



Introduction of Hexifloat

- A floating system integrating solar, wind, wave and tidal energy generators



Agenda

- Existing Offshore Renewable Energy Technologies
- Existing PV Farm Designs
- Coexistence of Multiple Renewable Energy Technologies
- Hann-Ocean's Solution – Hexifloat™
- Competitive Advantages
- Discussion

Existing Offshore RE Technologies



- Great potential
- Stronger, more stable winds
- Shortage of good land sites
- Avoiding community and environmental conflicts
- Economies of Scale

Offshore Wind



- Early stage technology
- Huge resource from ocean
- High expected future growth

Offshore Wave



- Early stage technology
- Stable and regular resource from tidal streams
- High expected future growth

Offshore Tidal

Existing Floating PV Farm Designs



- Deployed in a reservoir at Aichi, Japan
- 15 x 9 meters
- Water-cooled floating PV Systems installed
- 10kWp

Aichi Ike

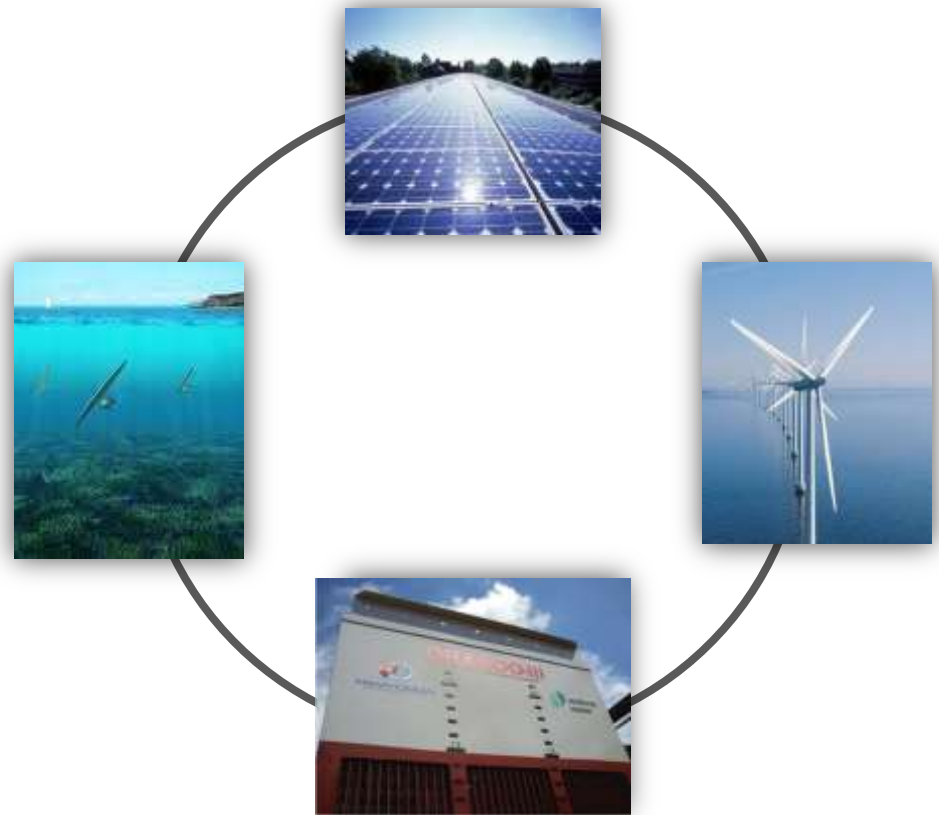


- By Enerdaiet (Italian Photovoltaics installer)
- Installed in Taranto, Italia
- Designed for inland waters
- 20kWp

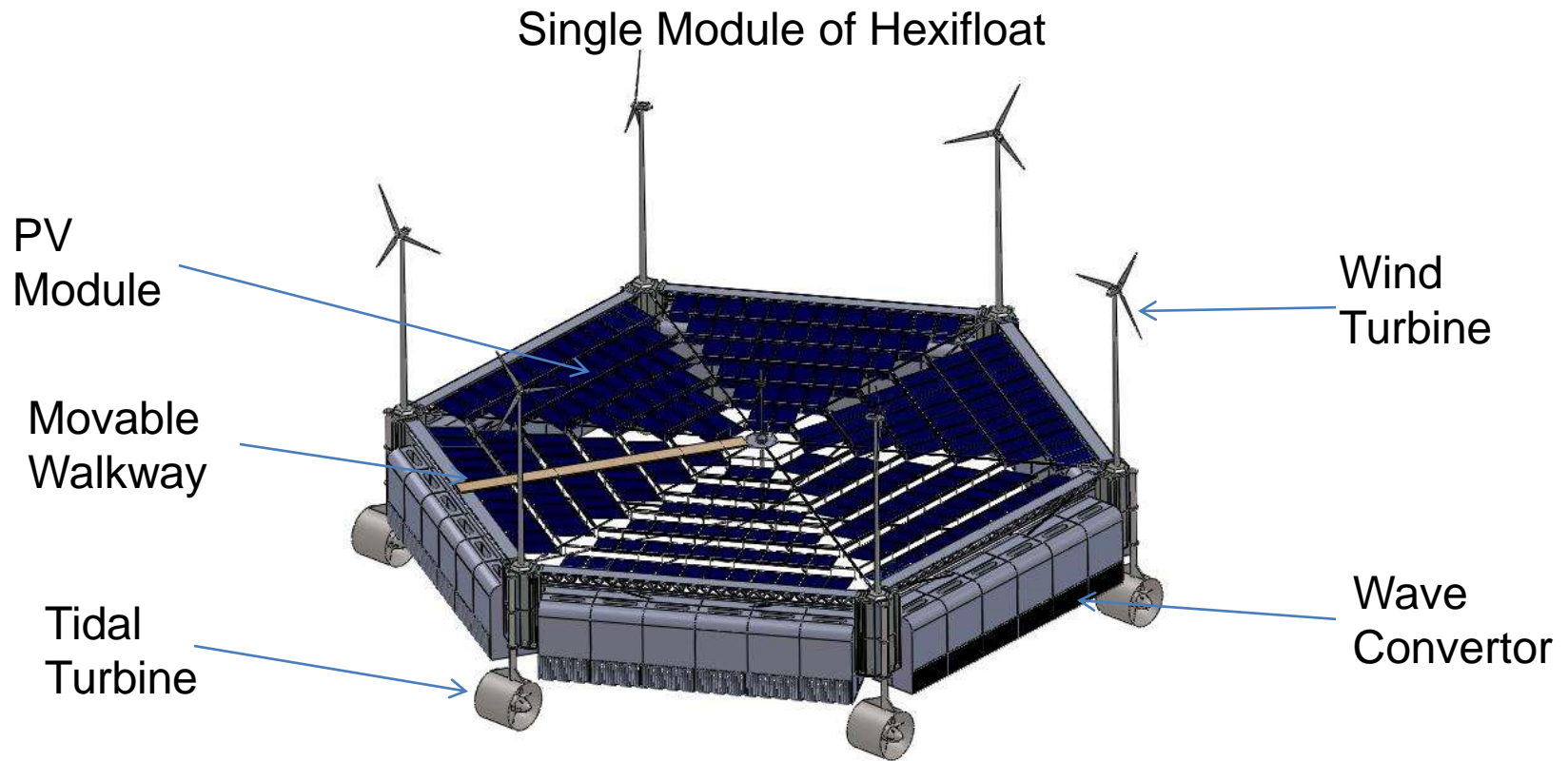
The Lotus Project

Coexistence of RE Technologies

- To derive maximum benefits, different REG can be combined in a single structure
- Needs to find new ways in order to make REG more competitive in the energy market
- Wave energy and floating offshore wind farms appear suitable to coexist



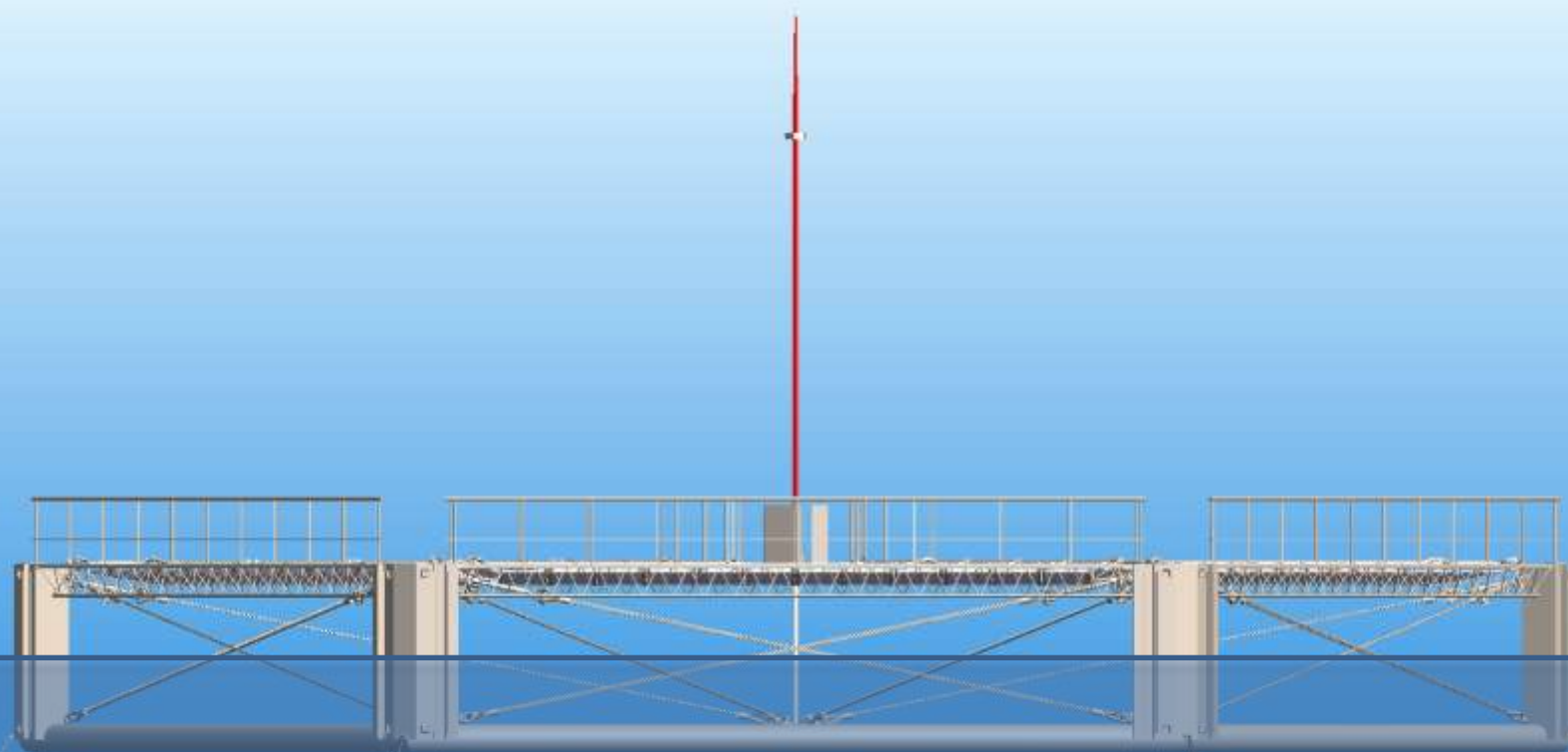
4-in-1 RE Implementation



Full System Configuration

Patent Ref. No. PCT/SG2011/000289

Position Keeping System



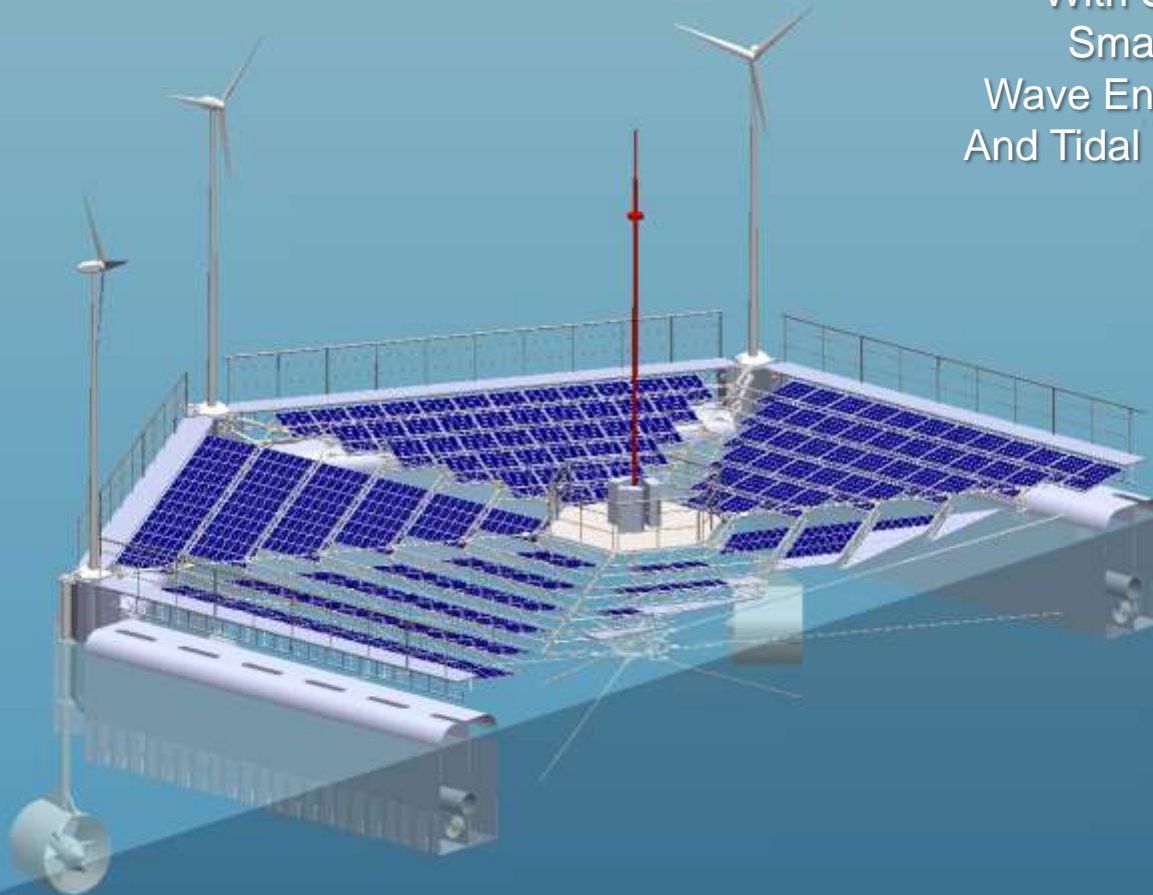
Typical Anchoring Layout

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4-in-1 RE Implementation

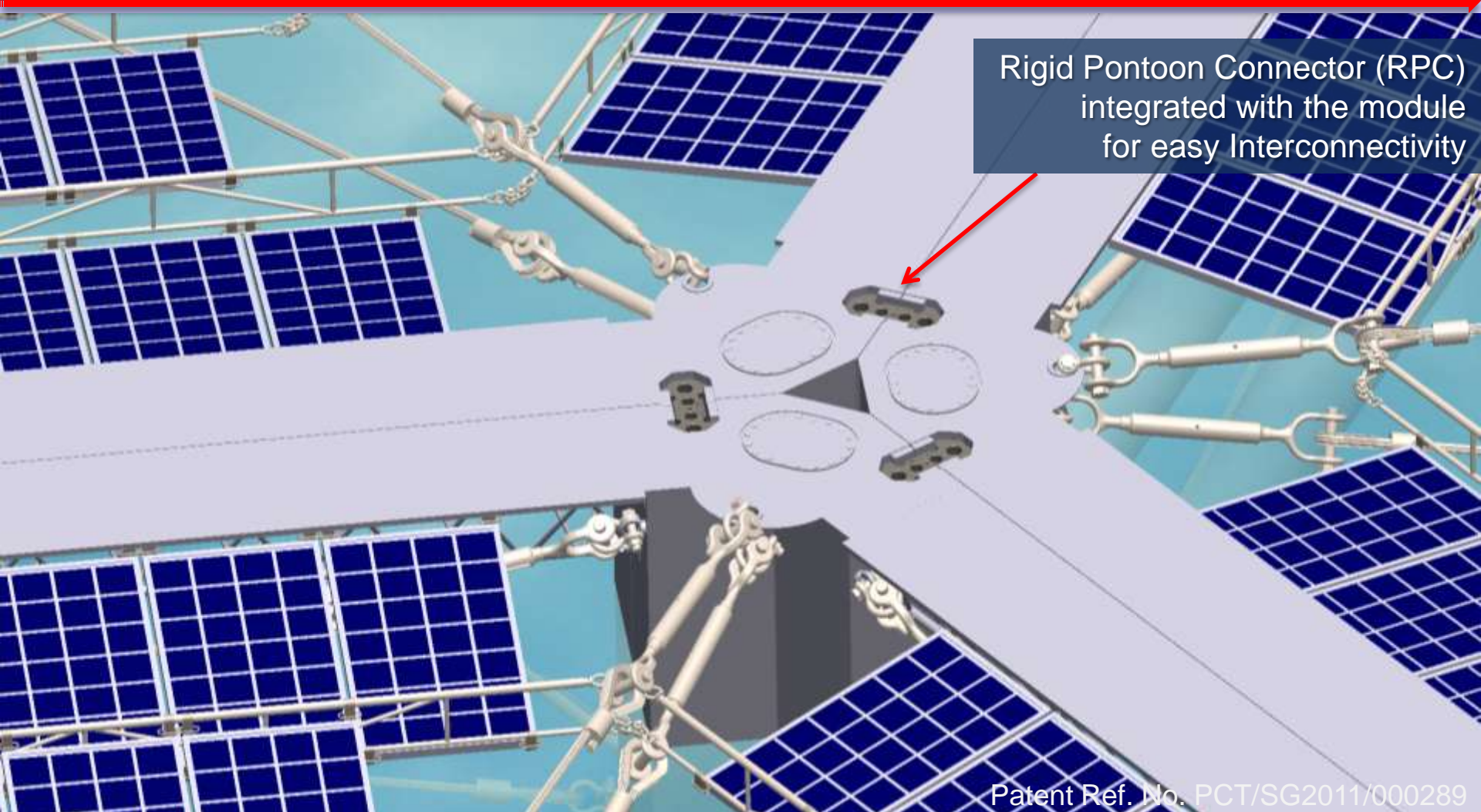
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With Solar PV Models,
Small Wind Turbines,
Wave Energy Convertors,
And Tidal Current Turbines



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Innovative Design Details



Rigid Pontoon Connector (RPC)
integrated with the module
for easy Interconnectivity

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Innovative Design Details

Tensioned wire and truss system optimised for

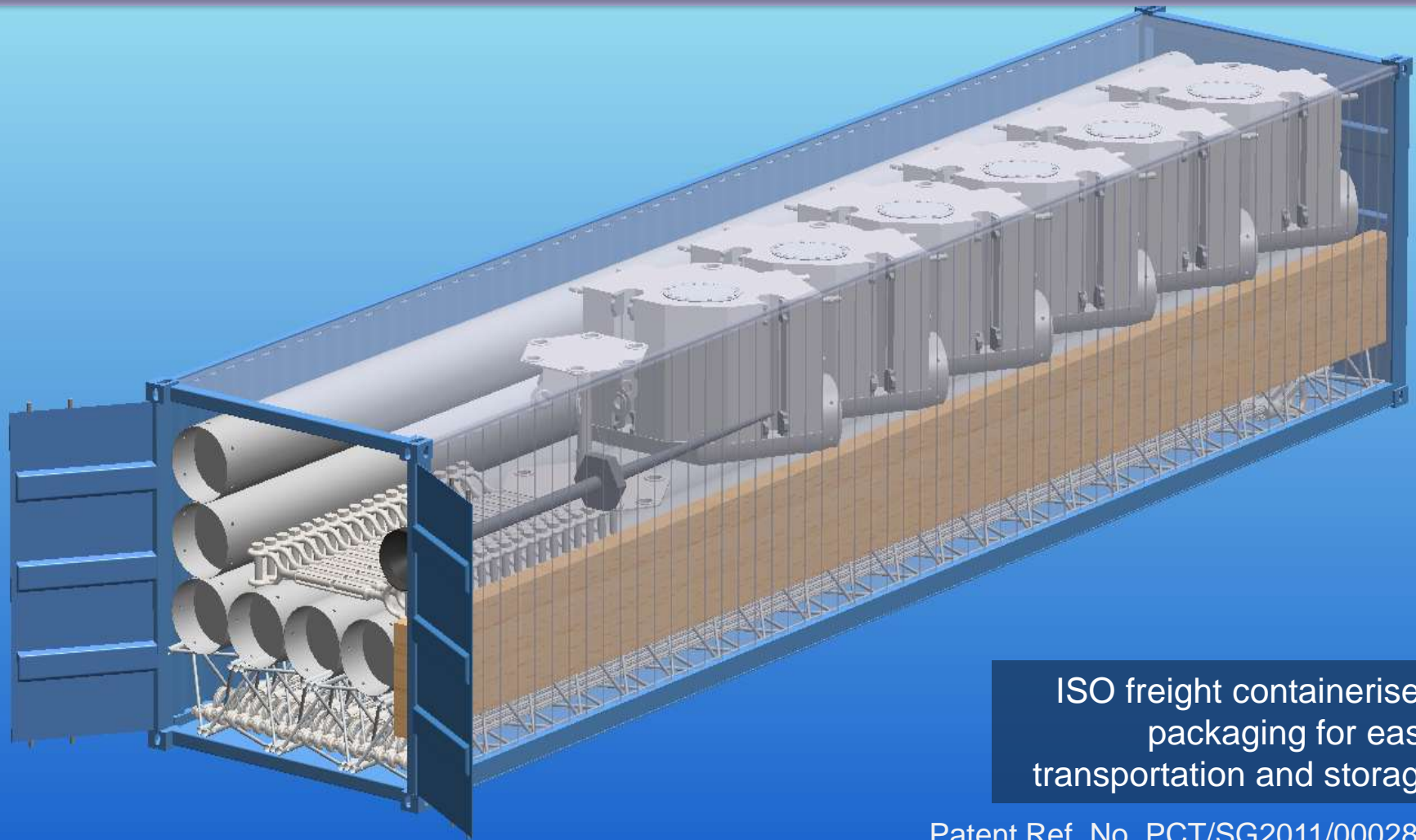
- Ventilation
- Light penetration
- Strength and stiffness
- Cost-effectiveness
- Free flow of water underneath

Eco-friendly

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Containerised System

*Introduction
of Hexifloat*

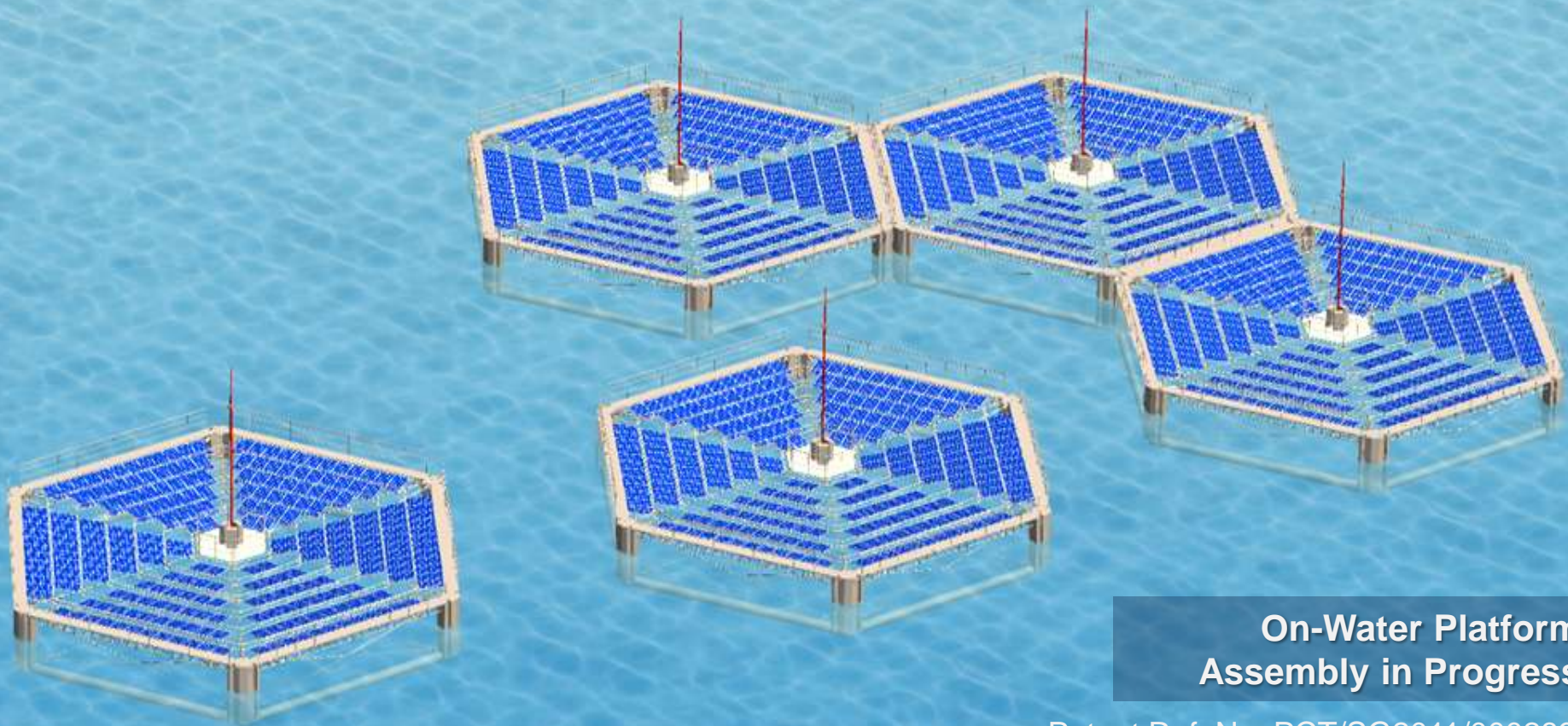


ISO freight containerised
packaging for easy
transportation and storage

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On-water Assembly

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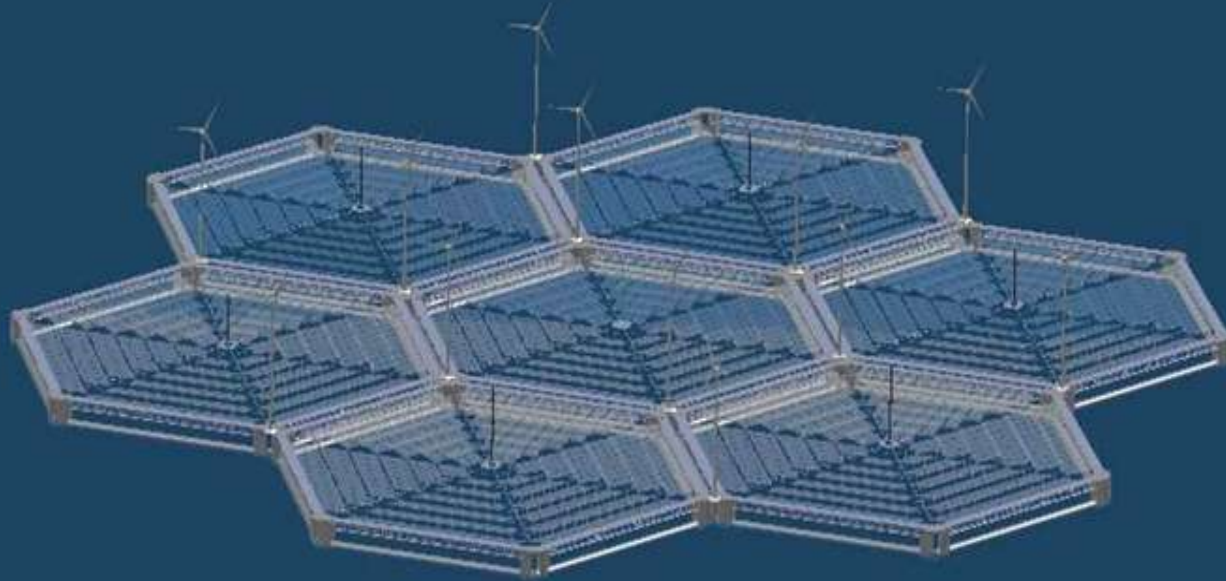
**On-Water Platform
Assembly in Progress**

Patent Ref. No. PCT/SG2011/000289

Sea Flower Layout

*Introduction
of Hexifloat*

HEXIFLOAT™
- A REVOLUTIONARY ONE-FITS-ALL PLATFORM



Layout A

Patent Ref. No. PCT/SG2011/000289

Alternative Layout

HEXIFLOAT™
- A REVOLUTIONARY ONE-FITS-ALL PLATFORM



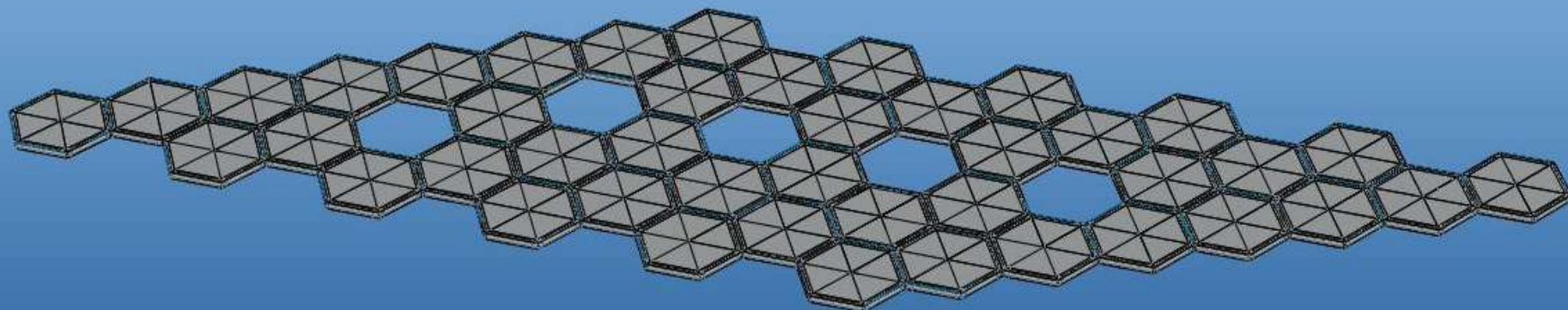
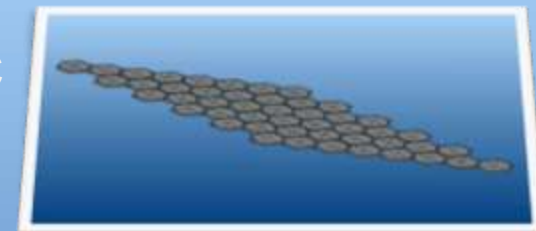
Layout B

Patent Ref. No. PCT/SG2011/000289

Alternative Layout

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Layout C



Patent Ref. No. PCT/SG2011/000289


Technical Specification

- Shape: Hexagon
- Size: Ø27m x 1.7m (min)
- Material: Aluminium Array/Steel


Technical Specification

Main Parameters:

Length (L) / Diameter:	27.0 m
Breadth (B):	23.6 m
Depth (D):	1.7 m
Light Ship Displacement:	14.0 ton
Light Ship Draft:	0.40 m
Full Load Displacement:	29.42 ton
Full Load Draft:	1.03 m
Maximum Payload:	6.22 ton
Minimum Freeboard:	0.73 m
No of Solar Panel:	252
Material of Corner Joint:	Mild Steel
Material of Floating Pipe:	Mild Steel
Material of Connection Beam:	Aluminium / Stainless Steel
Steel Wire Size:	Ø26mm (Top), Ø24mm (Cross), Ø14mm (Bottom)
No of Watertight Compartments:	12 no. (6 for Corner Joints and 6 for Buoyancy Pipes)
Position Keeping System:	Moorings to shore or anchored to seabed
Coating Specification:	Hot-Dip Galvanized > 125µm
Type of Pontoon Connectors:	Model no. RPC-S50 (certified by ABS)
No. of Connectors:	8 pairs
Maximum Strength of Connector RPC-S50:	100ton in tension 50ton in shear 50ton in compression
Structure Configuration:	6 Corner Joints, 6 Buoyancy Pipes, 8 Connection Beams, 1 Central Platform and 18 Tensional Wires.
Solar Energy Generation:	48 kWp
Wind Energy Generation:	18 kWp
Wave Energy Generation:	45 kWp
Total Energy Generation:	23 kWp



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Competitive Advantages

- Highly cost-effective
- Modular system with connectors
- One-type-fits-all floating solution
- Diversification of renewable energy
- Scalable & flexible configuration
- Rigid, stable, strong & durable
- Easy to transport & assemble
- Pleasing aesthetic appeal
- Eco-friendly

Power Generation

- Solar output: 48 kWp
- Wind output: 18 kWp
- Wave output: 45 kWp
- Tidal output: 23 kWp

Total Output: 134kWp per module
(depending on the devices chosen)

Sea Flower

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Contact



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