



Use Case Yacht Hybrid PropulsionPack

MAKE THE MOST OF YOUR
YACHTING EXPERIENCE




A Rolls-Royce
solution


Hybrid yacht solutions

INTRODUCING THE FUTURE-READY YACHT


The **mtu** Hybrid PropulsionPack not only reduces noise levels, emissions and vibrations on board, but also improves efficiency, dynamics and comfort. As a result, yacht owners like you can fully enjoy the benefits of quiet yet highly efficient electric propulsion with zero-emission anchoring: no smell, no smoke, no noise, zero-emission maneuvering in harbor areas, and an all-around eco-friendly system.



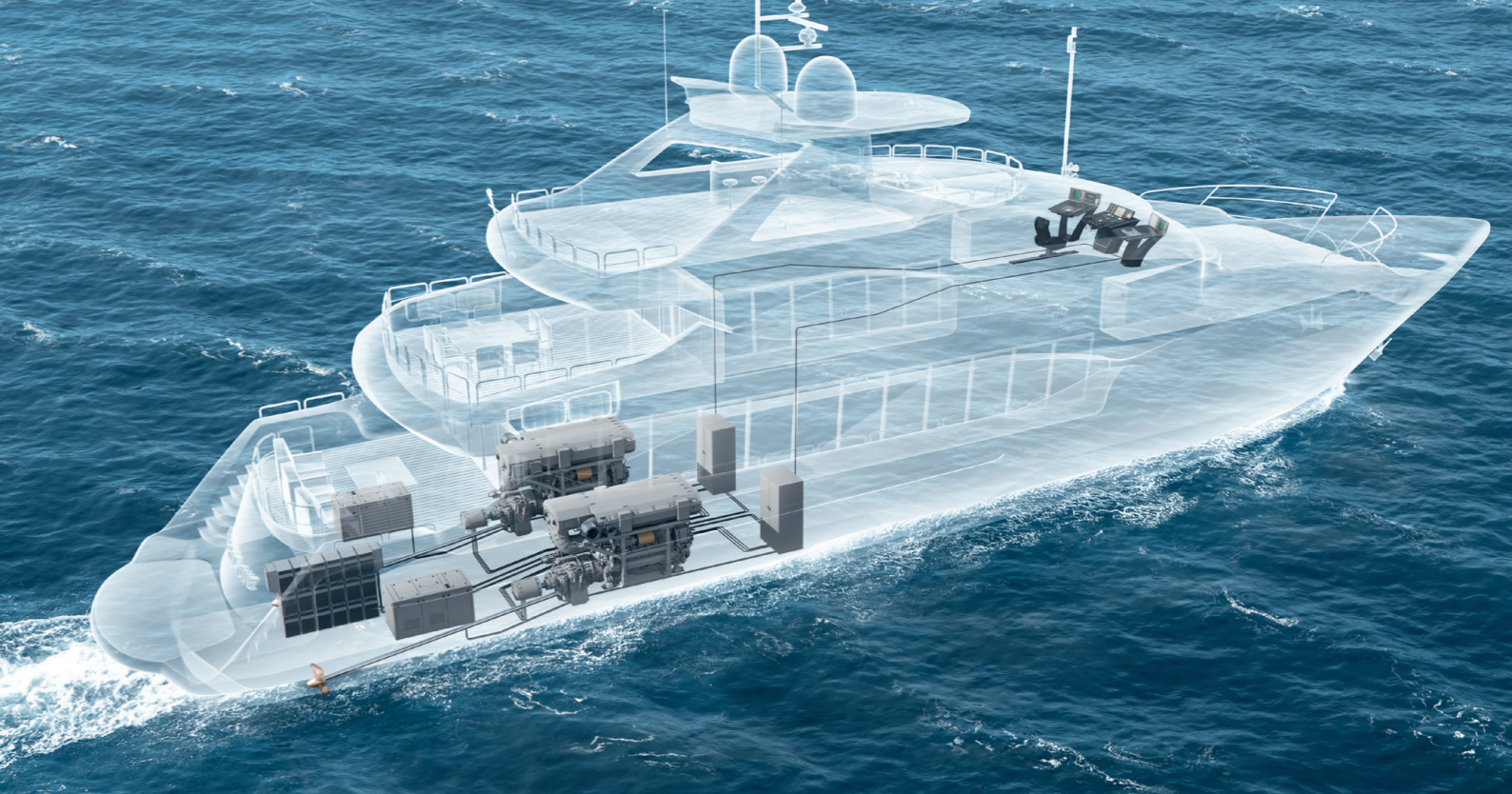
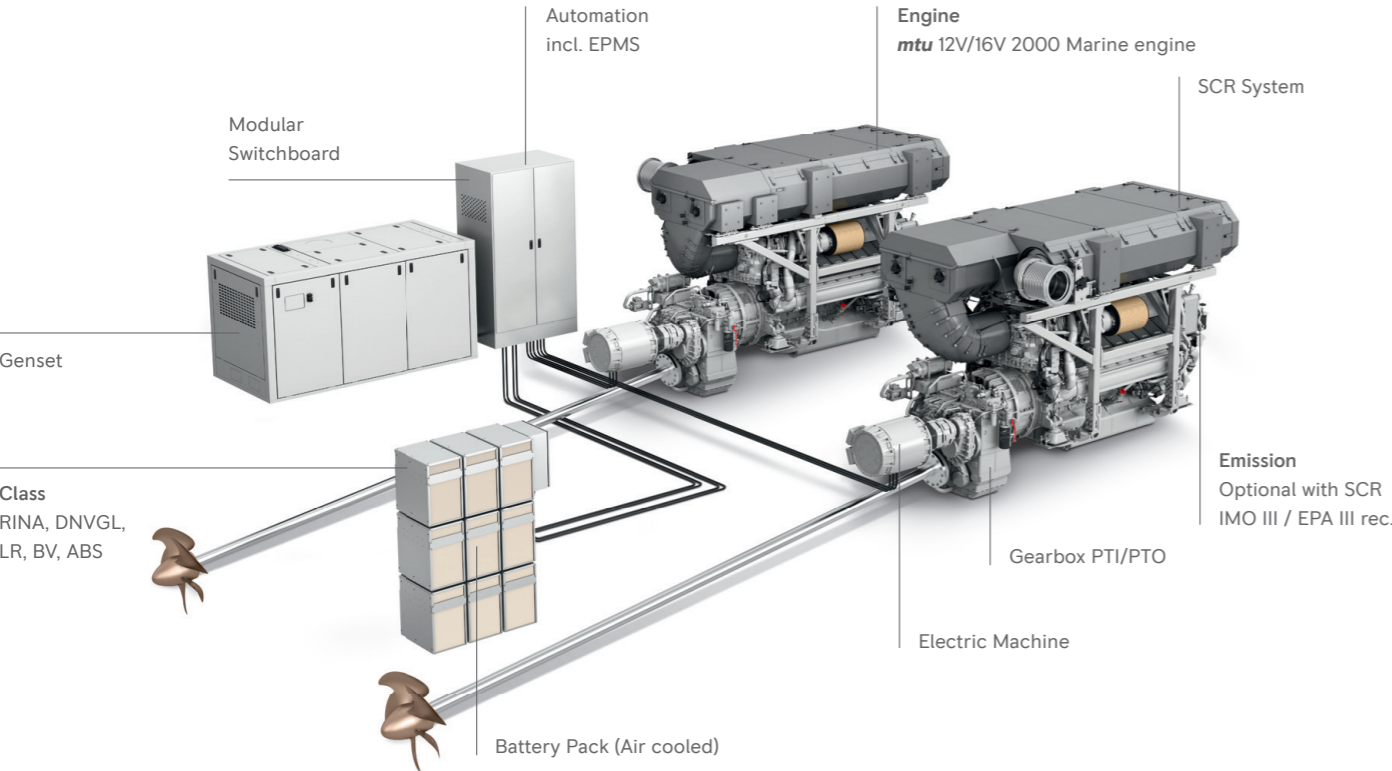
Powerful
Great maneuverability, e-power assisted propulsion



Clean
— Meets the newest emission regulations
— Local emission-free cruising/anchoring




Comfortable
Silent, vibration-free operation




USE CASE: 4-DAY TRIP IN THE LIGURIAN SEA

mtu Hybrid PropulsionPack



2 x **mtu** 12V 2000 M86 with 1,269 kW & 2450 rpm each
2 x Electric drivetrain system with 277 kW & 4000 rpm each



Battery system:
2 x LiON with 252 kWh total

Situation
Yachts like yours navigate the world's oceans in some of the most beautiful – and ecologically valuable – waters. Electric propulsion is the key to achieving full performance and sustainability in these challenging environments for the vessel. Supporting conventional propulsion with electric solutions with numerous benefits besides sustainability is already possible today, as this use case will show based on a typical yacht cruise.


- Main benefits of hybrid configuration**
- Lower fuel consumption
 - Lower fuel costs (including the electric charge of the batteries)
 - Lower CO₂ emissions
 - More flexibility (access to environmentally restricted areas)
 - Less noise and vibrations (equals more comfort on board)

Fuel consumption (using the example of the 4-day trip)

Conventional system	<div></div>	3,113 l
mtu Hybrid PropulsionPack	<div></div>	2,837 l

Overall performance

Conventional system	<div></div>	2,538 kW
mtu Hybrid PropulsionPack	<div></div>	3,092 kW



- 10%
Fuel consumption

4-day trip in the Ligurian Sea

LESS FUEL, MORE COMFORT AND FLEXIBILITY

Let's assume you decide to take a 4-day recreational cruise with your yacht in the Ligurian Sea. The *mtu* Hybrid PropulsionPack ensures optimal engine performance throughout the voyage while saving fuel, eliminating emissions, reducing noise and increasing overall comfort.


Day 1


Long haul with hybrid system


Friday: On the first day, you arrive at Porto Lotti in La Spezia in the afternoon. The captain has already stored fuel and loaded everything for the trip. You transfer to the island of Elba during the night.

The next morning you're in Porto Ferraio for breakfast and shopping followed by a swim in the clear waters of the Tuscan Archipelago.

Hybrid benefits:

 Battery capacity to save fuel

 PTO E-Motor to provide hotel load power

 Fuel efficiency improvement: 6.5% (-65 l)





Day 2


Overnight transit with hybrid system

Saturday: After a refreshing swim, you return back on board and the captain sets course for Porto Cervo, Sardinia. You've already booked a table in the beautiful restaurant La Pergola to have dinner with friends that evening.

Hybrid benefits:

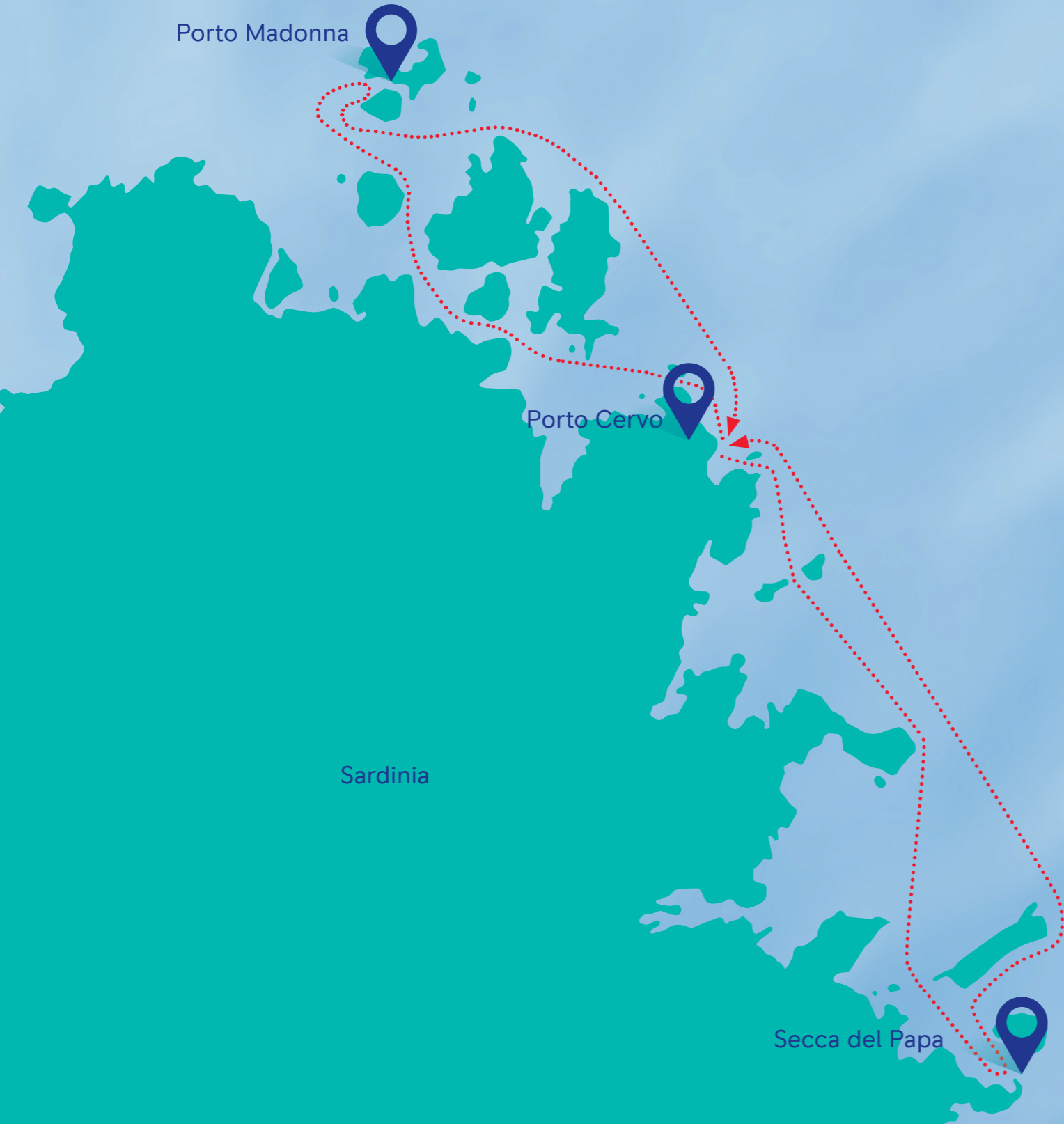
 Battery capacity to save fuel

 PTO E-Motor to provide hotel load power

 Fuel efficiency improvement: 6.5% (-88 l)

4-day trip in the Ligurian Sea

LESS FUEL, MORE COMFORT AND FLEXIBILITY



Day 3

Leisure journey with hybrid system

Sunday: After breakfast and a shopping tour in Porto Cervo, you set off for the natural marine reserve of Archipelago di La Maddalena off the coast of Sardinia. In the evening, you return for dinner at a restaurant in Porto Cervo and then a visit to the Phi Beach in Baja Sardinia.

Hybrid benefits:



Electric harbor arrivals/departures (emission-free and w/ very low noise)



Electric cruise through natural reserve



Fuel efficiency improvement: 19.4% (-58 l)

Day 4

Diving trip with hybrid system

Monday: Following breakfast in Porto Cervo, you head for the marine protected area of Tavolara south of Olbia. There you have lunch in front of Isola di Molara. After that, your ship's dynamic positioning system steers you to Tavolara natural reserve to dive in Secca del Papa, before heading back to Porto Cervo.

Hybrid benefits:



Electric harbor arrivals/departures (emission-free and w/ very low noise)



Full electric stay during diving



Fuel efficiency improvement: 14.5% (-65 l)




Hybrid systems for yachts

EXECUTIVE SUMMARY

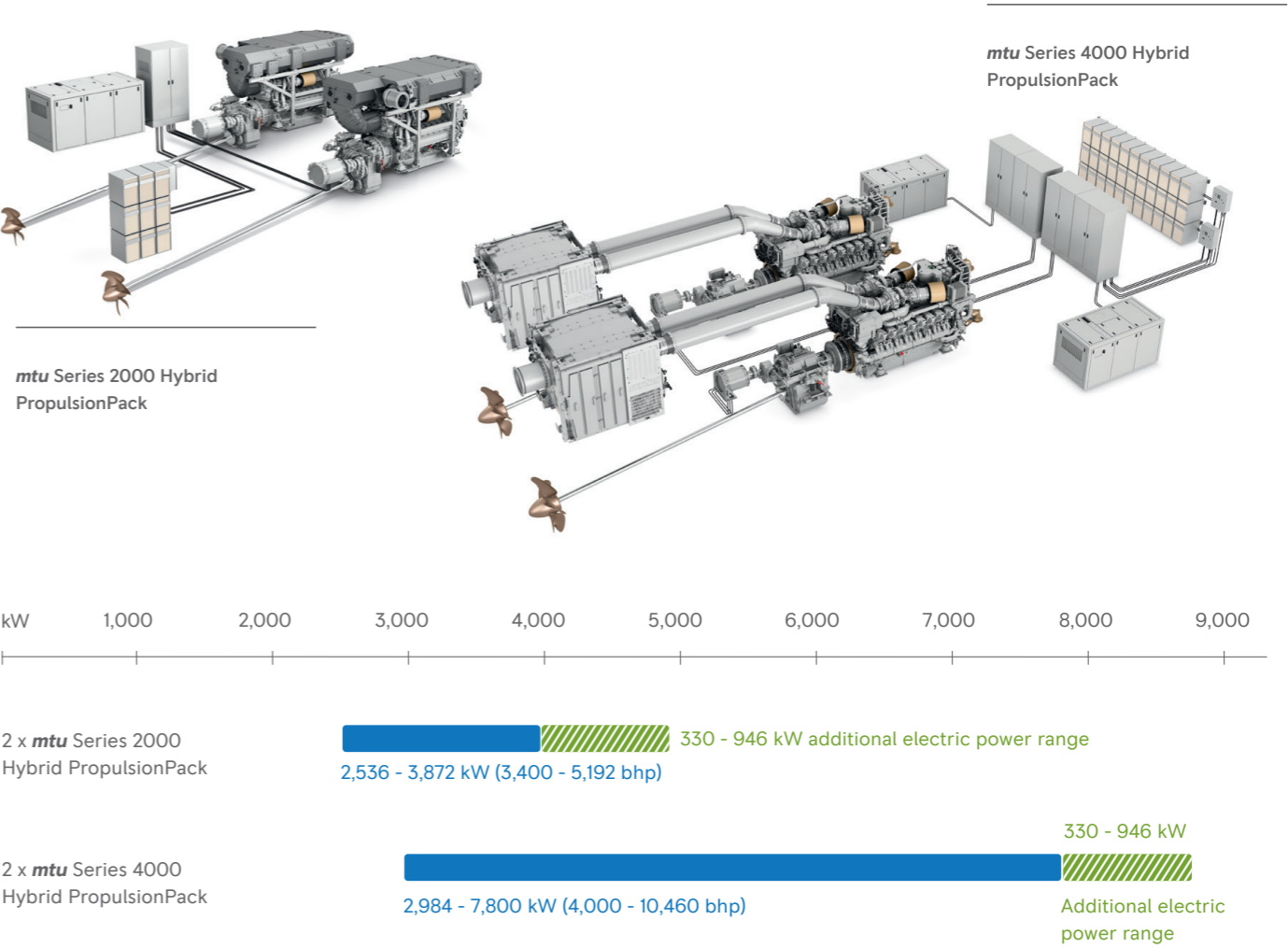
Less noise, less vibration and reduced fuel costs - the benefits of electric propulsion, even as a support for traditional propulsion, are manifold, especially by opening up new experiences in waters that could not be navigated thus far. An *mtu* Hybrid PropulsionPack offers you the peace of mind needed for carefree excursions where pleasure on board is the highest priority.

In times where sustainability is becoming more and more important, there are promising solutions that create benefits that go beyond the scope of sustainable operation. For yacht owners like yourself, an *mtu* Hybrid PropulsionPack offers a way to not only significantly reduce emissions, but also noticeably increase the comfort level aboard your pleasure craft. By lowering onboard vibrations and noise,

it also makes stays at sea much more enjoyable for you, your family and guests. In addition, you benefit from being able to explore and enjoy pristine waters that have previously been denied to yachts due to their ecological fragility. Electric propulsion is mandated for accessing many protected marine areas.

<div>1</div> <div>Silent cruising</div>	<div>2</div> <div>Performance</div>	<div>3</div> <div>Eco-friendly cruising</div>
		
<p>Imagine your yacht moving as if by magic, without noise and air pollution in superior comfort. The silent mode allows you to enjoy a pleasant ride through coastal or nature reserves without any emissions.</p>	<p>Whether operating in electric propulsion mode or in tandem with a diesel-powered combustion engine, an <i>mtu</i> Hybrid PropulsionPack gives your yacht the greatest possible onboard flexibility. You can rely on having precisely the right power mix at every moment of your trip.</p>	<p>Protecting our oceans is a responsibility we all share. An <i>mtu</i> Hybrid PropulsionPack enables you to easily fulfill that responsibility. As a sustainable propulsion solution, it not only reduces your emissions, but also allows you to undertake pleasurable voyages to previously inaccessible waters.</p>

Full range of power



mtu NautIQ Bridge

- One platform: full integration**

The *mtu* NautIQ Bridge allows you to seamlessly integrate the navigation equipment and all yacht subsystems needed to monitor and control the entire vessel into one platform. There is no need to modify third-party equipment or subsystems. You benefit from:

 - Easy and consistent user interface for the navigation equipment
 - In-depth integration of propulsion system
 - Multicontrol system – consistent control through a single device
 - Touchscreen controls – for easy HMI customization and software updates
 - Equipment health monitoring and vessel optimization
 - Connectivity & remote diagnostics of equipment condition
- One design: elegant, intuitive, user-optimized**

Another feather you'll appreciate: All of the navigation equipment information is presented in one elegant, user-optimized, easy-to-understand and consistent user interface design.

 - Total Navigation Control, simplified management
 - Innovative design and functionality
 - Safe and user-friendly thanks to consistent user interface
 - Seamless user interface across all integrated subsystems
- One source: dependability for builders and owners**

All technology and services come from one source, meaning one face to the customer for complete vessel operating system.

 - Global service support, anytime, anywhere
 - Seamless integration of products and technologies
 - Scalable, to integrate additional functions
 - High flexibility for updates and upgrades



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