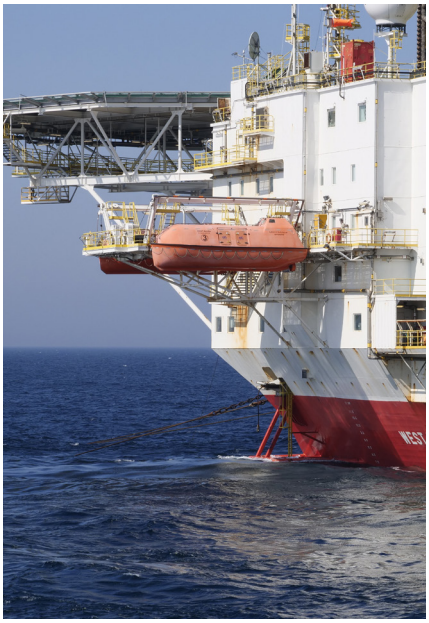
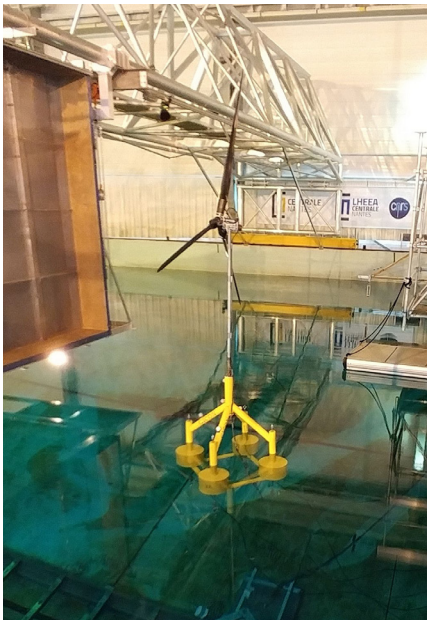
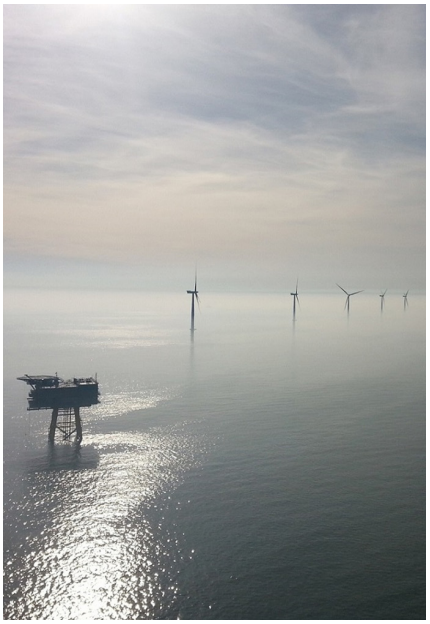
GICON®

ENGINEERING THE FUTURE

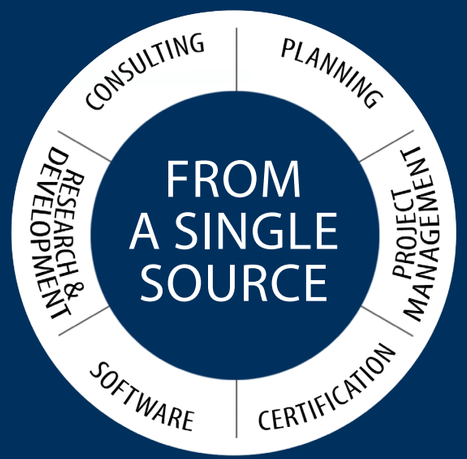






A UNIQUE SERVICE PROVIDER FOR ONSHORE & OFFSHORE WIND

ENGINEERING THE FUTURE OF WIND



> 20
Locations in Germany and offices worldwide

> 650
Employees stand for highly qualified solutions from a single source

> 100
Patents stand for the innovative power of our own green technologies

Onshore Wind Turbine Design & Optimization

- Design of on-/offshore foundations
- Design of fixed and floating substructures
- Complete design, dimensioning and specification of all components including tower and foundation
- Documentation for certification

Design evaluation

- Fully-coupled load simulation for floating and fixed offshore as well as onshore wind turbines
- Optimization of structural components and controller
- Wind park analysis

Consulting / Others

- Concepts for operation, control and safety
- Software engineering
- Support in measurement projects
- Risk assessment
- HSE analysis for offshore wind applications
- LIDAR & MetMast measurements

Certification

- Assistance during certification process
- Re-Certification (existing WT)
- Renewal of certification after design change

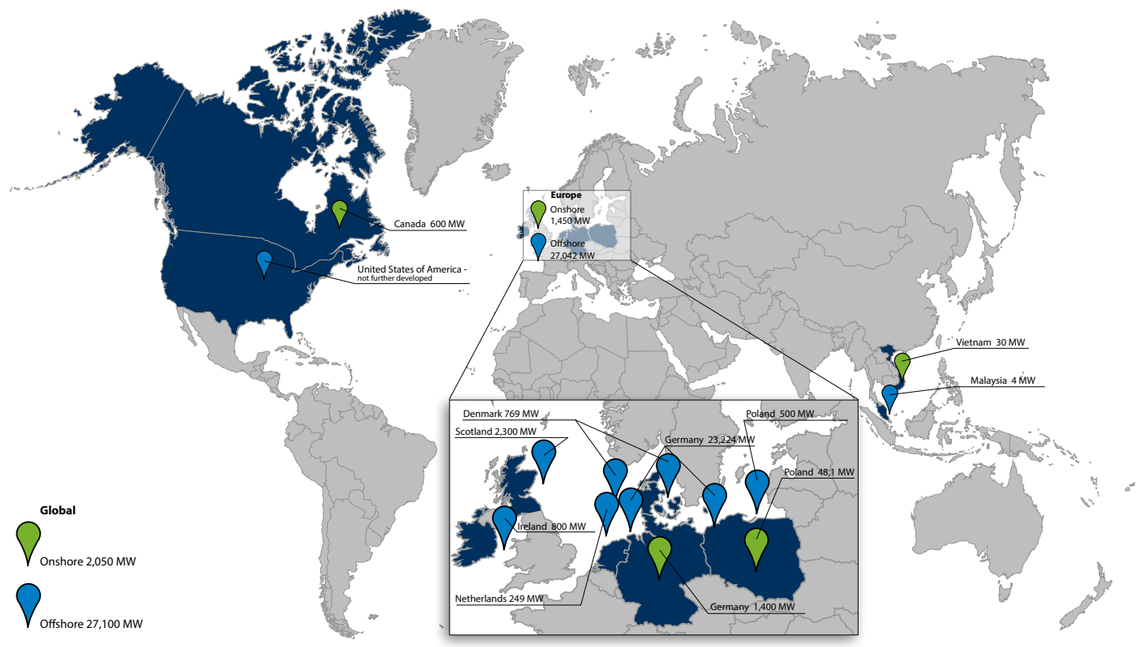
Founded in 1994 | Headquarter Dresden

Owner-managed Engineering Company

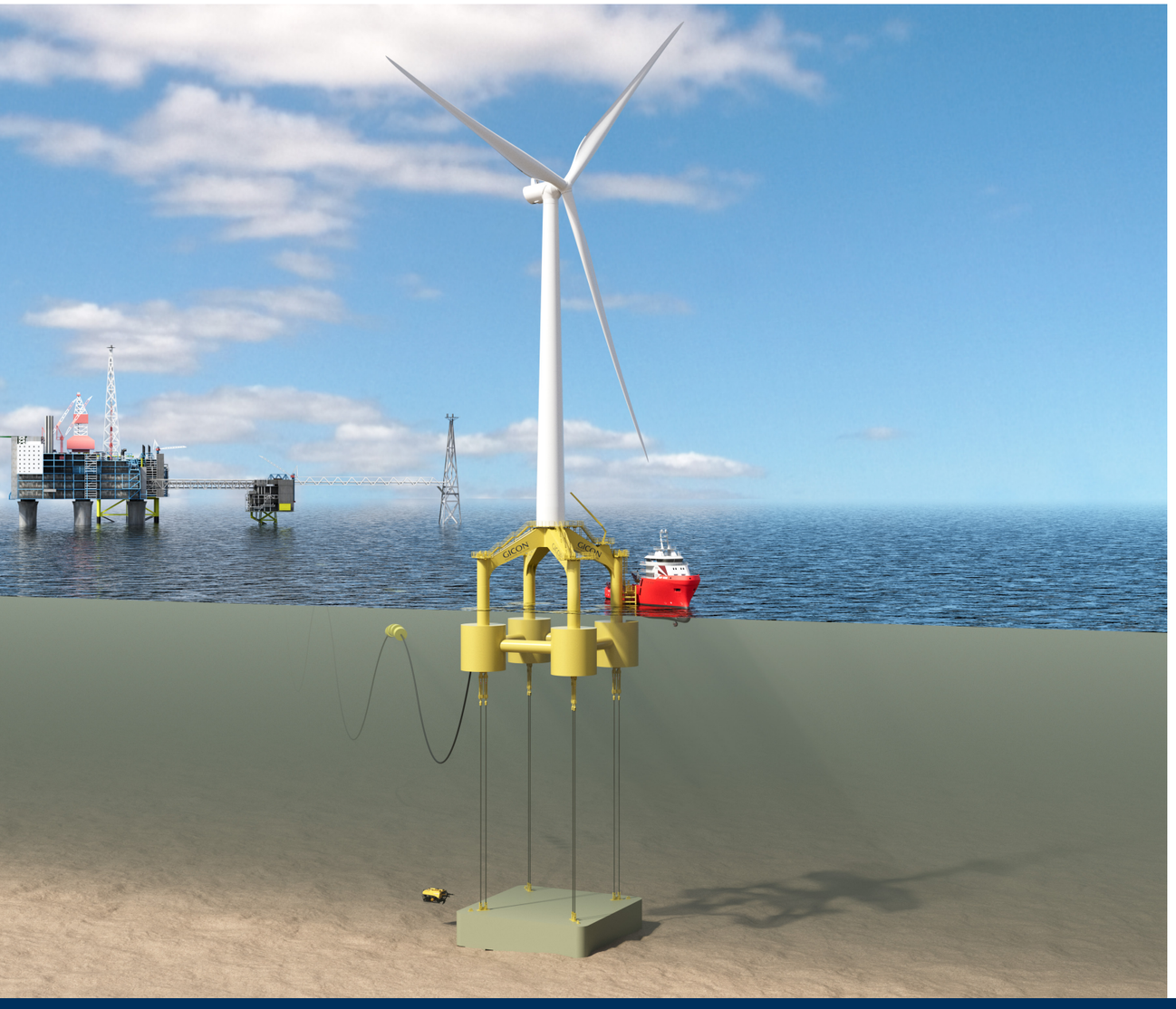
Engineering services from concept to commissioning

Departments for numerous specialised services and our own research & development

WIND ENGINEERING SERVICES



GICON®-TLP – UP TO 5 MW

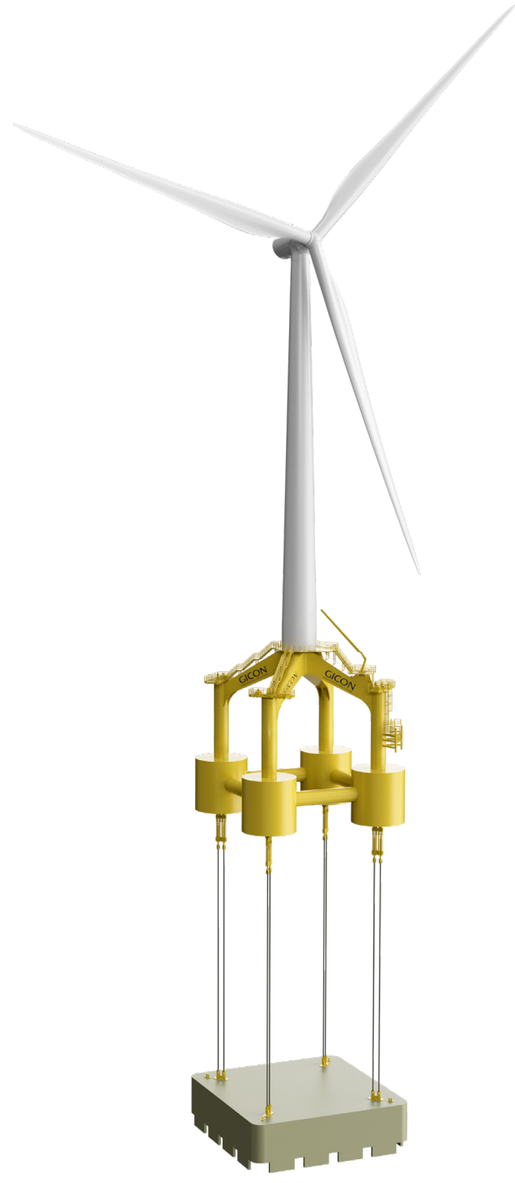


GICON® and its research partners have been developing the GICON®-TLP since 2009 with the objectives to address key challenges regarding cost, facrication, construction and ecology.

A TLP is attached to the seabed with pretensioned mooring lines. The structure's buoyancy, which is much greater than its mass, is causing a strong upward directed force. By this, the entire structure becomes firmly braced, resulting in a stiff system that can withstand even the most severe weather conditions with minimum accelerations and deflections.

Due to its stability, a TLP can be designed smaller compared to semi-submersible or a spar because a TLP's stability is not based on its outer dimension. Even for large 15+ MW wind turbines, a TLP substructure is significantly smaller compared to a semi-submersible or spar. This allows for reduced fabrication cost as well as increased flexibility in the supply chain.

When taking mooring systems into consideration, a TLP has smaller footprint due to its straight vertical lines compared to catenary mooring lines used with semi-submersible or spar. This tensioning system enables the positioning of wind turbines in areas that are optimally suited, with reduced significance placed on factors such as water depth or seabed structure.



Key advantages

- Small footprint
- Minimal motion behaviour of the system
- Gravity anchor compatible
- Synthetic mooring lines
- Simple and modular design
- Scalable dimensions and components

Main Specifications*

- TLP outer dimensions: 37x37 m
- Weight total TLP with Wind Turbine: 1.600 t
- Optional: Gravity Anchor outer dimensions: 38x38 m
- Weight total GA (not ballasted): 7.500 t
- Water Depth: 50-300 m
- Turbine size up to 5 MW

* Minor changes based on site-specific requirements possible

Successfully tested

Wind and wave tests
(Laboratory in Hydrodynamics, Energy and Atmospheric Environment of Central Nantes / CNRS in France)
- In ECN's water basin, waves with significant wave heights of up to 13 m were simulated.

Transport and installation tests
(SSPA Maritime Dynamics Laboratory in Gothenburg in Sweden)
- Tests included the towing of the TLP, the lowering of the gravity anchor and installation process of the TLP.

Higher Revenues

Accessing high wind resources in depth of 50-300 m generates higher revenues compared to conventional bottom fixed turbines in shallow water with often inferior wind resources.

Reduced fabrication costs

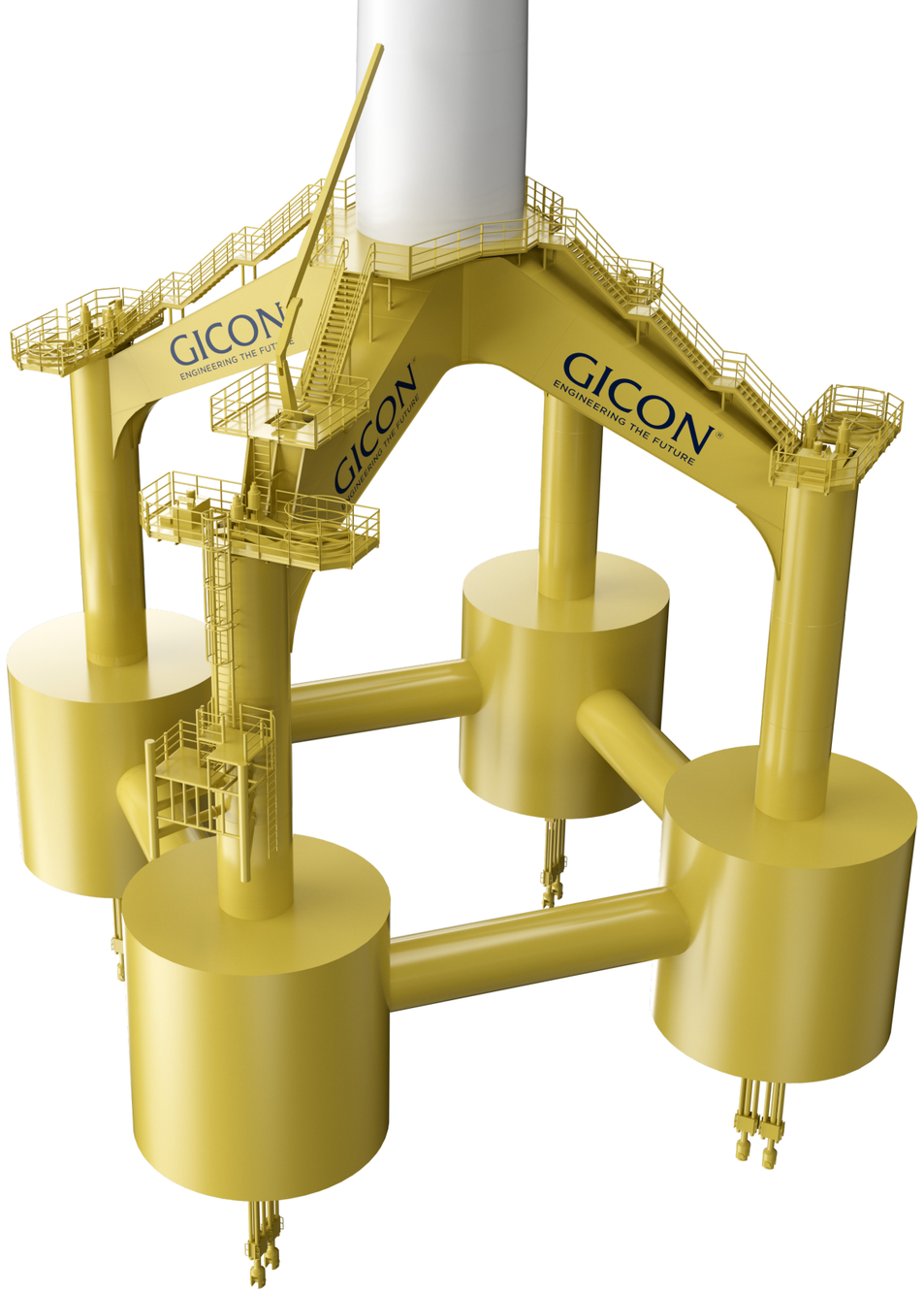
One standardized design can be utilized for an entire offshore wind park project. Also, modular steel structure follows into similar cost reductions.

Reduced installation costs and installation risks

Substructure construction and turbine assembly are carried out on land or on the quayside, independent of weather windows. The entire platform including wind turbine is then towed to the offshore deployment site. Expensive and rare installation vessels or jack-up platforms are therefore not required.

Reduction of maintenance costs

If required, the entire substructure, including wind turbine, can be replaced. For this purpose, a complete return transport in a self-floating state (as during installation) is possible. Major maintenance work can then be carried out in the harbour.



High accessibility

An external and internal system of platforms, stairs and ladders allows full access to all outer and inner areas of the structure.

Individual operating equipment

A dedicated on-board crane enables equipment to be transported to the heavy-duty platform located at the tower base. A dedicated boat landing enables people to be safely transferred to the floating structure. All other areas of the structure can be accessed from here.

Buoyancy body structure

The buoyancy bodies, which are located deep under water, are connected to each other by horizontal and vertical pipe elements. This structural design provides the stabilising buoyancy and sufficient structural stiffness.

Innovative connection technology

The floating substructure is connected to the anchoring using high-performance connection units. These enable a quick installation process and a secure connection during the entire operating time.

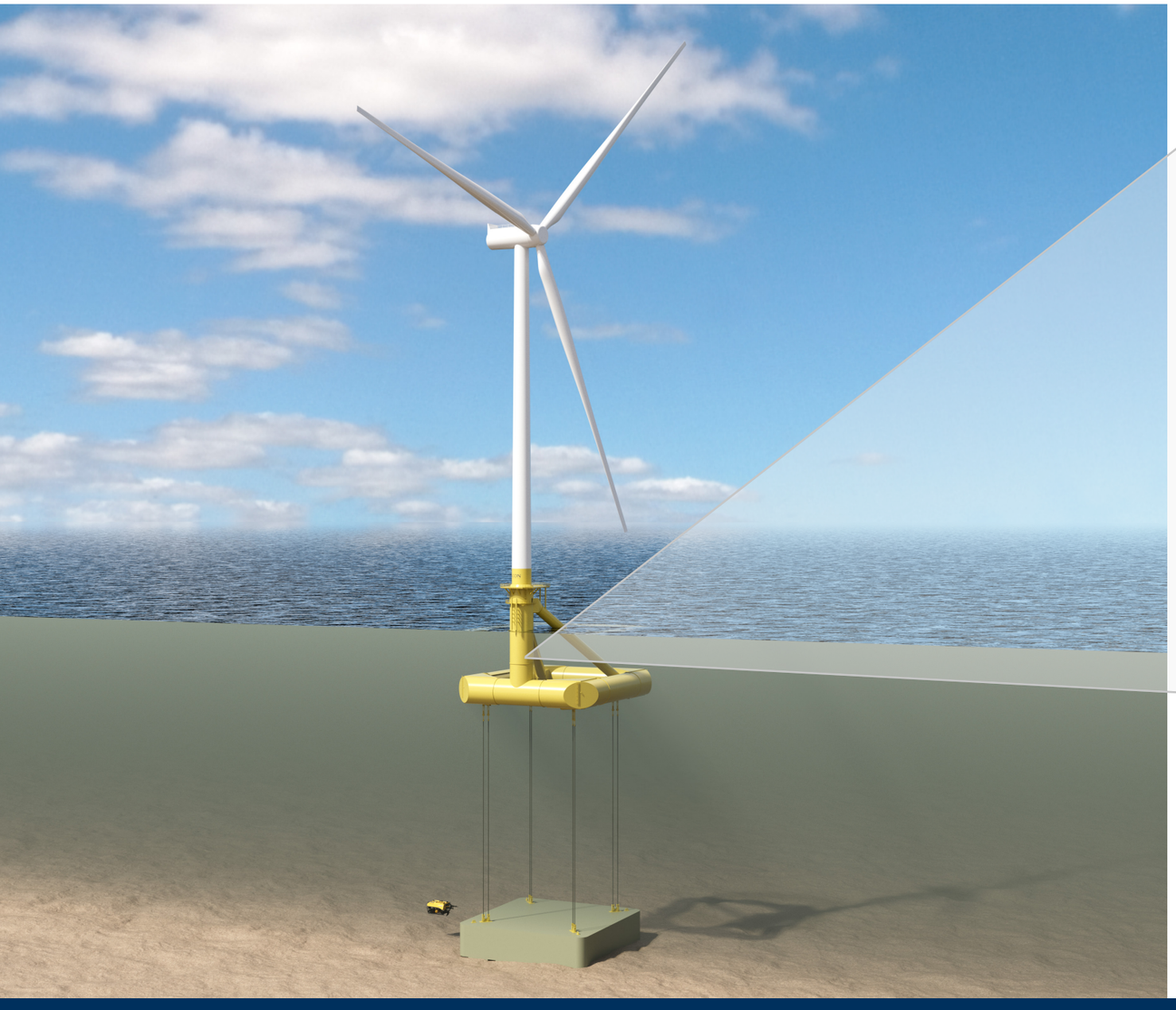
Series production

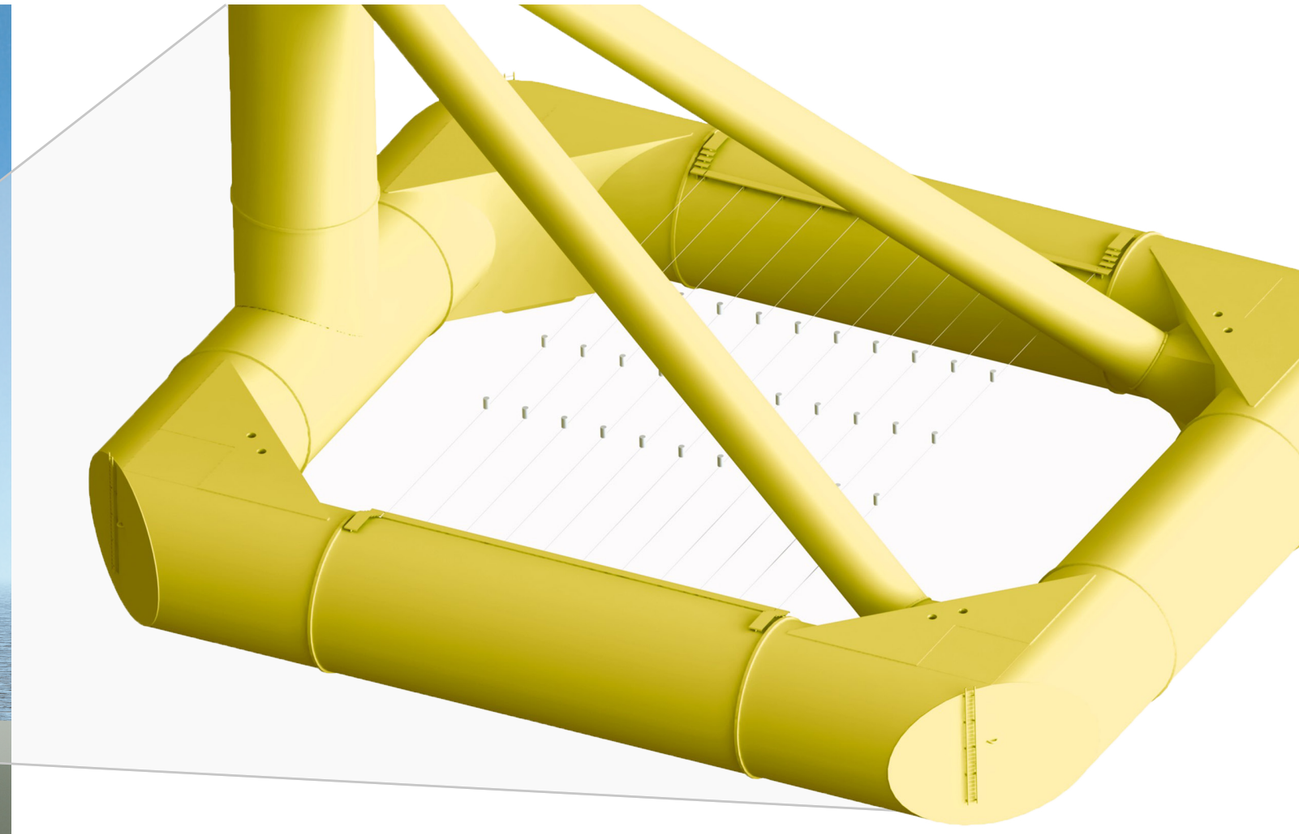
Shipyard and dry-dock lease times are significant cost factors. By fabricating key components and transferring them to the base port close to the commissioning site, such lease costs can be reduced. In addition, prefabrication of components adds great flexibility to the supply chain as well as to the available options for possible assembly sites. Utilizing components prefabrication reduces overall demand including infrastructure requirements on the assembly site. Furthermore, the assembly of the GICON®-TLP does not rely on a dry-dock. It can be handled on a pontoon or just a flat surface area in a port, using a shop-lift for the launch.

Individuality due to modularity

The structure was developed in close alignment with global regulations and standards. Site-specific environmental conditions or the operator's own guidelines may require specific adaptations that can be easily transferred to the structure design. The integration of an on-board battery storage system is just as feasible as individual monitoring and remote-control options.

GICON®-TLP – UP TO 15 MW





Key advantages

- Small footprint
- Minimal motion behaviour of the system
- Gravity anchor compatible
- Synthetic mooring lines
- Simple and modular design
- Scalable dimensions and components

Main Specifications*

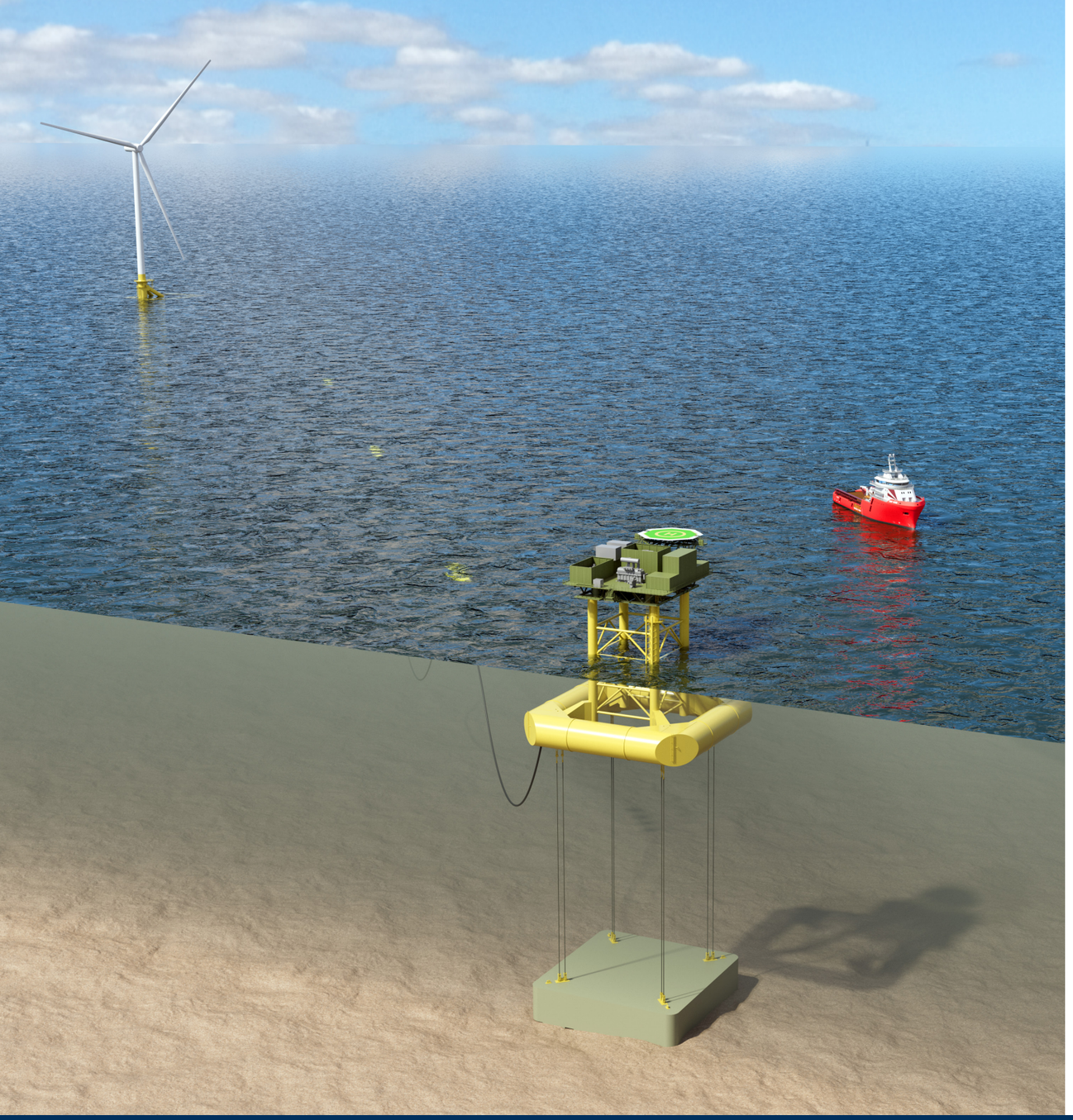
- TLP outer dimensions: 60x70 m
- Weight total TLP with Wind Turbine: 8.900 t
- Harbour self floating draft 8 m
- Anchoring type various
- Water depth between 50-1000 m
- Turbine size up to 15 MW

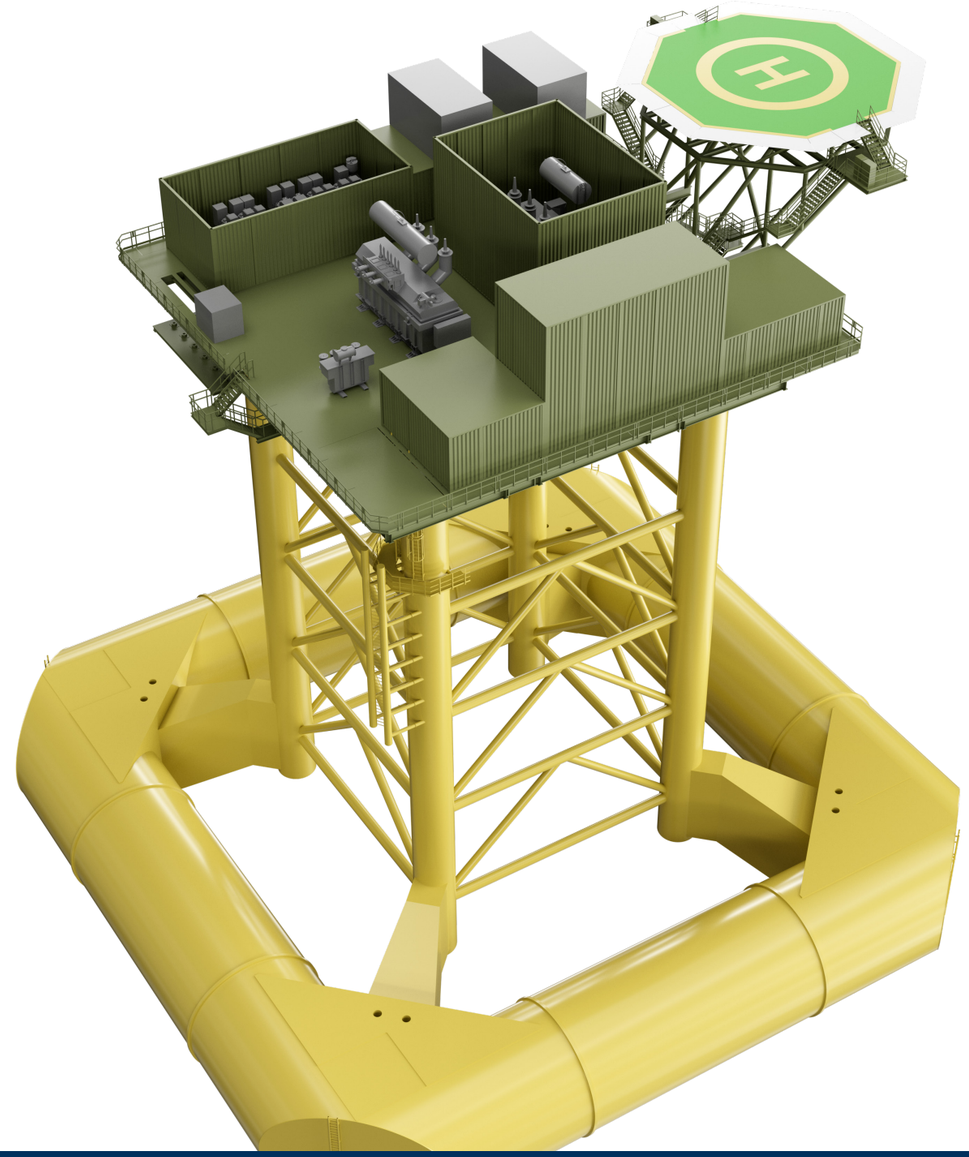
* Minor changes based on site-specific requirements possible

Nature inclusive design

Added Value
- Supports multi-use platforms and improves social acceptance of offshore projects.

Biodiversity Boost
- Creates habitats (textured surfaces, artificial reefs) supporting marine life like fish, mollusks, and crustaceans
- Promotes algae, coral, and barnacle growth
- Ecosystem Restoration and Water Quality Improvement





Multi-purpose platforms

Since the development of the original GICON®-TLP, GICON® and its research partners have continuously advanced the design to meet evolving industry demands. The latest iteration represents a cutting-edge TLP concept, specifically engineered to support next-generation offshore floating wind turbines with capacities of up to 15 MW.

The new TLP design maintains the fundamental advantages of tension-leg platforms, crucial for supporting large wind turbines. Key parameters such as cost-efficiency in fabrication, assembly, and environmental sustainability have been integral to the design process. The use of monopile components from existing series production, a low structural height of the floater, and a shallow draft in its self-floating transport condition are just a few of the advantages of this design.

Moreover, the new TLP is versatile, designed not only as a substructure for wind turbines but also for multi-purpose platforms, including AC/DC converter stations and hydrogen production facilities. This multifunctionality maximizes the value of this design in a wide range of applications.

Comprehensive tank tests have been conducted to validate the performance of the new TLP design. These tests confirm its exceptional stability, resilience, and efficiency, demonstrating that the advanced TLP is ready to meet the operational and environmental challenges of modern offshore energy projects.

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