hours

Full fuel flexibility

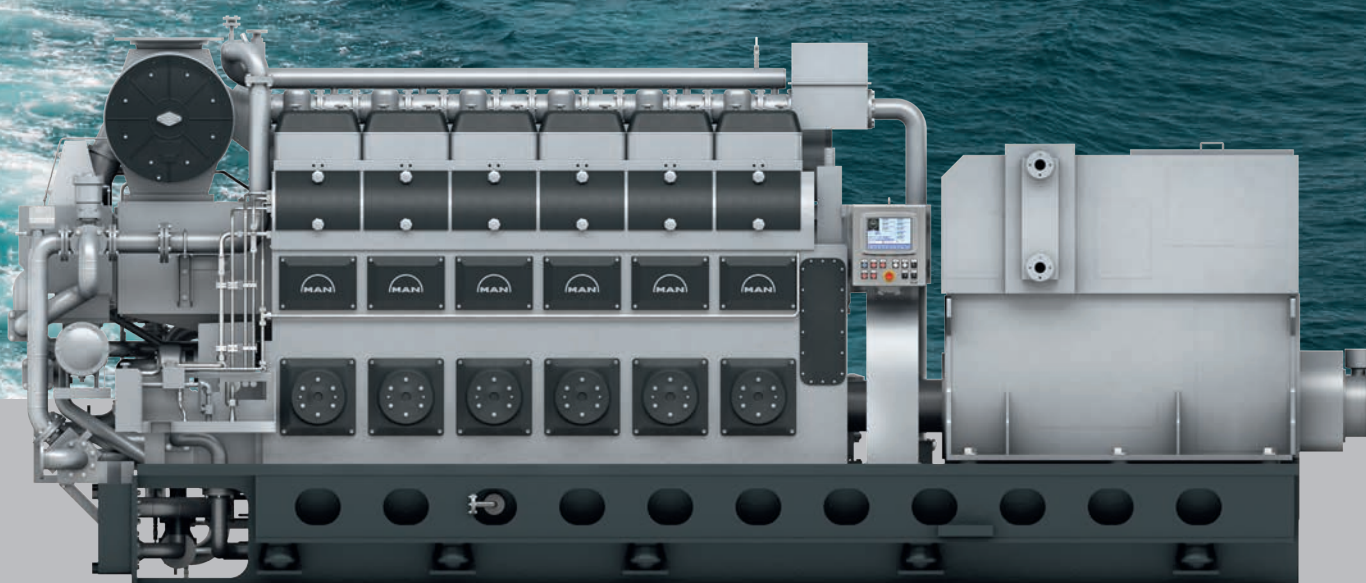
Not restricted by fuel market fluctuations

Safe and reliable operation

Design is based on engine types with decades of service experience

Competitive CAPEX

Simplified fuel injection system



Exploring the possibilities of clean-burning gas

The MAN L28/32DF engine is based on the proven MAN 28/32H workhorse, recognized worldwide as an ultra-reliable and robust engine with long TBOs. The engine is available in two versions: New build or retrofit. Designed to complement the four-stroke MAN 51/60DF or a two-stroke dual fuel ME-GI engine as part of a complete power package, the engine's ability to run on gas offers unprecedented possibilities.

Applications

LNG shipping
Ferry
Cruise
Cargo ship
Tanker
Bulk carrier

No compromises

MAN 28/33D STC

Features

The MAN 28/33D STC is a V-type diesel engine available with 12, 16 or 20 cylinders with 280 mm bore. It runs on MGO and has an output of 5,460 to 10,000 kW and the best power-to-weight ratio in the medium-speed engine class. Its advanced STC (sequential turbocharging) system provides high torque at low rpm. The MAN 28/33D STC complies with IMO Tier II and IMO Tier III (with optional selective catalytic reduction).

Benefits

Best power-to-weight ratio in its class

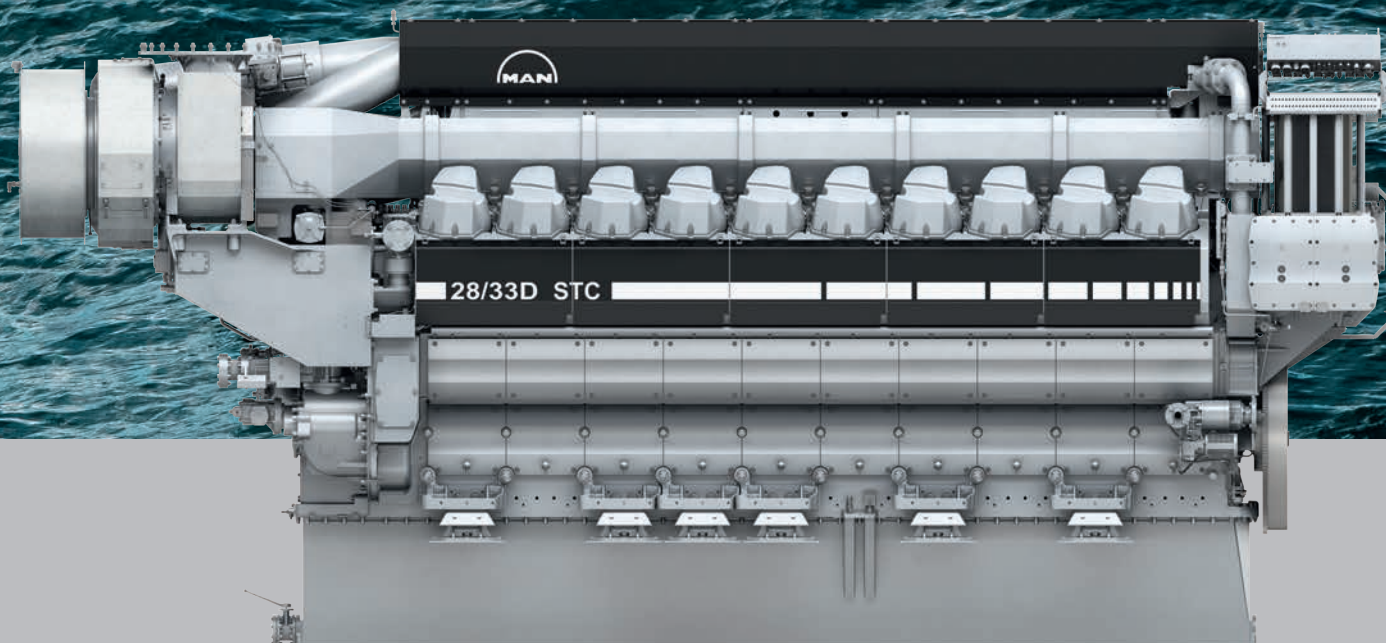
5.2 kg/kW, unequaled by any other medium-speed engine

High reliability and low maintenance effort

All maintenance in situ;
no removal from vessel necessary;
no change of crankshaft

Simple efficiency

Sequential turbocharging provides optimum matching over all loads with only two turbochargers



Versatile performance

The masterful performance of this engine is not just down to advanced technology like STC, it also makes a clear statement with low fuel consumption and full environmental compliance at a low cost. MAN 28/33D STC engines are ideal for naval applications as they offer an optimum combination of high power and rapid engine response as well as long endurance and economical operation with low acoustic and thermal signatures during cruising and patrolling missions. They are also ideal for fast ferries.

Applications

Naval defense
Fast ferry
Yacht

The drive for your needs

MAN 32/44CR

Features

The MAN 32/44CR is an L- and V-type diesel engine available with 6, 7, 8, 9, 10, 12, 14, 16, 18 or 20 cylinders with 320 mm bore. It runs on MGO, MDO, and HFO, and has an output of 3,600 to 12,000 kW. It is available for diesel-mechanic, diesel-electric, and auxiliary applications. The main components are all developed in-house. Compliance with IMO Tier III NO_x emission limits is ensured when combined with MAN SCR (selective catalytic reduction).

Benefits

Low fuel oil consumption over the whole power range

Due to highly flexible future-ready common rail technology

Excellent engine load acceptance

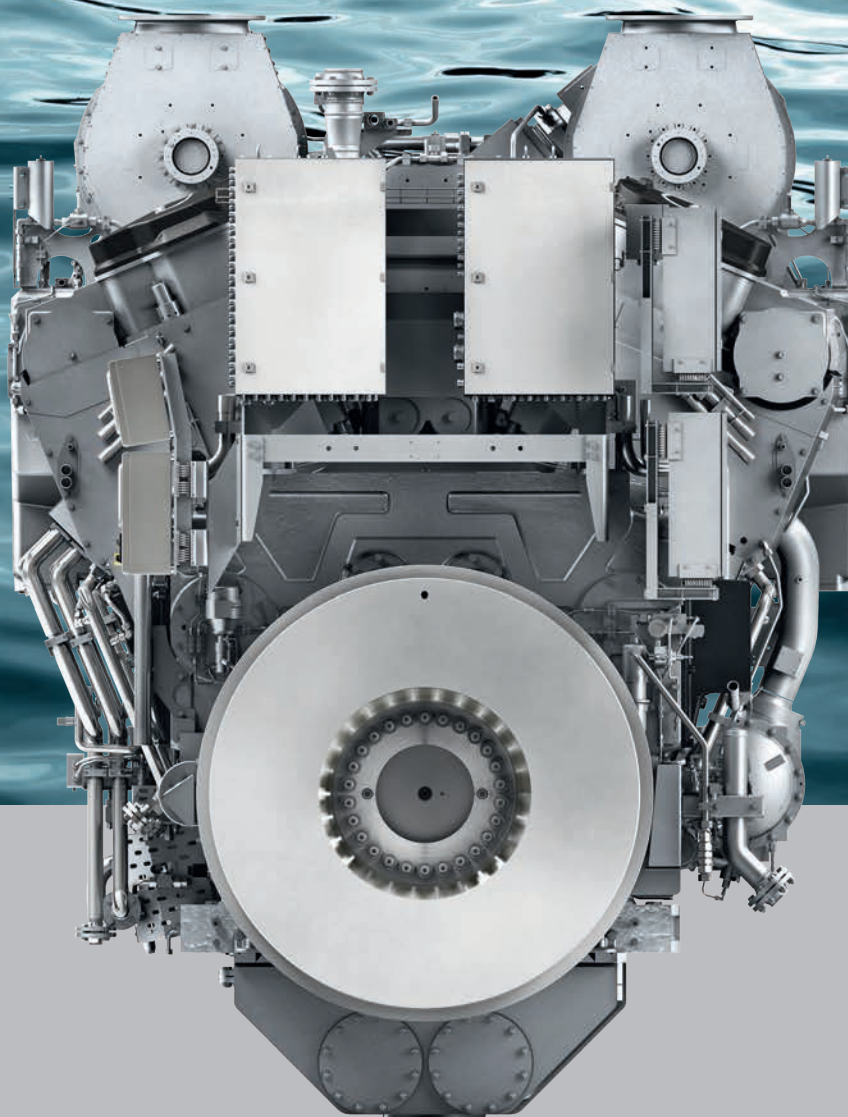
Thanks to common rail with boost injection

Reliable IMO Tier III compliance

With any fuel type and best fuel economy thanks to MAN's closed-loop SCR system

Latest engine management system

MAN SaCoS_{one} combines all the functions of modern engine management in one complete system



Engineered to set benchmarks

With its high power output, low operating and maintenance costs, and low exhaust emissions, MAN 32/44CR engines are multi-purpose “prime movers” for all marine applications, both commercial and governmental. Our current engine represents the latest technologies in the area of industrial-sized diesel engines operated at medium speed.

Applications

OSV
Cruise
Ferry
Naval defense
Fishing
Dredger
Offshore
exploration
Offshore
production
Icebreaker
Specialized vessel

Ready for the future

MAN 35/44DF

Features

The MAN 35/44DF is an inline dual fuel propulsion and auxiliary engine available with 6 to 10 cylinders with 350 mm bore. It is available for mechanical or electric propulsion and as an auxiliary genset. It runs on MGO, MDO, HFO, and natural gas and has an output of 3,060 to 5,300 kW. The MAN L35/44DF offers high output, dual fuel flexibility, and is IMO Tier II and IMO Tier III-compliant (in gas mode).

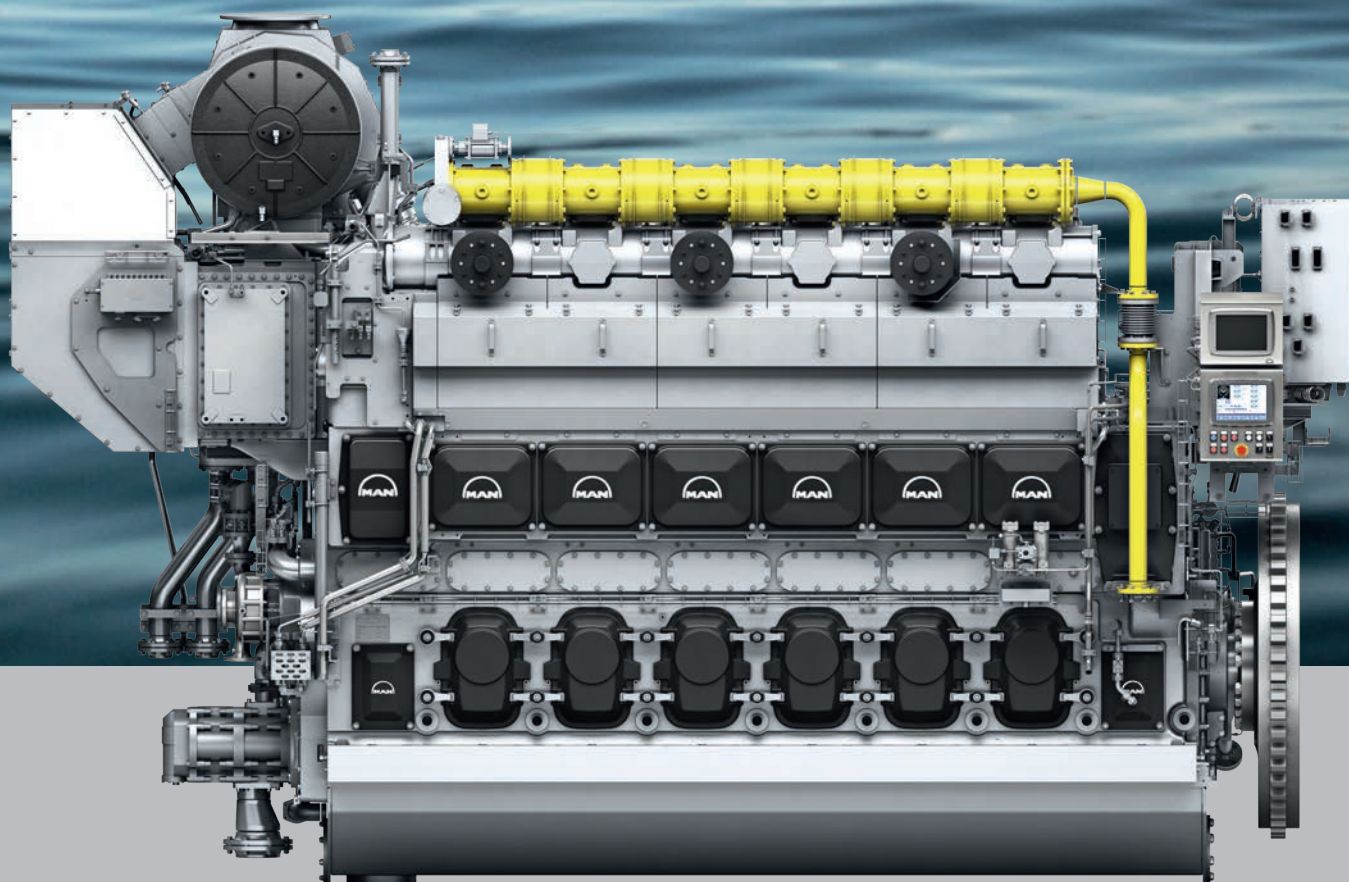
Benefits

Unrivaled power output in its class
530 kW per cylinder

Seamless switching over from gas to liquid mode
At any time, at loads between 10 % and 100 % – without the need for intermediate switch to MDO and with no loss of engine power

Reliable power with all fuels
Operation with gas qualities down to MN ≥ 70 without power reduction

Future-proof flexibility
LNG-ready solutions



Dual fuel flexibility

In the shipping industry, choosing a fuel for marine propulsion is becoming increasingly challenging. Highly flexible dual fuel engines offer an eco-friendly yet cost-effective solution. Engineering ingenuity enables ship owners to tap into component synergies and cut their operating costs. The MAN L35/44DF engine's unique design centers on gas operation and offers full operational flexibility thanks to the seamless switching over from gas to liquid.

Applications

LNG shipping
Cruise
Ferry
Workboat
Dredger
Fishing

Performance you can trust

MAN 48/60CR

Features

The MAN 48/60CR (common rail) is an L- and V-type diesel propulsion engine available with 6, 7, 8, 9, 12, 14, 16 or 18 cylinders with 480 mm bore. It has an output of 7,200 to 21,600 kW. The advanced common rail injection system of the MAN 48/60CR was designed for operation with heavy fuel oil (HFO) and it can also run on marine diesel oil (MDO) and marine gas oil (MGO).

The MAN 48/60CR was designed for all main marine applications and can be used in single- and multi-engine systems, for diesel-mechanic and diesel-electric drives. The optional MAN SCR (selective catalytic reduction) ensures it fully complies with IMO Tier III emissions standards.

Benefits

Powerful engine

1,200 kW per cylinder in the speed range of 500/514 rpm

Intelligent fuel savings

Optional MAN ECOMAP function enables different engine performance characteristics to be used

Low maintenance costs

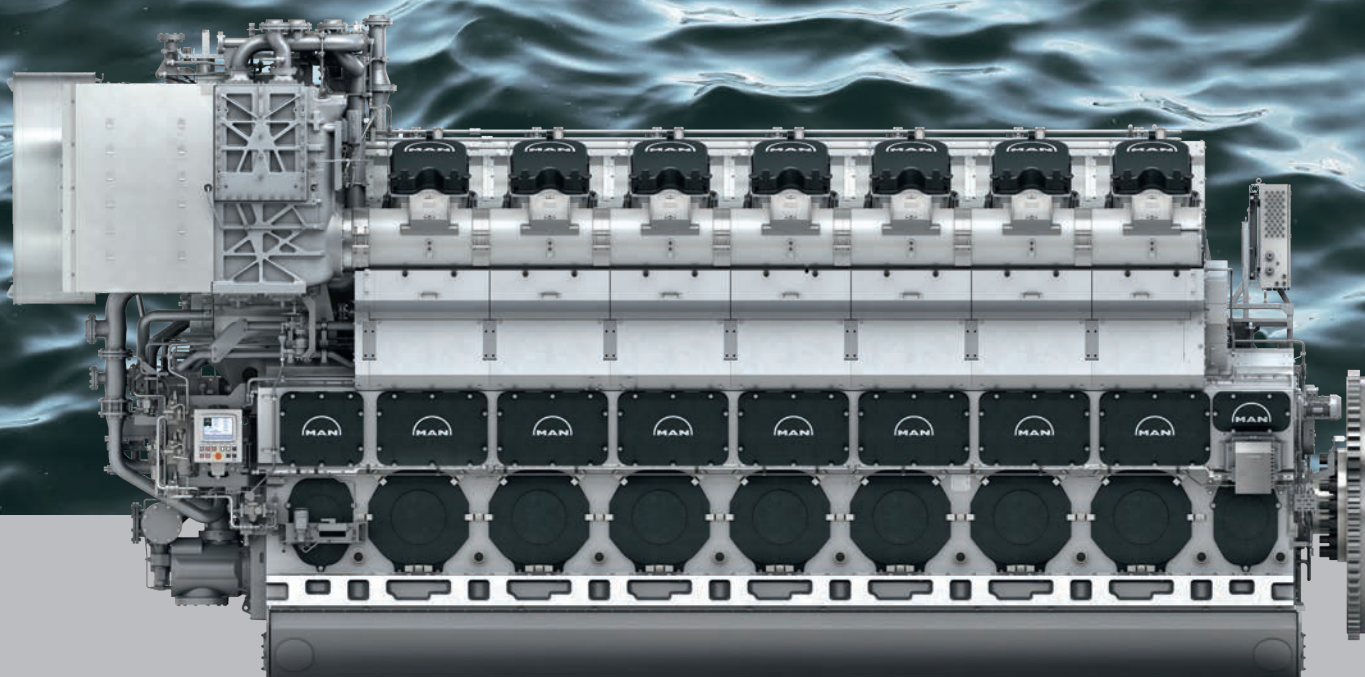
MAN quality and maintenance-friendly engine design ensure long service intervals

Most economic and reliable

Compliance with IMO Tier III in combination with MAN SCR and intelligent SCR regeneration

Lowest level of vibrations

Tailor-made engine seatings ensure the highest possible passenger comfort in cruise ships



Facing tomorrow's challenges today

The MAN 48/60CR is a striking combination of top performance, operational flexibility, and proven reliability. High power output as well as low fuel consumption and exhaust emissions meet today's market requirements – for every kind of marine application. The economic and ecological performance of the engine is determined by the in-house development and production of the key components.

Applications

Cruise
Ferry
Naval defense
Dredger

Adapting to future needs

MAN 49/60DF

Features

The new MAN 49/60DF is available as an inline engine with 6, 7, 8, 9, or 10 cylinders, or as V-type engine with 12 or 14 cylinders. Its output ranges from 7,800 to 18,200 kW. As a dual fuel engine, it can run on MGO, MDO, HFO, or natural gas.

High configuration flexibility makes it ideal for multiple applications. Its key applications are in cruise vessels, RoRos and RoPax vessels, dredgers, and LNG carriers. It satisfies IMO Tier III requirements in gas operation. With the addition of MAN SCR, it can fulfil IMO Tier III in liquid fuel mode. Future compliance with environmental regulations is supported by its fuel flexibility, unprecedented efficiency and very low methane emissions.

Benefits

New benchmark in efficiency

171.0 g/kWh liquid fuel consumption at 85 % MCR*
6,990 kJ/kWh gas consumption at 85 % MCR*
*Higher values apply for 8L and 10L

Long-term CO₂ emissions compliance

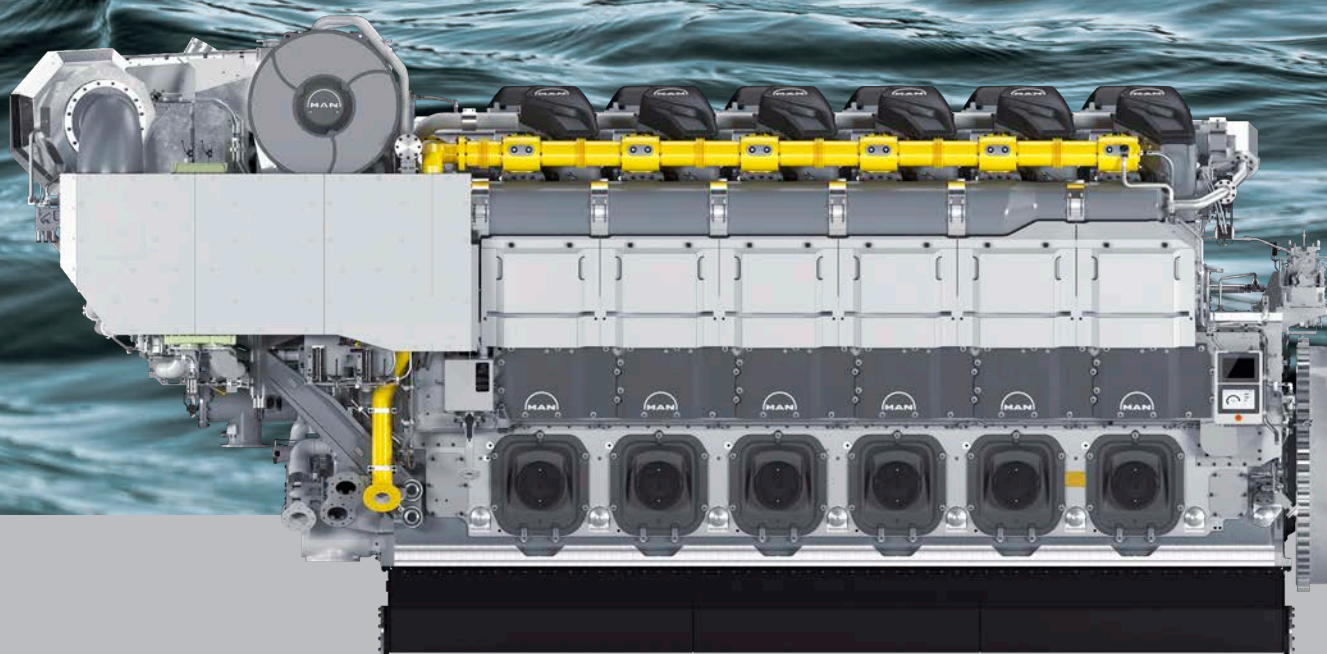
Thanks to benchmark efficiency, low methane emissions and fuel flexibility

Ready for further digitalization

With next-generation engine automation MAN SaCoS 5000 and new Advanced Combustion Control ACC 2.0

Compact design

By increased power density



Built to last

The built-in flexibility of the MAN 49/60DF means vessels can be long-term emission-compliant. This is possible thanks to the engine's low fuel consumption and low methane slip, its fuel flexibility and the availability of MAN upgrade packages. The MAN 49/60DF offers you flexibility to adapt based on state-of-the-art technology such as the MAN SaCoS 5000 safety and control system, MAN's next-generation Common Rail CR 2.2, the highly efficient MAN TCT and MAN TCX two-stage turbocharging system and the Advanced Combustion Control ACC 2.0

Applications

Cruise
RoPax
RoRos
Dredger
LNG carrier

Proven versatility and power

MAN 51/60DF

Features

The MAN 51/60DF is an L- and V-type dual fuel engine available with 6, 7, 8, 9, 12, 14, 16, or 18 cylinders with 510 mm bore. It is suitable for mechanical or electrical propulsion. It runs on MGO, MDO, HFO, and natural gas, and has an output of 6,300 to 20,700 kW. For every engine version there are high power (HP) and high efficiency (HE) variants.

Fuel consumption in liquid fuel mode is the best in class. The MAN 51/60DF engine satisfies IMO Tier III requirements in gas fuel operation and in liquid fuel operation (by means of MAN SCR). It is available as main engine propulsion and as power source for floating processing or power generation units. Its high configuration flexibility makes it ideal for multiple applications.

Benefits

Highest power output in its class

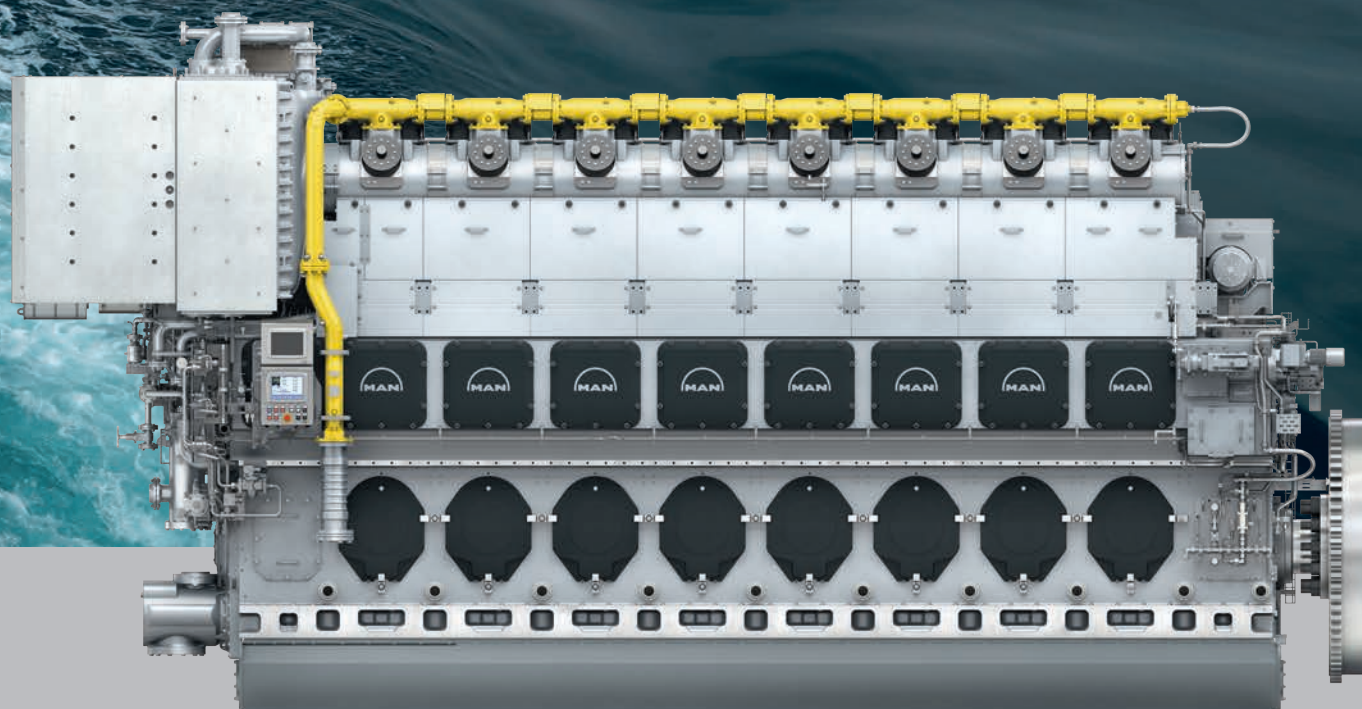
Up to 1,150 kW per cylinder with 10 % overload margin in both diesel and gas mode

Full environmental compliance in gas and liquid fuel operation

IMO Tier III in gas mode and with MAN SCR in liquid fuel mode/starting capability gas mode

Operating stability and flexibility

Seamless switch from HFO to gas mode and vice versa, gas operation even above 100 % MCR and gas start capability



Clean, clever, compact

The MAN 51/60DF is a highly efficient dual fuel engine that produces low emissions and can be conveniently switched from gas mode to liquid fuel mode without interruption. Combined with a state-of-the-art safety design, this multi-fuel capability makes this option the ideal drive solution for LNG carriers.

Applications
LNG shipping
Cruise
Ferry

MAN PrimeServ

Service with passion



MAN PrimeServ is the dedicated MAN Energy Solutions service brand. Via a network of over 100 service centers worldwide, MAN PrimeServ provides 24/7 service across the globe. Our range of services includes technical support, consulting, and OEM spares, as well as maintenance, repair, and comprehensive individualized service plans.



365

days a year

24

hours a day



MAN PrimeServ provides:

- Prompt delivery of high-demand OEM spare parts within 24 hours
- Fast, reliable, and competent customer support
- Individually tailored O&M contracts
- Ongoing training and qualification of operators and maintenance staff
- Global service, 24 hours a day, 365 days a year
- Diagnosis and troubleshooting with our high-performance online service

MAN Energy Solutions and legacy brands

MAN PrimeServ is our brand name for high-quality aftersales support for the entire MAN Energy Solutions product portfolio. Through refinements to our products and repair techniques, we ensure and reinforce our technological leadership and technical expertise as an original equipment manufacturer (OEM) for the brands united under MAN Energy Solutions.



Worldwide service

We offer retrofitting and upgrade services to bring engines and turbochargers already in service up to the very latest standards of performance and efficiency.

Using the latest digital technology, we enable you to maximize the performance and availability of your MAN equipment by accessing real-time data analysis, remote support, and rapid solutions. We also offer an extensive range of training courses at MAN PrimeServ Academies around the world.

Our service does not vary according to location. We know that a vessel may be built in Asia, operated in Europe for ten years, and then move to Africa for the next ten years. That does not alter our focus on dedicated training, fast delivery of strategic spare parts, a comprehensive approach, or our tailored maintenance contracts.

For more information, please visit
www.man-es.com/services



100

service centers
worldwide



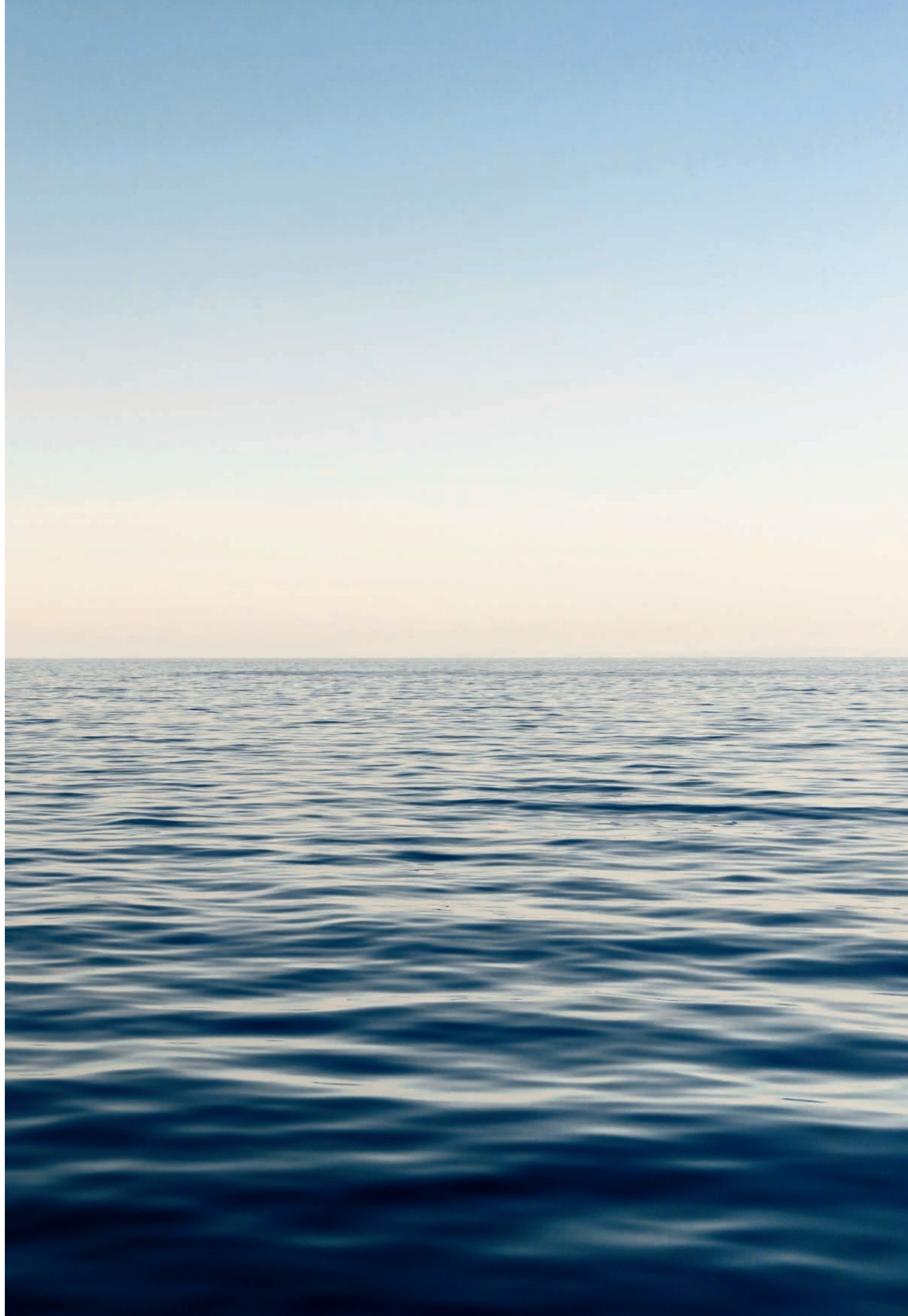
MAN PrimeServ

Get your engines started ...



An interactive experience

Download our MAN Brochure Store app from the App Store or Google Play Store. Use its exciting interactive features to explore our complete range of products and services. Suitable for iPhone, iPad, and Android.



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