CORVIA

Leading the way in sustainable shipping

The Modular Propulsion Platform (MPP)
Flexible. Efficient. Future-ready.

Contents

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The shift
Powering the maritime energy transition

How to stay competitive in a world of changing energy solutions, technologies, and regulations?

The maritime industry stands at a turning point. Stricter emission standards, rising fuel costs, and increasing digitalization are reshaping how vessels are designed, built, and operated. Shipowners, shipyards, and system integrators are under growing pressure to reduce environmental impact while maintaining operational reliability and economic performance.

At the same time, propulsion technology is evolving rapidly. Alternative fuels, battery systems, fuel cells, and hybrid propulsion concepts are moving from innovation to implementation. Traditional propulsion architectures, often designed around single-fuel or single-purpose systems, are increasingly challenged by the demand for flexibility and scalability. The challenge is clear: how to design propulsion systems that combine reliability, efficiency, and future readiness without increasing complexity or project risk.

Our answer
At Corvia, we turn these challenges into opportunities. We believe the maritime energy transition requires propulsion systems that are not only cleaner, but also smarter, more flexible, and easier to integrate.

Our configurable Modular Propulsion Platform (MPP) bridges today's ship designs to tomorrow's zero-emission fleet, combining reliability, flexibility, future readiness, modularity, and data-driven control in one compact and scalable solution.

Our solution

The Modular Propulsion Platform (MPP)

The configurable Modular Propulsion Platform (MPP) redefines maritime propulsion with a standardized yet configurable system that easily adapts to each vessel's design and operational profile.

Every module is engineered for safety, redundancy, and flexibility, so shipowners can deploy hybrid, full-electric, or future-fuel concepts on a single, modular architecture that integrates multiple energy sources and consumers with ease. This architecture is built around several key technical characteristics:

- ~ 1,000 V DC (Direct Current) grid
- Minimized electrical losses
- Reduced component count and size
- Power conversion efficiency up to 99%
- Engineered for safety, redundancy and flexibility
- Hybrid, full-electric, and future-fuel ready

Built for maritime professionals
Corvia works with shipowners, shipyards, designers, and system integrators who are shaping the next generation of maritime propulsion.

Whether you are an electrical installer, naval architect, or technical manager, the Modular Propulsion Platform (MPP) helps you design and deliver advanced propulsion layouts based on proven, standardized building blocks. By combining modular hardware, smart power architecture, and a Configure-to-Order approach, Corvia reduces engineering complexity, improves predictability, and enables efficient integration of future-ready energy solutions.

The result: faster design cycles, lower project risk, and propulsion systems that are ready for today's operations and tomorrow's transition.

"CORVIA REDUCES ENGINEERING COMPLEXITY, IMPROVES PREDICTABILITY, AND ENABLES EFFICIENT INTEGRATION OF FUTURE-READY ENERGY SOLUTIONS."

Benefits for shipowners & designers

Delivering operational and long-term value

Backed by decades of maritime engineering expertise at Eekels, the Modular t Platform represents a scalable approach to modern ship propulsion. Its modular architecture supports the transition toward low- and zero-emission shipping while maintaining operational reliability, compliance, and efficiency.

The MPP delivers measurable advantages across vessel design, operation, and long-term lifecycle management. By combining modular system design with integrated DC distribution and advanced energy management, it provides a propulsion platform built for adaptability, performance, and sustained operational resilience.

- **Ensure long-term fleet adaptability**
  The modular architecture allows vessels to integrate zero-emission energy carriers such as hydrogen, ammonia, and advanced battery systems. This supports phased upgrades and retrofits without costly redesigns, protecting long-term asset value.

- **Improve operational efficiency**
  High electrical efficiency and optimized DC energy flow reduce energy losses across varying load conditions. The result is stable propulsion performance with lower operating costs.

- **Thermal stability with minimal downtime**
  Integrated stainless steel water-cooling ensures consistent thermal performance under demanding conditions. Reduced maintenance requirements contribute to higher system availability.

- **Optimize fuel consumption across operating profiles**
  Advanced energy management maintains engines within optimal load ranges. This lowers fuel consumption and emissions while improving overall cost efficiency.

- **Accelerate the energy transition**
  The MPP simplifies the integration of clean and renewable technologies, enabling a step-by-step transition toward full zero-emission operation.

- **Reduce lifecycle costs**
  Standardized modules and simplified maintenance reduce wear and service complexity. Predictable service intervals help lower total cost of ownership.

- **Increase operational reliability**
  Built-in redundancy, fault isolation, and integrated monitoring enhance system resilience. This ensures reliable performance in demanding maritime environments.

- **Maximize available vessel space**
  The compact system architecture reduces machinery footprint. This allows greater flexibility in hull design and increases usable cargo or fuel capacity.

- **Fast, reliable delivery**
  The Configure-to-Order methodology and dedicated production process ensures on-time delivery and consistent system quality.

The Modular Propulsion Platform provides the technical robustness and adaptability required to lead the maritime energy transition. It enables smarter design, supports cleaner operation, and delivers lasting value across the vessel lifecycle. In doing so, the MPP empowers maritime innovators to build efficient, future-ready, and sustainable vessels today and tomorrow.

MPP's key characteristics
System capabilities in practice

Behind the benefits delivered by the Modular Propulsion Platform lies a set of defining system characteristics. Together, these characteristics shape the platform's performance, integration flexibility, and operational reliability across diverse maritime applications.

Modular & Compact design

The MPP is built around a modular architecture that enables flexible and space-efficient system layouts. Its construction supports upgrades, retrofits, and maintenance while reducing installation complexity.

Modules are available for a wide range of energy sources and buffers, including:

- Batteries (including redox flow)
- Supercapacitors
- Fuel cells (methanol, hydrogen)
- Solar and wind systems
- Heat recovery systems
- Dual-fuel generators (fixed or variable speed)

This architecture enables greater layout flexibility, reduced machinery footprint, and simplified integration of future technologies.

DC Main distribution

At the core of the MPP is a direct-current distribution grid optimized for electrical efficiency and system stability.

- Compact footprint with back-to-back panel design
- Water-cooled modules achieving up to 99% efficiency
- Separation of high- and low-power grids to ensure low THD and EMC compliance
- High electrical efficiency with minimal heat dissipation
- Prepared for next-generation energy technologies
- Modular and scalable configuration

Advanced cooling system

The MPP incorporates a stainless steel watercooling system designed to ensure stable performance under varying operational conditions. >>

- Modular cooling units with redundant pumps and flow control
- Integrated climate control and condensation prevention
- Engineered for reliable operation, low acoustic impact, and minimal maintenance

Redundancy & resilience

Redundancy and fault tolerance are integrated at module level to enhance system availability.

- Separable zone design options for redundancy and fault isolation
- Swappable electronics and universal spare parts for rapid replacement and recovery
- Advanced remote diagnostics and maintenance capabilities

Seamless system integration

The MPP integrates into both Corvia and third-party control environments.

- Compatible with Propulsion Control Systems (PCS) and Energy/Power Management Systems (PMS/EMS)
- Supports advanced propulsion modes (RPM, ECO)
- Enables load sharing, hybrid operation, and full-electric energy optimization

Adaptability to future energy technologies

The MPP consolidates energy sources at DC level, allowing it to manage multiple voltage levels and dynamic characteristics from diverse inputs.

- Prepared for hydrogen, ammonia, and next-generation battery technologies
- Designed for integration with evolving energy systems and regulation

Operational data & monitoring

Each MPP module is equipped with integrated monitoring capabilities for real-time performance analysis and fleet management.

- Continuous performance optimization through data analytics
- Predictive maintenance and remote support options
- Integration with Corvia's digital monitoring suite for fleet-wide insights

Safety & compliance

The MPP is based on standardized hardware and software platforms designed for consistent performance and regulatory compliance.

- Cybersecure architecture compliant with maritime data standards
- Meets all classification requirements for physical and digital safety
- Designed for operational simplicity and long-term reliability

Configure-to-Order (CTO) Process

The MPP is delivered through a structured Configure-to-Order approach.

- Fully specified and documented configurations from project start
- Reduced engineering lead time and faster delivery
- 2D/3D system visualization via Corvia's Configurator tool

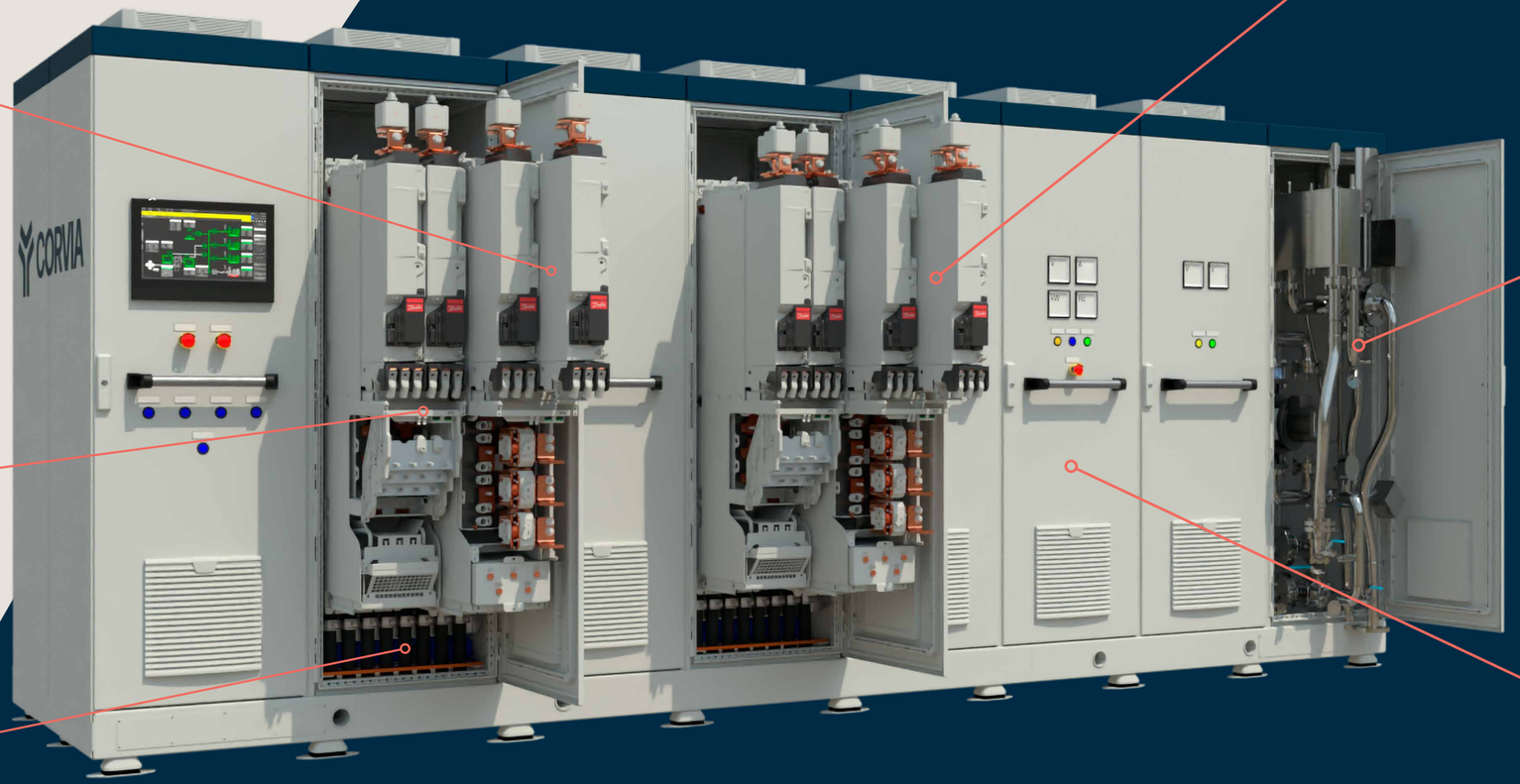
Certified & proven

All MPP systems are class-approved and validated in commercial marine applications.

- Field-proven in operational environments
- Remote FAT (Factory Acceptance Test) options reducing travel, footprint, and cost

Taken together, these characteristics define a propulsion platform engineered for reliability, scalability, and operational resilience. All MPP systems are validated and documented to meet long-term performance, safety, and compliance requirements in demanding marine applications.

MPP COMPONENTS



Compact and Modular semi-conductor power stacks.

Water cooled racks ensure compact and efficiently cooled applications.

Safe and reliable connection of various consumers and power sources.

Power stacks can be removed easily for service related tasks without draining the cooling system.

Closed circuit liquid cooing for efficient and reliable cooling of components.

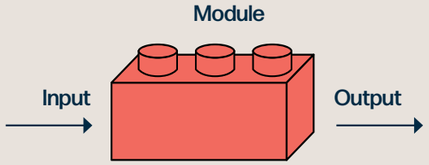
Spare sections can be added for future add-ons or client-specific functions.

How it works
The Modular Propulsion Platform (MPP)

At the core of the Modular Propulsion Platform is a smart DC power architecture designed to simplify integration and optimize vessel performance. The following overview explains the technical principles and system components that enable this modular approach.

Modularity
The Corvia modules are clearly defined and documented, explaining the available interfaces, behavior, functionality, configurability, and scalability. This ensures that the electrical integrator can tune the performance of the MPP to the required needs.

1,000 V DC grid
MPP uses a direct-current distribution grid at ~1,000 V DC. Safely within marine low-voltage standards, to reduce transmission losses.



Compact by design
Conventional electric systems with frequency-controlled e-motors typically require two major conversion steps: AC→DC rectification, then DC to variable AC (voltage and frequency) for motor speed. In multi-motor installations, these steps repeat across components, adding bulk and complexity. MPP integrates these functions into dedicated modules using next-gen power electronics to shrink the overall footprint and simplifying layouts. DC also eliminates many bulky AC filters, saving space further (see Power Quality).

Power quality & harmonic reduction
Power electronics used in AC systems introduce harmonics (THD). Class regulations typically limit allowable THD in AC systems to 5%. Without specific mitigation measures, THD levels can easily exceed this threshold. Traditional solutions include equipping active rectifiers with sine filters or using 12/24-pulse transformers in combination with passive rectifiers. However, these solutions are often large and costly. Corvia's MPP addresses this by decoupling large power electronic consumers from smaller AC consumers through the DC grid, reducing filtering requirements and delivering significant space and cost savings.

Layout efficiency & vessel optimization
The compact nature of the MPP allows greater flexibility in ship room layouts, enabling more efficient hull and cargo space design. This creates opportunities for additional optimization across the vessel. The MPP also supports seamless integration of a wide range of energy sources, buffers, and consumers within a compact DC distribution cabinet.

Integrating sources and buffers
By connecting energy sources to a common DC distribution, the MPP enables seamless integration of components with varying dynamic characteristics while maintaining load-sharing capabilities.

MPP allows the connection of various AC generator types, even those operating at different speeds or responsive levels in parallel. This is particularly beneficial for dual-fuel applications or slow-steaming configurations, such as PTO (Power Take-Off) and PTI (Power Take-In) setups. This flexibility empowers the Energy Management System (EMS) to select optimal setpoints for Internal Combustion Engine (ICE) sources, resulting in enhanced fuel efficiency.

"MPP ALLOWS THE CONNECTION OF VARIOUS AC GENERATOR TYPES, EVEN THOSE OPERATING AT DIFFERENT SPEEDS OR RESPONSIVE LEVELS IN PARALLEL."

The same principle applies to battery systems, fuel cells, and other renewable energy sources or buffers. Many of these are inherently DC-based and can be easily integrated into the MPP's DC distribution using smart module configurations.

Consumers
In most MPP configurations, the largest energy consumers are propulsion motors. Dedicated motor drive modules safely control and protect both permanent magnet (PM) and asynchronous motors by converting DC power into a precisely controlled AC voltage and frequency.

This enables precise control of:
- Main propulsion motors
- Bow and stern thrusters
- Pumps
- PTI shaft motors

... and more

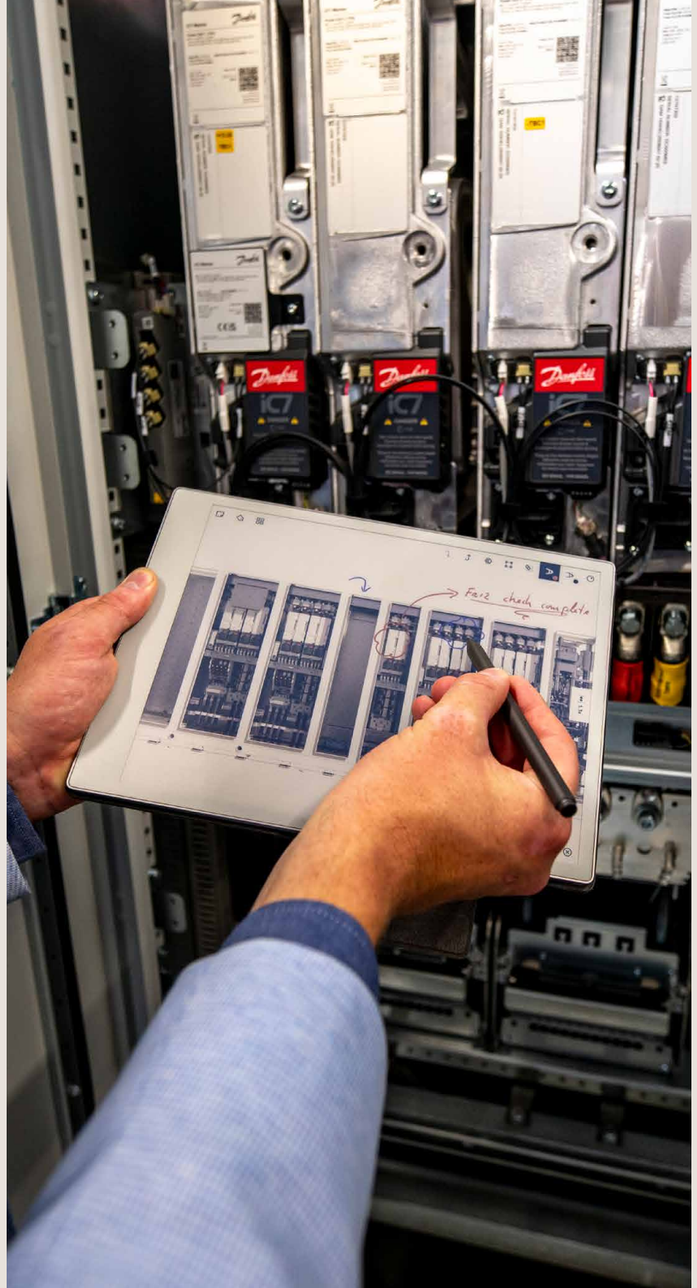
>>

“WITH ITS MODULAR ARCHITECTURE, THE MPP ENABLES CUSTOMIZABLE CONFIGURATIONS THAT ADDRESS THE EVOLVING CHALLENGES OF MODERN SHIP DESIGN.”

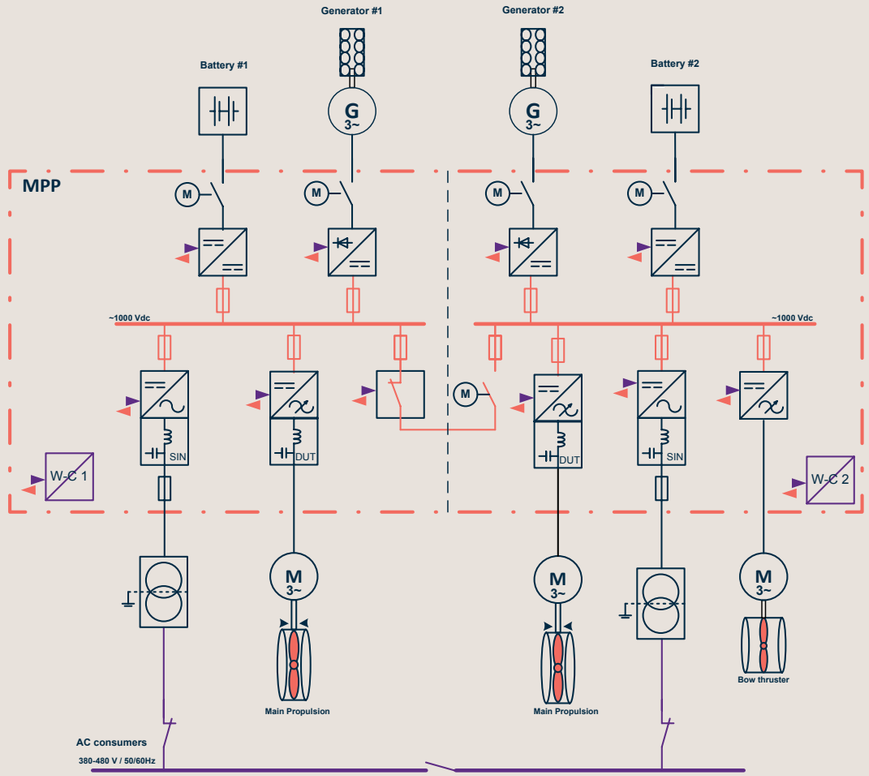
Other typical consumers include microgrid (µGrid) solutions, which convert DC into a safe and usable AC voltage for onboard systems. Output voltage can be tailored to the vessel’s requirements, with common configurations including 3-phase 400V, 440V, or 480V AC distributions.

Large DC consumers, such as deck cranes, can also be connected directly to the MPP through protected DC interfaces, reducing integration complexity.

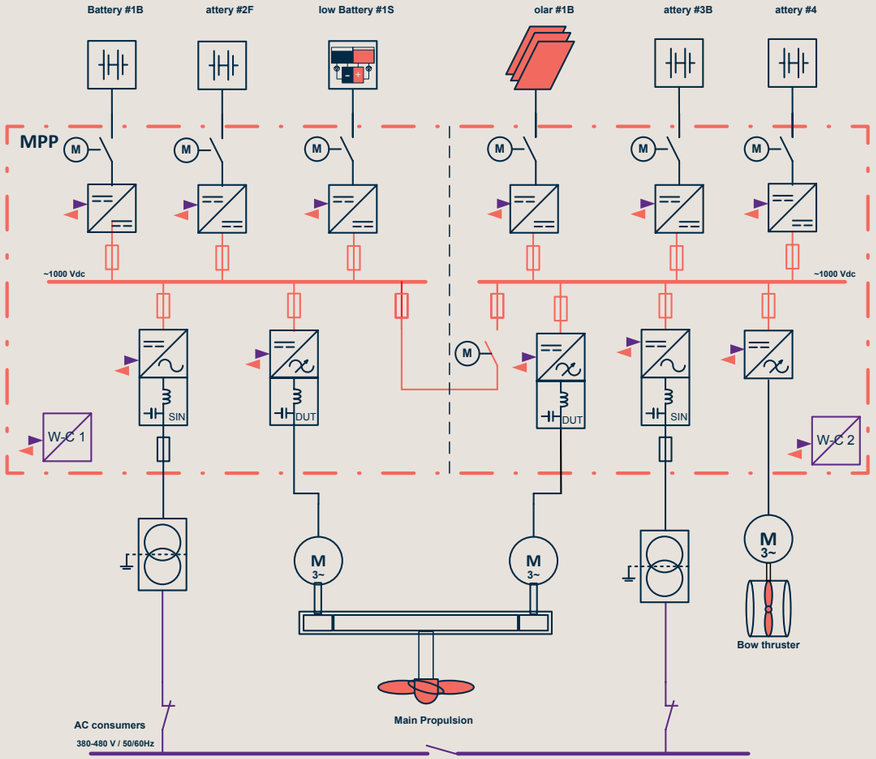
With its modular architecture, the MPP enables customizable configurations that address the evolving challenges of modern ship design. Whether integrating divers energy sources or managing complex consumer loads, the MPP provides a compact, efficient, and scalable solution for marine power systems.



Typical MPP configurations

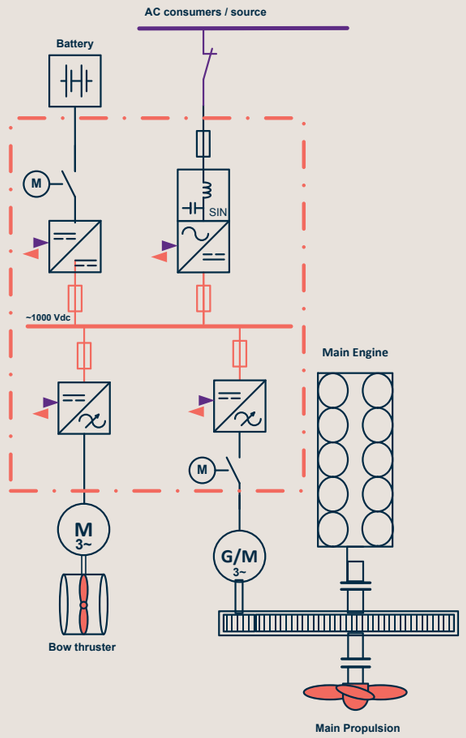


1. Hybrid electric:
In hybrid electric configurations, energy storage solutions can be combined with conventional internal combustion engines. Typical layouts can consist of highly efficient diesel engines combined with battery packs providing various fuel saving options.



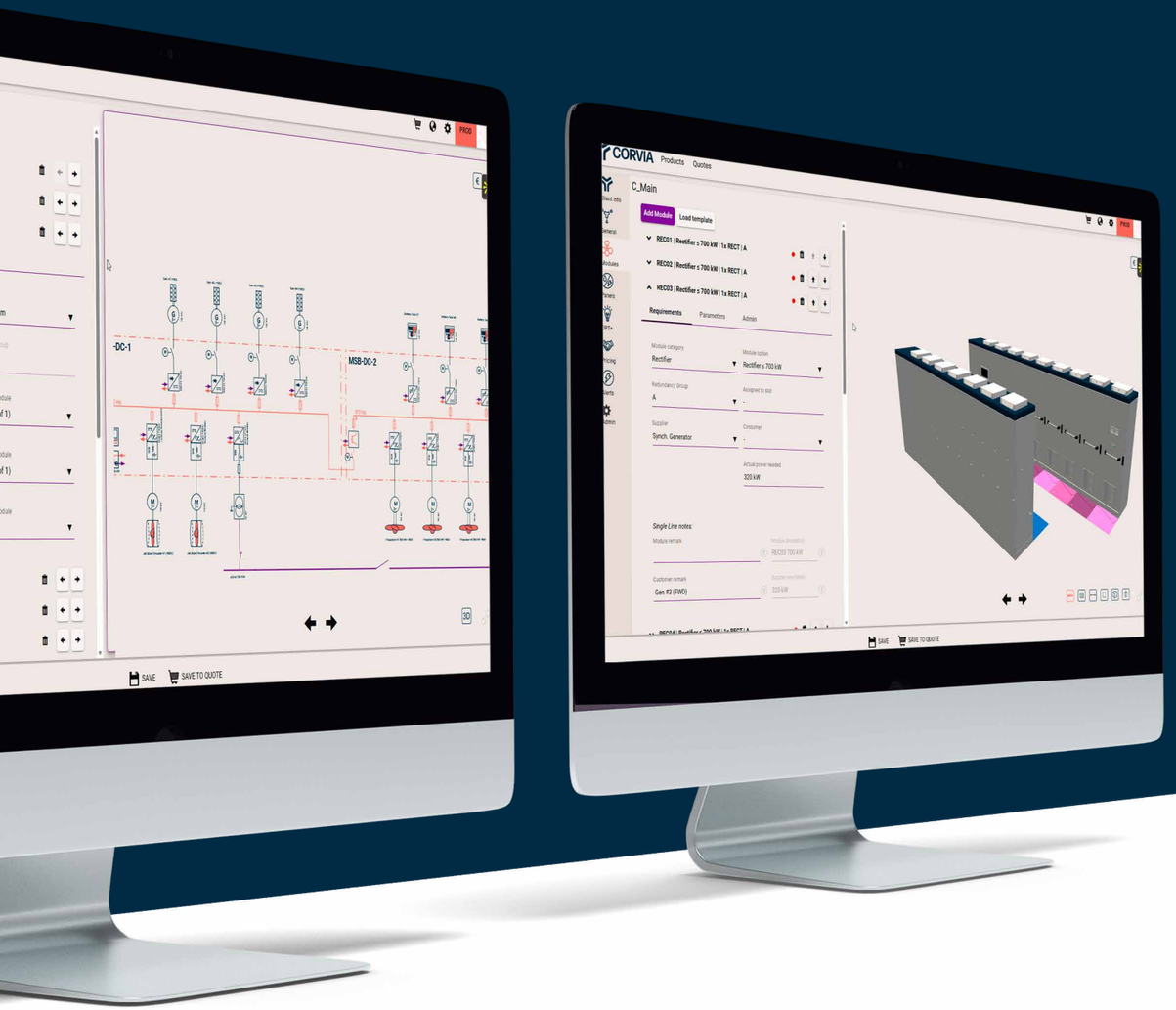
2. Full electric:

Full electric propulsion solutions are essential for reaching true zero emission shipping. Using renewable energy sources with onboard MPP modules, Corvia can provide full-electric solutions.



3. PTO/PTI / hybrid propulsion:

PTO/PTI systems enhance vessel efficiency and flexibility by enabling hybrid propulsion. In PTO mode, the main engine powers onboard systems, reducing reliance on auxiliary generators, and saving fuel. In PTI mode, electric power assists or replaces the main engine, ideal for low-speed operations, slow-steaming, silent cruising, or redundancy. The MPP allows easy integration of bow thrusters or battery systems to optimize usability.



The Configurator
Smarter design in minutes

The Corvia Configurator transforms how propulsion systems are designed.

Designing a propulsion system traditionally involves lengthy engineering cycles, multiple revisions, and complex coordination between shipowners, designers, shipyards, and suppliers. The Corvia Configurator streamlines this entire process by translating complex propulsion concepts into clear, configurable solutions.

Working closely together with clients, Corvia specialists use the Configurator to explore propulsion layouts, visualize configurations in 2D and 3D, and instantly generate detailed technical specifications. This collaborative approach allows stakeholders to evaluate multiple design scenarios early in the process, making it easier to balance performance, efficiency, and operational requirements while gaining clear visual insight into the proposed solution.

By combining intuitive design tools with proven modular technology, the Configurator reduces uncertainty and accelerates decision-making throughout the entire project lifecycle. Teams collaborate more efficiently, engineering timelines are shortened, and projects move from concept to implementation with greater confidence. In an industry where efficiency, clarity, and adaptability are becoming essential, the Corvia Configurator sets a new standard for propulsion design: faster, smarter, more transparant.

“BY COMBINING INTUITIVE DESIGN TOOLS WITH PROVEN MODULAR TECHNOLOGY, THE CONFIGURATOR REDUCES UNCERTAINTY AND ACCELERATES DECISION-MAKING THROUGHOUT THE ENTIRE PROJECT LIFECYCLE. ”

The people powering maritime innovation

Behind every Modular Propulsion Platform stands a growing team of engineers and specialists committed to advancing maritime power systems. As Corvia continues to expand, strengthening technical expertise and international collaboration remains a key priority.

2025 marks an important milestone with the formation of Corvia's Romanian team. This motivated and highly skilled group works in close cooperation with colleagues in the Netherlands, contributing to system development, engineering, and innovation initiatives. Together, the teams combine deep maritime experience with fresh perspectives, reinforcing Corvia's ability to deliver scalable and future-ready propulsion solutions.

By investing in people, knowledge and collaboration, Corvia continues to build a strong foundation for long-term growth and technological leadership in the maritime energy transition.

Building the future together.

Built on experience

Designed for what's next

For more than a century, Eekels Technology has been a trusted partner in the industrial and maritime sectors. From early electrical installations to advanced hybrid and electric propulsion systems, the company has continuously evolved in step with technological progress and societal demands.

The Modular Propulsion Platform reflects this legacy. It translates decades of engineering expertise into a scalable propulsion architecture designed to meet the challenges of modern shipping. Each MPP installed represents a concrete step toward lower emissions, higher efficiency, and long-term operational resilience.

Sustainability in maritime operations must be practical, scalable, and technically robust.

Through modular design, integration expertise, and continuous innovation, Eekels and Corvia are shaping propulsion systems that evolve alongside the vessels they power.

Change in shipping does not happen by chance. It is engineered, implemented, and refined over time. With every vessel configured and delivered, the transition toward cleaner and more adaptable maritime power moves forward.

Our milestones

EVE era
1976 - 2017

First (analog) frequency drive product (EVE) in operation. 1976

First view of the newest Danfoss Hardware, later known as iC7. 2017

Marpower era
2018 - Now

Eekels / Marpower becomes one of the first liscensed partners to apply for pilot projects using iC7. 2019

First ship launched with the MPP. 2022

2020

Introduction of the **MPP**

Launch of the Corvia brand with a dedicated Sales, Product management and Production line for the MPP. 2025

Corvia era
2025 - Now

Leading the way in sustainable shipping.

Ready to future-proof your fleet?

Let's design the propulsion system that powers your next generation of vessels.

CORVIA

Corvia by Eekels Technology B.V.
Kolham - The Netherlands - info@corvia.eu - **www.corvia.eu**