Manta Marine Technologies

The complete guide to ship side Shore Power solutions

Your turnkey Shore Power provider

We at Manta Marine Technologies believe that a single partner, taking responsibility for the complete process, from initial design phase, through installation and ongoing technical support, is the best choice for any vessel owners and operators.

We provide comprehensive, turnkey retrofit solutions for all vessel types, fully compliant with the IEC 80005 series as well as all relevant class society guidelines and requirements. Our multidisciplinary expertise spans electrical, mechanical, and naval architecture engineering, as well as project management and installation.

We offer flexible collaboration models based on the shipowner's preferred execution method:

- Full Turnkey Solution: Including installation, steelwork (welding and cutting), room construction or modification, cable pulling, and tray/ladder installation.
- Key Equipment Supply & System Responsibility: Delivery of core components and system design while collaborating with the shipowner or shipyard for installation activities.

Manta Marine provides comprehensive in-house expertise across all key technical disciplines, including: Electrical Systems, Automation, Mechanical Engineering, Naval Architecture & Design, Project management, Installation, Steel Fabrication and Cable Works.

With our fully staffed and highly experienced teams, all required competencies are handled internally - eliminating the need for additional suppliers or subcontractors

System and design flexibility

We make it (retro)fit

A retrofit Shore Power installation often comes with various boundries, such as space constraints on any given vessel.

This has never been a show stopper for Manta Marine. Our flexibility in design enables us to fit a Shore Power system on any vessel.

From mid-ship designs on chemical tankers to for purpose built intake cabinets on RoRo/RoPax vessels without taking away crucial freight space, we will find a way.

The first stage of project planning includes a visit to the vessel in question. Our engineers will find a suitable space for key equipment like intake rooms and HV switchboard and transformer. Sometimes an exisiting room on a vessel can be repurposed. Other times, a brand new room needs to be built, as seen below, without taking away freight space onboard.

For this RoRo customer, we constructed a dedicated intake room - no freight space lost.

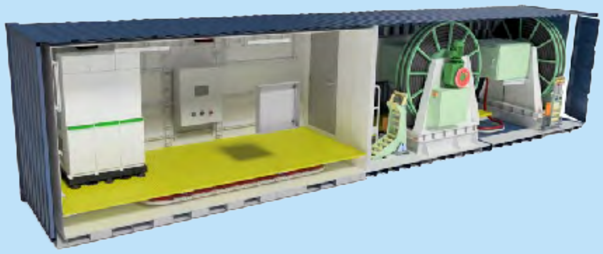
Container ship solutions

Container vessels come with one major question in the beginning of a shore power installation process:

Containerised or fixed installation?

"A containerised solution usually permanently takes the space of a container, hence crucial freight space", says our Head of Marine Electrification and Technical Director, Christoffer Ahlström, in Riviera Maritime Media.

We at Manta Marine Technologies thus believe that a fixed installation of equipment is favourable for shipowners, but can naturally deliver any of the two possible solutions, depending on the vessel owner's preference.



Depicted here, a fully equipped 40ft container including cable managment. One of many possible MMT designs.

Newbuilds

Manta can also assist with a full scope turnkey service for Onshore Power Supply (OPS) installations on newbuild vessels.

Our flexibility allows us to provide the design, electrical components and/or automation system.

Depending on the vessel owner's wishes and requirements, the installation can be executed by our experienced experts or the partnering yard.

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System and design flexibility

Turning experience into a more efficient installation process

The primary objective of any port call is efficient cargo operations; therefore, the time spent on OPS cable connection and system start-up should be minimised. Experience from previous installations has enabled us to continuously refine both our system design and installation process, ensuring the solution is as crew-friendly and efficient as possible.

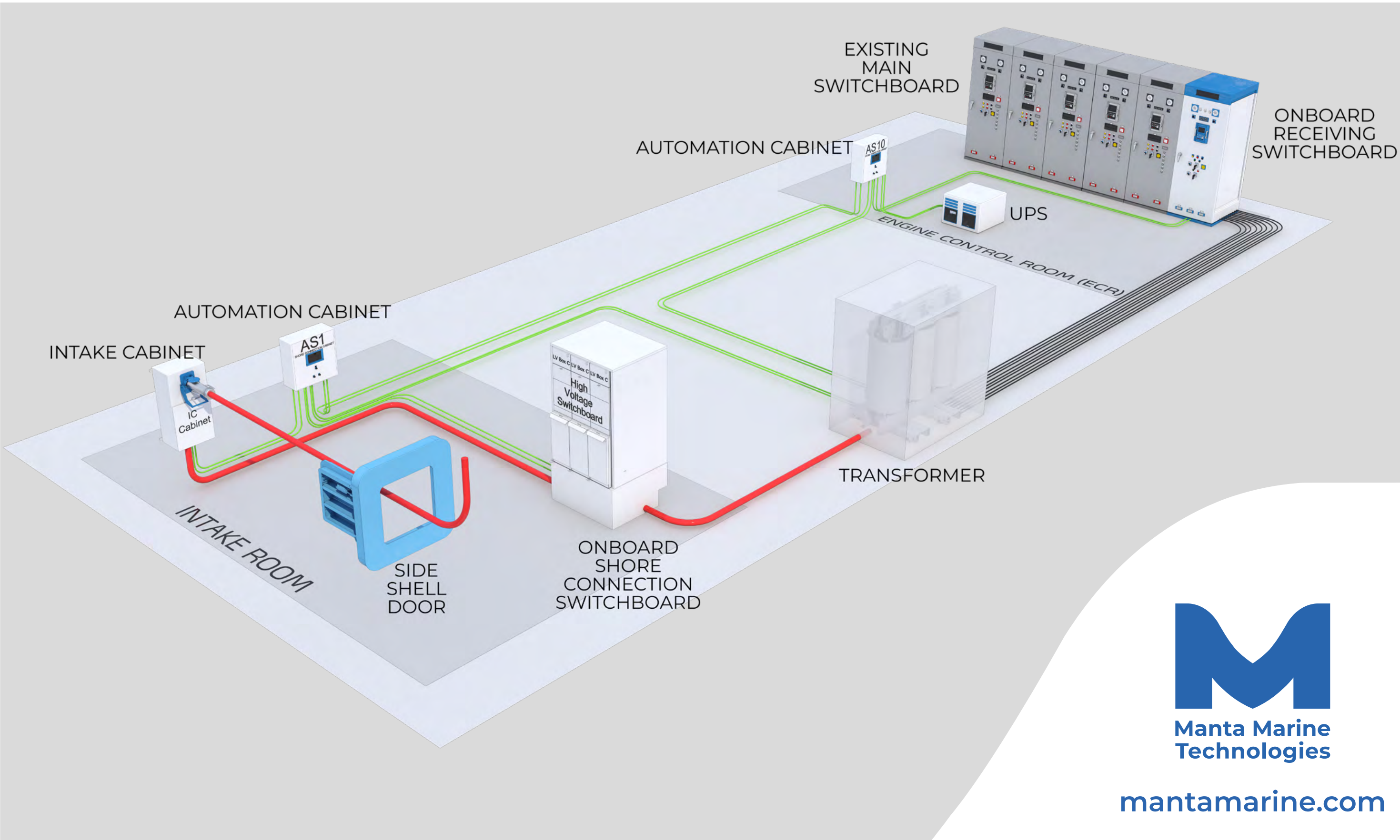
Our objective is to complete as much as possible of the installation during regular operations - reducing the need for offhire. Due to the technical nature of a main switchboard retrofit, a partial blackout is required. Through close coordination with the crew, we have previously reduced blackout durations to as little as four hours, ensuring minimal impact on the power supply.

High- and low-voltage

High-Voltage (HV) Systems (typically **6.6 kV or 11 kV**) are designed for large vessels such as **RoRo, RoPax, PCTC, container, and chemical tanker ships**, which have high onboard power demands (1–10 MW+). These systems usually include **step-down transformers, HV switchgear, and automated safety interlocks.**

Low-Voltage (LV) Systems (typically **400–690 V**) are ideal for **smaller vessels** with power requirements below 1 MW. LV solutions offer a simpler, more cost-effective alternative for ships with moderate energy demands.

Below is a schematic representation of MMT's key electrical equipment for ship-side OPS



Post-Installation Testing

After completion, we perform thorough testing post-installation to verify system integrity, safety, and functionality. All tests follow IEC standards and are witnessed by authorized personnel.

These tests include:

1. Visual Inspection, which verifies that the installation is correct and free from physical damage.
2. High-voltage (HV) switchgear testing, conducted at the supplier's factory in accordance with IEC 62271-200, to confirm operational reliability.
3. HV cable voltage testing, performed according to IEC 60502-2, to assess insulation quality and dielectric strength.
4. Insulation resistance measurement, which ensures that insulation materials maintain integrity and prevent leakage.
5. Bonding resistance testing, used to confirm effective grounding and equipotential bonding across the system.
6. Protection device functional testing, which validates that devices are correctly configured and respond appropriately to fault conditions.
7. Interlocking System testing, ensuring that safety interlocks operate as intended to prevent hazardous states.
8. Control system testing, which assesses the functionality of control and monitoring systems, including signal accuracy and response times.
9. Phase sequence testing, verifying that electrical phases are correctly aligned to prevent equipment damage.
10. Cable Management System testing, if applicable, to ensure proper routing, organization, and mechanical protection of cables.
11. Emergency stop testing, which confirms that the system can be safely and immediately shut down in critical situations
12. Integration testing, verifying coordination between shore-side and ship-side systems, including power distribution, alarms, and control interfaces.

All testing follows IEC standards specific to each component: IEC 62271-200 for HV switchgear, IEC 60502-2/3 for HV cables, and other relevant IEC standards based on system voltage and configuration.

ShorePower

Technical Standards Responsibility

As IEC working group member, we don't just ensure regulatory compliance of our system, but we actively participate in unifying the global standards in safety and efficiency.

More specifically, we are member of the Joint Working Group 28 (JW28) within the International Electrotechnical Commission (IEC) under Technical Committee 18 (TC18). JW28 is responsible for preparing and maintaining the IEC/IEEE80005 series, which governs utility connections in ports.

In cooperation with ISO TC8/SC3 WG10 and IEEE WG HVSC, we contribute to the development of international standards that ensure the safe and efficient transfer of electrical power to ships in port.

Our participation in shaping these vital standards underlines our dedication to advancing sustainable and innovative shore-to-ship power solutions, ensuring compliance with global standards for safety and efficiency.

- IEC/IEEE 80005-1: Utility connections in port – Part 1: High Voltage Shore Connection (HVSC) Systems – General requirements.
- IEC/IEEE 80005-2: Utility connections in port – Part 2: High and low voltage shore connection systems – Data communication for monitoring and control.
- IEC/IEEE 80005-3: Utility connections in port – Part 3: Low Voltage Shore Connection (LVSC) Systems – General requirements.
- IEC/IEEE 80005-4: Utility connections in port – Part 4: DC Shore Connection (DCSC) Systems – General requirements.

Our IEC member Saman Fassa, Technical Manager for Marine Electrification, is happy to answer all your technical and regulatory questions.

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Regulation as a driving force

Monetary benefits

The financial relevance of Shore Power has grown significantly under the ambitious EU Green Deal and the European Commission's Fit for 55 package, which has included the maritime sector in the EU ETS since 2024 and introduced the FuelEU Maritime Regulation (applicable from 1 January 2025).

Within the scope of the FuelEU Maritime Regulation, connecting to Shore Power provides a cost-effective way for seagoing vessels to comply with the new greenhouse gas intensity limits.

By connecting to shore-side electricity when at berth, vessels improve their overall attained GHG intensity without relying solely on biofuels, e-fuels, or other alternative fuels.

An average vessel drawing about 6.4% * of its annual energy consumption from shore power in major EU ports will comfortably meet — and even slightly exceed — the FuelEU Maritime GHG intensity limits for the entire 2025–2029 period. **This delivers two financial benefits:**

- Complete elimination (or a very significant reduction) of FuelEU non-compliance penalties for vessels using conventional fuels
- Reduction in EU ETS allowance (EUA) costs while at berth

Moreover, the ongoing rollout of shore-power infrastructure across TEN-T core and comprehensive ports mandated by the Alternative Fuels Infrastructure Regulation (AFIR) - guarantees increasing availability year after year.

*T&E Briefing on European ports unplugged, 2025

European market leaders

With 20+ completed and 8 ongoing installations, Manta Marine Technologies has been a key player of Shore Power since 2012. We are one of the leading suppliers in the European market, particularly in the field of RoRo/RoPax and PCTC vessels.

Since actively entering this sector, we have collaboratively developed a range of solutions with our customers and continue

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What influences the ROI?

The return on investment for Shore Power is influenced by a range of practical and regulatory factors. The key factors driving Shore Power's cost effectiveness are a vessel's number of port calls, connection duration, and overall power demand - the greater the power drawn from shore, the higher the efficiency and compliance benefits. Fuel EU Maritime directly incentivises operators who reduce GHG intensity through measures such as shore connections. Utilising electricity at berth not only lowers fuel costs, but also strengthens the vessel's long-term regulatory compliance profile.

FuelEU Maritime rewards ship operators for reducing GHG intensity, with shore-side electricity (onshore power supply, OPS) being one of the most straightforward measures available. Using electricity in port not only reduces fuel expenditure but also improves the vessel's compliance balance over its entire operational lifetime, due to the 0 gCO_2e/MJ WtW stipulation for electricity drawn at berth in EU ports.

In addition, FuelEU flexibility mechanisms — such as banking and pooling — can further strengthen the business case for vessel owners operating fleets that combine low-carbon fuels with shore power use at berth. By combining the surplus compliance credits from shore power with other GHG intensity reduction measures, operators can reduce total lifetime costs and create greater room for long-term optimisation across their fleet.

Taken together, these elements make shore power one of the most mature and economically viable ways to meet FuelEU and EU ETS requirements while delivering sustainable operational savings.

We hope you enjoyed the read!

Are you still curious about Shore Power and how it could benefit your fleet?

Talk to one of our experts!

Mats Olsson
COMMERCIAL DIRECTOR

Mats has a technical background as a Naval Architect, with experiences from ship design and working at shipyards in Europe, USA and Asia. The past +25 years, he has had a stronger commercial focus with the sales of complex solutions such as SOx scrubber, RoRo ramps, Wind Assisted Propulsion, and lately Shore Power and VFD systems.

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