iMSPO – igus Mobile Shore Power Outlet: Leveraging New Technologies and Lessons Learned for Future-Proof Investments

igus INC
for
Maritime Innovator of the Year

INTRODUCTION:

igus®, headquartered in Cologne, Germany, is a global leader in motion plastics, known for its innovative cable management and energy routing solutions across industries, including maritime ports. With a strong foundation in research and over 15,000 annual product tests, igus delivers durable, high-performance components for demanding environments. One of its key innovations, the Mobile Shore Power Outlet (iMSPO), addresses major challenges in shore power implementation such as rigid infrastructure, limited vessel compatibility, and high retrofitting costs by offering a mobile, modular system that ensures 100% connection capability across berth lengths of 400 meters or more. Utilizing advanced Roller e-chain® technology, iMSPO enables safe, efficient cable routing without bulky reels, reducing installation and maintenance costs. This scalable solution supports ports in meeting zero-emission targets while enhancing operational efficiency, safety, and environmental sustainability, empowering them to transition toward cleaner, more adaptable maritime operations.

BACKGROUND:

When igus was first approached by a port customer to explore the challenges of shore power connections, it conducted a survey of existing installations and a study of current user experiences. This analysis revealed three key obstacles preventing consistent vessel connectivity, collectively referred to as **"The Connection Dilemma."**[1][2][3]

GOALS AND OBJECTIVES:

The **igus Mobile Shore Power Outlet (iMSPO)** technology was conceived to address the "connection dilemma" which defines a set of challenges inherent with existing methodology that prevents achieving the goal of 100% shore power connections.

Three main design goals for iMPSO

1. **Provide 100% connection capability today AND tomorrow with a single investment.** Connect any vessel at any point along the terminal in any configuration.

2. **Fully comply with the IEC 80005-1 standards and machinery safety directives.** All systems must be tested and certified per all applicable standards and the EU machinery directive.

3. **Integrate seamlessly into the core business of moving containers.** Connecting to Shore Power should no longer drive berthing and operational planning.

[1] Connection Dilemma Challenge 1 See Appendix
[2] Connection Dilemma Challenge 2 See Appendix
[3] Connection Dilemma Challenge 3 See Appendix

GOAL: Fostering Sustainability in Ports:

The iMSPO enables vessels to achieve 100% shore power connectivity, allowing them to shut down diesel auxiliary engines entirely while at berth. This eliminates localized emissions, significantly reduces noise pollution, and contributes to measurable improvements in air quality for surrounding port communities. By aligning with both regional and international zero-emission mandates such as CARBs at-berth regulations and the FuelEU Maritime Initiative, the iMSPO not only supports global decarbonization efforts but also ensures full regulatory compliance, positioning it as leading shore power solution for sustainable, future-ready port operations.

GOAL: Achieving Universal Shore Power Accessibility:

Traditional fixed shore power vaults often fail to provide comprehensive connection coverage due to immovable infrastructure placement. The iMSPO system's self-propelled outlets, capable of spanning distances of 400 meters and beyond, solve this issue by guaranteeing 100% connection capability across various vessel types, sizes, and berthing position.

IMPLEMENTATION AND RESOURCES:

The implementation of the igus Mobile Shore Power Outlet (iMSPO) system followed a carefully planned and structured approach, addressing the technical, logistical, and operational challenges inherent in fixed shore power systems. The development of the iMSPO is based on modular engineering designs, surveys, and close collaboration with stakeholders to achieve seamless deployment.

Methodology and Action Plan

The process began with a thorough terminal survey to evaluate site-specific constraints, including berth layouts, vessel docking zones, and existing infrastructure limitations. These assessments were crucial in tailoring the iMSPO configuration to accommodate diverse berthing positions, tidal variations, and spatial restrictions.

Timeline and Milestones

The implementation timeline was broken into key milestones:

1. Initial surveys and conceptual planning were completed within the first month, providing site-specific recommendations.

2. Engineering and production phases followed, with components rigorously tested at igus' test laboratory in Cologne to ensure compliance with international regulatory standards, including IEC 80005-1.

3. System installation occurred over a two-month window, during which mobile sockets were strategically positioned along the berth to eliminate connection dead zones.

4. The final phase involved testing and commissioning to ensure operational readiness while preparing port operators with training sessions for system use and maintenance.

Resource Requirements

The iMSPO deployment required a combination of technological, financial, and human resources. Technological resources included the Roller e-chain® systems, corrosion-resistant components, and flexible modular designs tailored to port-specific needs. Financial resources were optimized by eliminating fixed shore power constructions and trenching, reducing installation costs by up to 30 percent compared to traditional shore power infrastructure. Human resources were deployed to oversee surveys, installations, and training programs, ensuring port operators could manage the system efficiently upon commissioning. Through this detailed methodology and resource allocation, the iMSPO offers a scalable system that modernizes port operations while ensuring long-term efficiency, cost savings, and environmental benefits.

EFFECTIVENESS

The **igus® Mobile Shore Power Outlet (iMSPO®)** system demonstrates outstanding effectiveness in overcoming the limitations of traditional fixed shore power outlet infrastructure. Designed to meet the evolving demands of global ports, the iMSPO delivers measurable improvements in operational flexibility and efficiency safety, and sustainability.

Key Achievements:

1. **100% Connection Capability**
   The iMSPO ensures **100% connectivity** for vessels of any size or configuration, regardless of their position along the berth. With a service range of over **400 meters**, the system eliminates the need for multiple fixed outlets and adapts seamlessly to changing berthing configurations.

2. **Safety, Compliance, Certifications**
   Fully compliant with **IEC 80005-1** standards, the iMSPO ensures global interoperability with other systems and has been **third-party tested and certified** by the ABB Laboratory achieving thermal, arc flash & short circuit certifications. The system has also been **fully certified by DNV** and is **fully compliant with the EU Machinery Directive.**

3. **Seamless Terminal Integration**
   The system was designed to have **minimal impact on the terminal and loading operations**. Quay face mounted systems provide **zero terminal footprint** preventing the addition of obstructions in the work area and provide the perfect alignment for every connection **making the process repeatable and predictable**.

4. **Operational Efficiency**
   The flexibility of the system **relieves the operations team from the burden of planning berthing arrangements around shore power connections.** This provides flexibility and immediate adaptability to the ever-changing conditions within todays modern port. The system enables **fast, simple and safe and ergonomic connections and disconnections in under 15 minutes** using just two operators. This streamlined process reduces vessel turnaround time and minimizes labor demands, contributing to improved terminal throughput.

5. **Sustainability and Cost Savings**
   By replacing multiple fixed installations with a single mobile unit, ports can significantly reduce **capital expenditure**, **maintenance costs**, and **installation complexity**. The iMSPO supports global decarbonization goals by enabling more vessels to connect to shore power, reducing emissions from auxiliary engines.

INNOVATION

The **igus® Mobile Shore Power Outlet (iMSPO®)** redefines maritime electrification through a revolutionary mobile design that brings shore power directly to the vessel rather than requiring vessels to align with fixed outlets. This paradigm shift exemplifies transformative engineering providing unprecedented adaptability, enhanced safety, and operational efficiency that redefines the future of modern port infrastructure.

Key Innovations:

1. **Disruptive Technology: First-of-Its-Kind Mobile Shore Power System**
   The iMSPO is the **world's first mobile shore power connection system** capable of providing flexible connections to **over 400 meters of berth with a single system.** The system provides a land side outlet **at any point along the terminal enabling any vessel of any size at any berthing location whether moored to port or starboard** to connect.

2. **Adjacent iMSPO System "Overlapping" Capability**
   Adjacent iMSPO systems can be designed to overlap each other providing additional flexibility to ensure connections in high density berthing arrangements with dissimilar size vessels. This allows terminals with long quays to remove the 1:1 berth to vessel alignment and increase productivity by allowing almost infinite berthing arrangements while still connecting to shore power.

3. **Modular, Self-Propelled Design**
   The iMSPO features a **self-propelled trolley** with pendant control, allowing precise positioning along the quay. Its **modular architecture** supports future scalability and adaptation to evolving port layouts.

4. **HMI Guided Operation**[4]
   The Human Machine Interface (HMI) offers **real time system status, step by step visual guidance for all operating steps and trouble shooting** from the display on the socket box carriage. This screen also provides a graphical display **showing the location and status of each safety mechanism** providing clear situational awareness for the operator.

5. **Patented Engineering Excellence**
   The iMSPO incorporates **multiple patented technologies**, including innovations in mobile socket deployment, energy chain routing, and safety interlocking systems. These patents underscore igus' leadership in reengineering shore power delivery.

6. **Award-Winning Recognition**
   The iMSPO was honored with the **"Port Innovation of the Year"** award at the **Electric & Hybrid Marine Expo Europe 2024**, validating its impact on port electrification and sustainability.

   Electric & Hybrid Marine Expo Europe 2024 Award for Ports & Harbor Innovation of the year (link)

   World's first mobile shore power connection arrives at the Port of Hamburg

IMPACT

The **igus® Mobile Shore Power Outlet (iMSPO®)** delivers both immediate and enduring value to ports and terminals, offering a scalable, sustainable, and cost-effective solution for shore power connectivity. Its design supports rapid deployment and long-term adaptability, making it a strategic investment for ports seeking to modernize operations and meet environmental mandates.

Short-Term Impact: Immediate Operational Gains

1. **Plug-and-Play Deployment**: The iMSPO is a **ready-to-implement solution** for both greenfield and brownfield terminals. Its **modular design** can be configured based on the operational criteria and space limitations of the port or terminal.

2. **Universal Vessel Access**: With a **400-meter range**, the iMSPO ensures **100% connectivity** for vessels of varying sizes and berthing positions, eliminating delays caused by fixed infrastructure limitations.

3. **Faster Turnaround**: Ships can connect to shore power in **under 15 minutes** with just two operators, reducing idle time and improving berth utilization.

4. **Improved Worker Safety**: The ergonomic, remote-controlled system minimizes manual cable handling and exposure to medium-voltage components, enhancing occupational safety.

[4] Illustration iMSPO HMI Interface See Appendix

5. **Emission Reductions from Day One**: By enabling immediate shutdown of onboard diesel generators, the iMSPO helps ports cut **NOx, SOx, PM, and CO_2 emissions**, contributing to cleaner air and compliance with local environmental regulations.

Long-Term Impact: Future-Proof Sustainability and ROI

1. **One-Time Investment, Lasting Value**: A single iMSPO unit can replace multiple fixed outlets, significantly reducing **capital expenditure**, **maintenance costs**, and **infrastructure complexity** over its estimated **20-year service life.**

2. **Adaptability to Future Growth**: The system is designed to scale with increasing vessel sizes and evolving power demands, ensuring long-term relevance and avoiding costly retrofits.

3. **Sustainability Leadership**: The iMSPO supports port decarbonization strategies by facilitating widespread shore power adoption, helping ports meet **"Zero Emission"** goals and improve **urban air quality.**

4. **Circular Economy Contribution**: Components such as the **igus® energy chains** are recyclable through the **igus® chainge® program**, reinforcing the system's environmental credentials.

The iMSPO is not just a technical solution, it's a catalyst for cleaner, smarter, and more resilient port operations. Its dual impact across short-term efficiency and long-term sustainability provides measurable benefits for port operations and port resiliency strategies.

INTEGRATION:

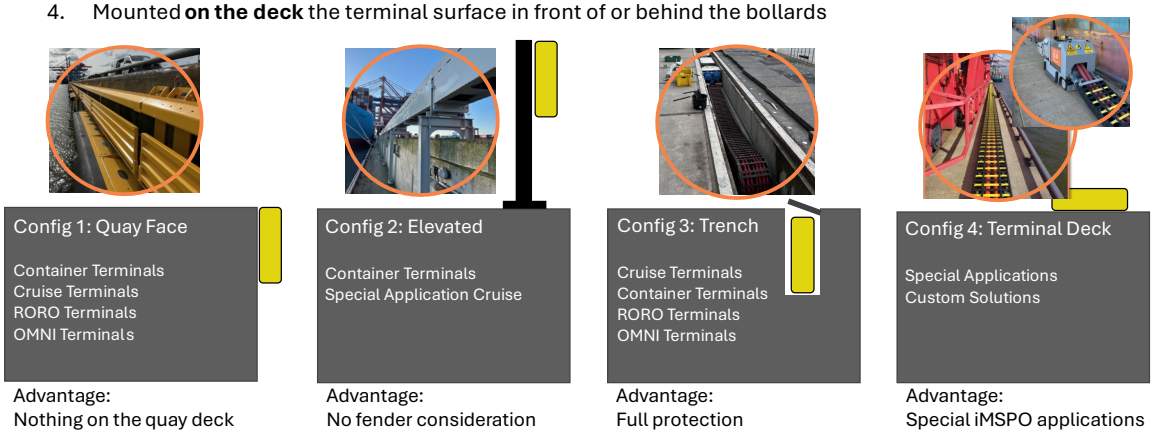
The **igus® Mobile Shore Power Outlet (iMSPO®)** system is engineered for seamless integration into diverse port environments and workflows, ensuring minimal disruption and maximum compatibility with existing infrastructure and operations.

Civil Works Integration

1. The iMSPO's **modular and flexible design** allows installation in a variety of configurations: **quay face-mounted**, **elevated on columns,** installed **within a trench as well as special adaptations** can be implemented to suit the physical and operational needs of each terminal. It was designed to be retrofittable into brown field projects and easily integrated into greenfield designs.

iMSPO® is Modular & Configurable to Solve Many Challenges

1. Mounted on the **face of the quay** wall above the fenders
2. Mounted **on a custom steel structure** to use the dead space on the terminal
3. Installed **inside a trench** in the terminal
4. Mounted **on the deck** the terminal surface in front of or behind the bollards



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2. Because the iMPSO only has one outlet and therefore only needs one set of cables, **trenching and in ground cable installation is minimized**. Also, there is no need for major construction digging on the quay to install reinforced vaults in the quay structure of cargo terminals. The **iMSPO system is essentially a bolt-on solution** that is minimally invasive to the structure of the quay.[5]

3. In the cruise configuration, the iMSPO socket system is installed within a recessed trench, enabling a fully landscape-integrated deployment. As demonstrated at the Port of Rotterdam, this design ensures continuous passenger flow and cargo operations during mobile shore power delivery as the iMSPO socket activates and pivots into position only at the vessel's connection point to maintain optimal terminal functionality.

Electrical Design Integration

1. The iMSPO system is **designed to the IEC 80005-1 standards** ensuring interoperability with other systems around the world. The electrical system is designed to match the individual requirements for each specific type of vessel Annex.

2. The system can be **tailored to fit seamlessly into existing architecture and processes** maintaining familiar procedure such as interlocking with physical interlocking keys or can be configured with PLC driven safety features removing the need for physical keys. The system possesses the flexibility to adapt to existing designs or can be **configured with the latest technology by request of the end user**.

[5] Illustration Construction and Equipment Savings See Appendix

3. **The iMSPO can be used to revitalize fixed shore power outlets that no longer provide the flexibility to make connections**. An existing shore power outlet vault can be reconfigured to feed an iMPSO system eliminating the need to add any additional infrastructure using the existing electrical system and "augmenting" the existing fixed shore power outlet system with additional "mobile" capability.

Maintenance Program Integration

1. Built with **igus® energy chain systems**, the iMSPO offers **low-maintenance, high-durability performance**, with e-chain® components rated for over **10 million cycles**. The system has been successfully cycle-tested beyond the projected lifetime of 20 years without breakdown.

2. The design philosophy emphasizes **robustness and minimalism** to ensure reliable functionality and long service life, even under demanding conditions. The system's **modular architecture** simplifies part replacement and upgrades, reducing downtime and lifecycle costs. **A "piggyback" (removable) maintenance platform is provided with every system** to provide easy access for inspections or any maintenance work that needs to be performed.[6]

3. **Predictive maintenance capabilities** can be integrated via optional sensors and monitoring tools, enhancing reliability and service planning. **Real time system monitoring and feedback are accessible from the HMI** on the operator's station on the socket carriage.

Workforce Integration

1. The iMSPO is designed with **operator ergonomics and safety** in mind. Its **pendant-controlled interface** and **simplified cable handling** reduce physical strain and exposure to medium-voltage components.

2. Training requirements are minimal, with most operators able to become proficient within a **single shift**. Standard operating procedures are also developed to provide further integration into the mooring or berthing procedure.

3. **Collaboration with port authorities, port operators and labor representatives** during the development and design phase also ensure alignment with local workforce practices and safety protocols.

The iMSPO's strategic integration across infrastructure, operational processes and workforce safety exemplifies a holistic approach to modern port electrification. By enhancing efficiency without disrupting established workflows or adding another layer of "workaround" technologies, the iMSPO stands out as a scalable and transformative solution for ports globally towards zero emission goals.

[6] Illustration Maintenance and Installation Platform See Appendix

ADAPTABILITY AND SCALABILITY

The **igus® Mobile Shore Power Outlet (iMSPO®)** is a future-ready solution engineered to meet the evolving needs of global ports. Its modular, mobile design allows for seamless adaptation to a wide range of port configurations, vessel types, and operational strategies, making it a truly scalable and financially sound investment.

The iMSPO Concept is Adaptable for all Vessel Types

The iMSPO system can be configured to **provide different configurations for each of the individual requirements for different vessel types**. Solutions for container vessels, cruise vessels and RORO vessels have already been implemented. Expanding the product line to tankers, bulkers and PSVs is on the development roadmap. **Different cable sizes and configurations as well as different voltage requirements can all be serviced from the same platform.** 11kV, 6.6kV, as well as low voltage configurations can all be handled with modular components from igus.

The iMPSO System is Adaptable to Support Omni Terminal Operations

In an Omni Terminal environment requires the ability to service both cargo/container and RORO vessels which require different electrical systems. Cargo/container vessels require a 6.6kV system with two cables, while a RORO vessel requires an 11kV connection with one cable. They have different plug requirements and are physically incompatible with each other. The iMPSO can provide both connection systems onboard a single socket carriage to provide flexible connection capability for both types of vessels within a single system. [7]

iMSPO Provides Scalability

1. The iMSPO system can be deployed as a simple single berth solution or scaled into a complex multi-zone overlapping system that can handle even the most complex berthing density schemes. System configurations can be realized that are capable of servicing complex arrangements of different size vessels providing 100% connection capability for all vessels.

2. Because of the modularity of the system and bolt-on style design, the system can be deployed and then removed and redeployed after berth enhancement construction has been made.

The iMSPO empowers ports to scale sustainably, adapt intelligently, and invest confidently. Its ability to evolve with the maritime industry's shifting demands makes it a cornerstone technology for the next generation of clean, efficient port operations.

RELEVANCE

The **igus® Mobile Shore Power Outlet (iMSPO®)** directly addresses critical operational and infrastructure challenges faced by ports today, offering a transformative solution

[7] Illustration Dual Voltage Socket Carriage See Appendix

that aligns with the maritime industry's top priorities for **decarbonization** and **resilience**.

Addressing Current Gaps in Shore Power Infrastructure

Since the early 2000s, when shore power was first introduced for non-military ocean-going vessels, the limitations of the original approach have become increasingly evident. While the initial design was a technical milestone, enabling vessels to connect to shore power, it lacked the flexibility and scalability required to support the dynamic needs of today's modern ports. The challenge of achieving 100% connection capability for a constantly changing mix of vessels and operations has exposed the economic inefficiencies of the legacy system.

Before the advent of the iMPSO, the ambitious goal and in some cases, regulatory requirement of connecting every vessel at every port call was practically unachievable without continuous investment and the risk of creating stranded assets. This uncertainty has slowed the adoption of shore power in non-regulated regions, where investment strategies remained unclear in the absence of a future-proof, cost-effective solution.

Removing Barriers to Shore Power Adoption

Now, with the introduction of a technology that delivers the necessary flexibility to ensure consistent vessel connectivity, the case for return on investment (ROI) is much clearer. Ports can now consider a single, strategic investment in a system designed to adapt and scale—maximizing usage and making shore power a more viable and attractive option.

The iMSPO eliminates these concerns by offering a **"one-and-done" solution** that is adaptable, scalable, and compliant with **IEC/ISO/IEEE 80005-1** standards. It empowers ports to act now without fear of obsolescence, making it a catalyst for widespread shore power implementation. In an era of **reduced federal funding**, the iMSPO offers a **sound investment strategy** with a clear return on investment of 100% connection capability with a one-time investment, making iMSPO adoption feasible even in **non-regulated or budget-constrained ports**.

Alignment with Industry Priorities

1. **Digitalization & Automation**: The system is optimized for automated operation, featuring pendant control, built-in safety interlocks, and the ability to integrate with port energy and asset management systems to support smart port initiatives.

2. **Decarbonization**: By enabling more vessels to connect to shore power quickly and reliably, the iMSPO supports immediate reductions in **CO_2, NO_x, SO_x, and PM emissions**, contributing to cleaner air initiatives and goals. and compliance regional and state requirements with CARB requirements, EPA Clean Ports Program funding and BABA compliance in the US. For EU ports, the FuelEU Maritime regulations require all container and cruise ships to connect to shore power at berth by January 1, 2030.

3. **Resilience**: The iMSPO **future-proof architecture** solves berthing arrangement misalignment issues. As shipping lines invest and retrofit vessels for shore power due to decarbonization goals and cost reduction initiatives, ports that can provide "guaranteed" shore power service have a competitive advantage. These iMSPO enabled ports ensure long-term operational relevance and avoid the risk of stranded assets.

The iMSPO is not just relevant, it is essential to decarbonization goals. It bridges the gap between today's operational realities and tomorrow's sustainability goals, offering a practical, scalable, and intelligent path forward for ports worldwide.

USER SATISFACTION

The **igus® Mobile Shore Power Outlet (iMSPO®)** has earned strong endorsements from its end users: port authorities, terminal operators, technical crews, and longshore workers by delivering a solution that is safe, ergonomic, easy to use and maintain and operationally transformative for 100% connection capability.

Proven Success at the Port of Hamburg

The **Port of Hamburg**, one of Europe's busiest and most advanced maritime hubs, was the first to implement the iMSPO over four years ago. Today, **nine iMSPO systems** operate within the Port and three elevated iMSPOs are located within the **Container Terminal Hamburg (CTH)**, providing flexible, efficient, and safe shore power connections across berth lengths of **300, 150, and 110 meters**. When measuring success, the following factors are important:

- **High Adoption Rates**: The Port of Hamburg's continued expansion of iMSPO units reflects strong user confidence and satisfaction. The Container Terminal Altenwerder (CTA) has implemented 3 systems after the success of CTH and CTB.

- **Positive Operator Feedback**: Port operators and technical crews report that the iMSPO has significantly **reduced connection times to under 10 minutes**, **improved worker safety**, and **eliminated alignment issues**.

- **Operational Efficiency**: The iMSPO's ability to move along the quay and align with any vessel position has been praised for **enhancing berth flexibility** and **minimizing disruptions** to cargo operations.

Proven Success at the Port of Rotterdam

The Port of Rotterdam is a global pioneer in maritime decarbonization, advancing clean energy solutions like green hydrogen, carbon capture, and electrified logistics to drive the transition to a climate-neutral future. They selected the iMPSO as the technology to lead their innovation for flexible energy supply to enhance the shore power operation of their cruise terminal. We have provided a video testimonial link.

- **High Adoption Rates**: After the success of the Port of Rotterdam's iMSPO cruise system, the same system was copied with (5) systems being constructed in Copenhagen and another in Sydney, Australia.

Stakeholder-Centric Design and Deployment

From concept to commissioning, igus® engaged closely with key stakeholders:

- **Port Authorities**: Collaborated on infrastructure integration and regulatory compliance. Optimize investment for 100% shore power connection goals.
- **Terminal Operators**: Provided input on operational workflows and berth configurations for integration into vessel berthing process.
- **Terminal Engineering Consultants:** Collaboration with multiple engineering firms to ensure all interfaces and system integrations were successful.
- **General Contractors**: Participated in ergonomic evaluations and hands-on training to ensure the system met safety and usability standards.
- **Installing Subcontractors:** Training and work inspections to ensure that all material and equipment was installed and commissioned properly.

This inclusive approach ensured that the iMSPO was not only technically sound but also **tailored to real-world user needs**.

Ease of Use and Training

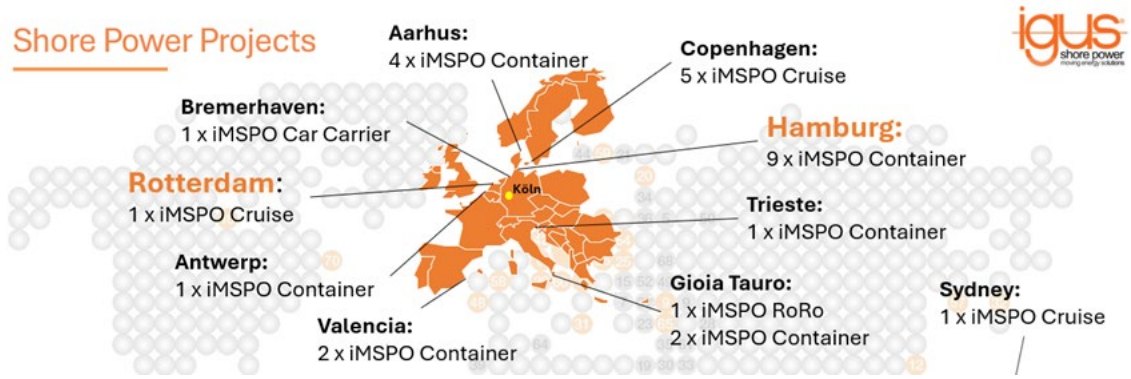
- The iMSPO system features a pendant-controlled interface and streamlined cable management, enabling safe and ergonomic operation by just two workers with minimal training.
- Most operators achieve proficiency within a single shift, significantly reducing onboarding time and boosting operator confidence.

The iMSPO's proven success at the Port of Hamburg and its expanding global adoption highlight its ability to consistently meet and exceed user expectations. By emphasizing safety, operational simplicity, and close collaboration with stakeholders, igus® has delivered a trusted, innovative solution that operators around the world rely on every day.

View a collaborative reference video between the Port of Hamburg and igus below:
Igus Mobile Shore Power at the Ports of Hamburg for Container Vessels

Global Footprint & Growing:

There are currently 28 igus Mobile Shore Power Outlet installations and projects worldwide with more to be announced in 2025 & 2026. The winning bid for the first North American installation is positioned to be announced in September 2025.



Reference flagship iMSPO installations (video links below):

Igus Mobile Shore Power at the Ports of Hamburg for Container Vessels

Igus Mobile Shore Power at Rotterdam Cruise Port

CONCLUSION:

A New Standard in Shore Power Innovation

The **igus® Mobile Shore Power Outlet (iMSPO®)** is more than an innovation, it is a paradigm shift in how ports approach electrification, sustainability, and operational resilience. By replacing the limitations of fixed shore power outlets with a **modular, mobile solution** capable of spanning up to **400 meters**, the iMSPO delivers **100% vessel connectivity**, **IEC/ISO/IEEE 80005-1 compliance**, and seamless integration into existing port workflows.

The iMSPO system directly addresses the key pressing challenges in the maritime sector:

- **Decarbonization** through immediate emissions reductions.
- **Operational efficiency** with less than 10-minute connection and disconnection times.
- **Worker safety** via ergonomic, easy to use automation-ready design.
- **Results-driven investment** through an adaptable, future-proof and streamlined infrastructure design that avoids stranded assets with little to no maintenance requirements.

The iMSPO has already demonstrated strong performance in real-world conditions. At the **Port of Hamburg,** early adoption has resulted in high user satisfaction, rapid connection and disconnection times, and a repeatable, ergonomic workflow. The system's design and deployment were shaped through active collaboration with key stakeholders including port authorities, terminal operators, and unionized labor ensuring it meets current operational demands and remains adaptable for future port requirements.

The iMSPO is engineered to overcome the limitations of fixed shore power outlet systems through a modular, flexible design that enables seamless integration across diverse port environments. With a projected service life of 20 years, it is purpose-built to meet the operational needs of today's vessels and port operations while anticipating the evolving technical requirements of tomorrow's global maritime fleet.

Looking ahead, igus® is committed to advancing the iMSPO® system through enhanced digital monitoring, smart automation, and integration with broader shipping alliances. These developments will ensure that ports remain competitive, regulatory-compliant, and aligned with global climate goals.

Why iMSPO Deserves the 2025 AAPA Lighthouse Award

The iMSPO exemplifies what the Lighthouse Award celebrates: **visionary innovation with measurable impact**. It removes traditional barriers to shore power adoption, aligns with global decarbonization goals, and empowers ports to modernize without compromise. In doing so, it sets a new benchmark for sustainable maritime infrastructure, one that is **scalable, resilient, and ready for the future**.

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APPENDIX

Figure 1 The Connection Dilemma Challenge 1 [1]

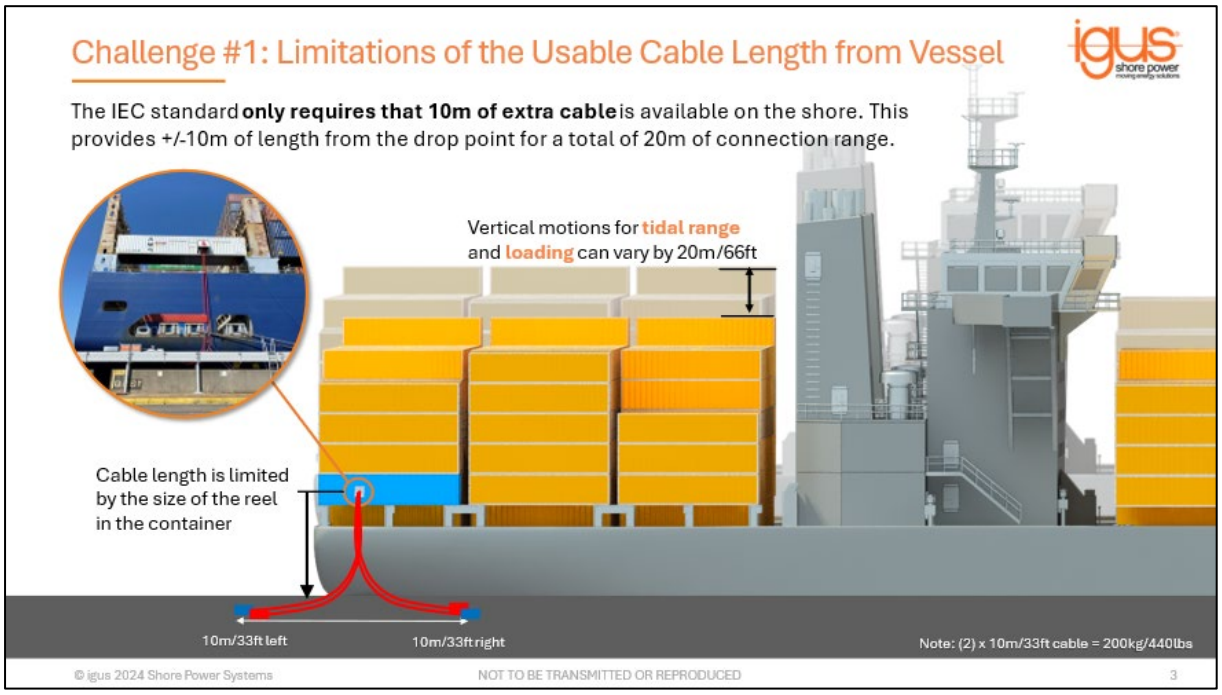

Figure 2 The Connection Dilemma Challenge 2 [2]

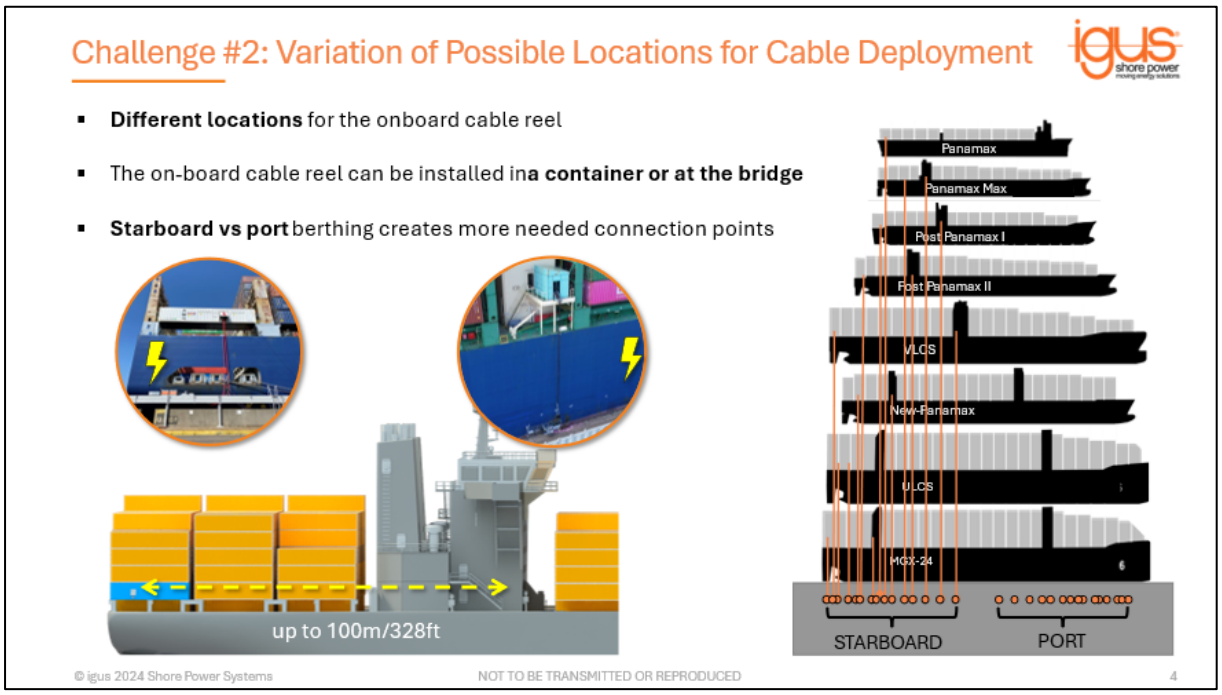

Figure 3 The Connection Dilemma Challenge 3 [3]

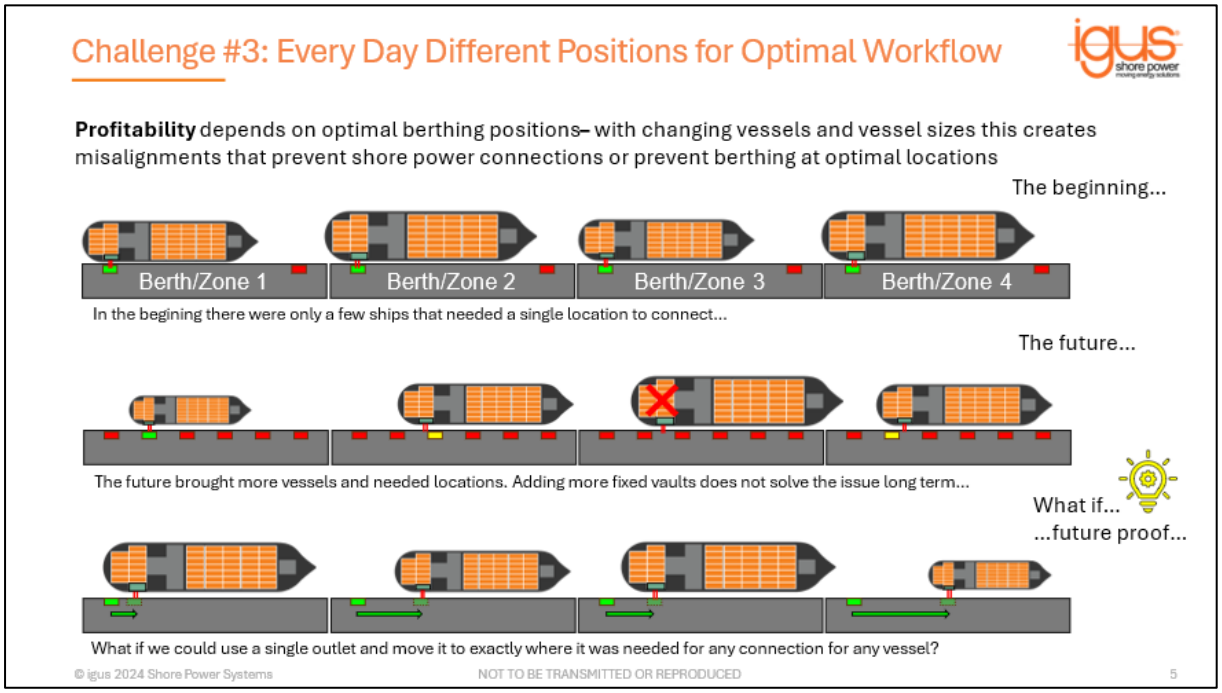

Figure 4 Illustration iMSPO HMI Interface [4]

Figure 5 Illustration Construction and Equipment Savings [5]

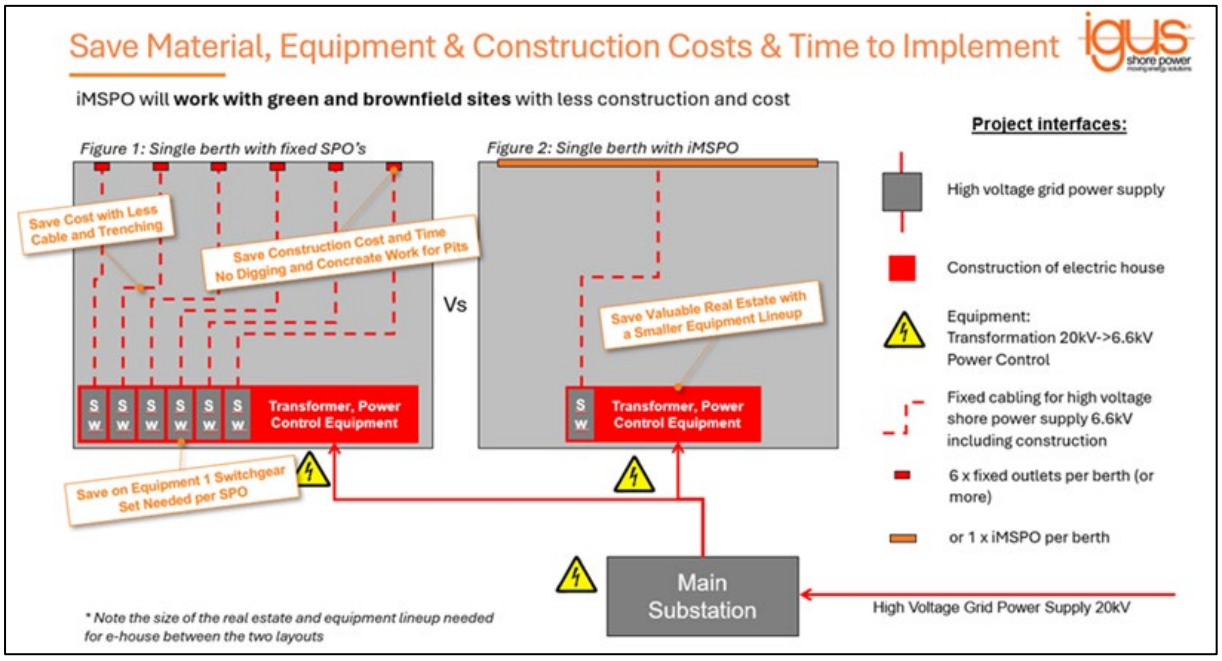

Figure 6 Illustration Maintenance and Installation Platform [6]

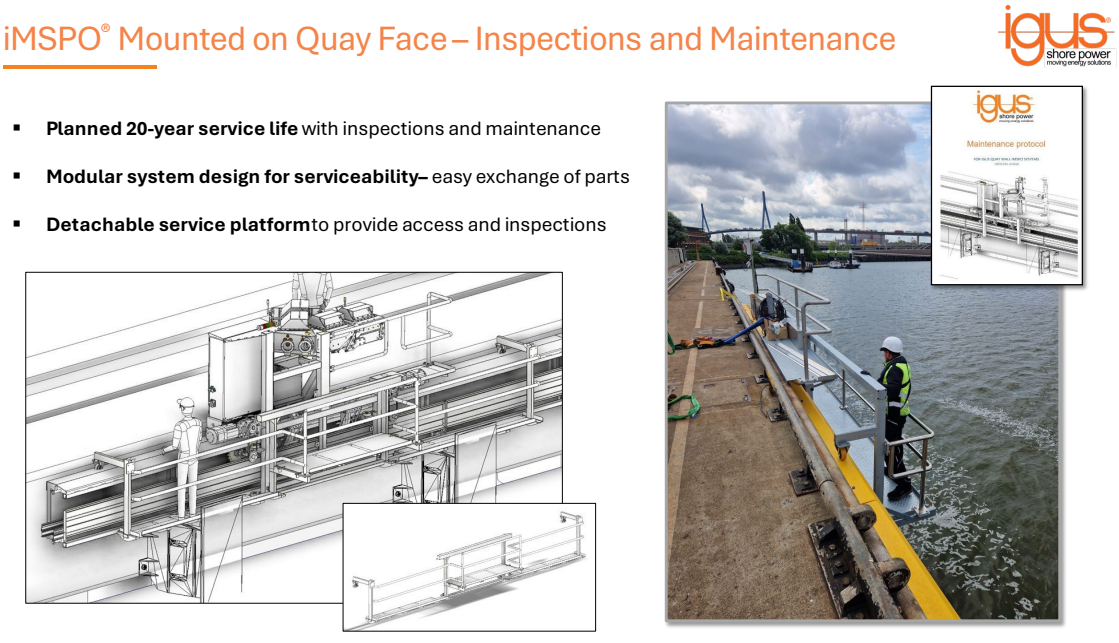

Figure 7 Illustration Dual Voltage Socket Carriage [7]