



**Advanced Containerised
Hybrid Power System For
Expeditionary Applications
& Remote Operations.**

Containerised Hybrid Power System.

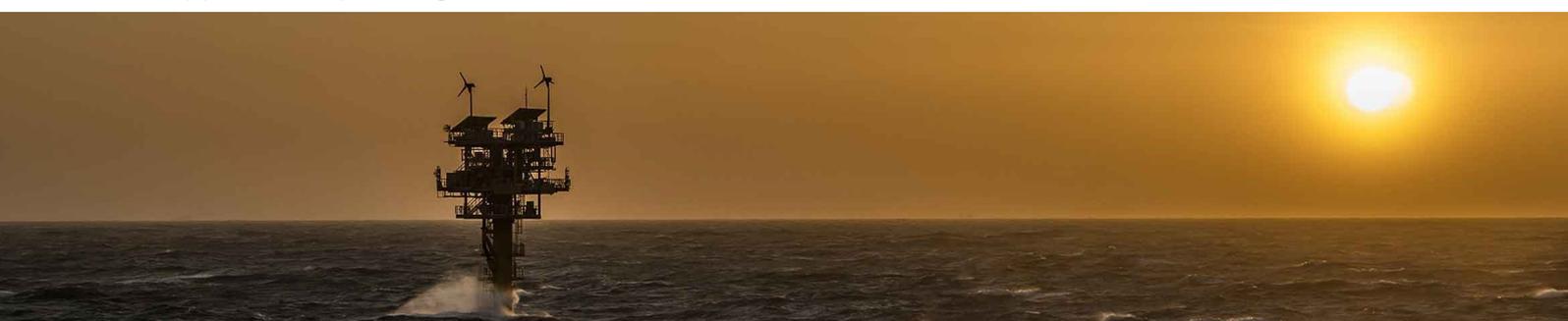


CMCA's Containerised Hybrid Power System utilises the latest renewable technology to deliver high quality power generation and distribution for remote operations and deployable infrastructure. Fully integrated into a 20ft ISO 668 container, the **CHPS** utilises wind, solar, battery storage and back up diesel power to support or create remote grids. The onboard intelligent charging, management and distribution system autonomously supports the load requirements. Providing on demand power from renewable energy sources, drawing on the integrated diesel generator during periods of high power demand or low renewable output to maintain full capability.

The CHPS delivers an unrivalled amount of renewable power in such a compact and innovative integration, delivering:

- 12kW from wind energy utilising two ruggedized down wind horizontal axis wind turbines with active pitch control and overspeed protection, allowing the turbines to operate in extreme wind conditions without the need for forced braking.
- 8.6kW from solar energy through a forty eight panel array, on a single axis solar tracker, to maintain maximum absorption across the sun's path.
- 10kW of deep cycle battery storage delivering power conditioning and reserve. Integrated battery monitoring and charging systems maintain battery condition and provide visual capacity indicators.
- 9.4kW of stand-by diesel power generation to support the load during periods of high power demand and low renewable delivery. The onboard fuel tank and stand by operation reduces the logistical burden of traditional remote electrical power systems.

The CHPS is designed to minimise logistical requirements for delivery and prolonged operation, containing all of the equipment required for installation and operation. Each feature of the system is stowed within the space envelope of the container, maintaining air, sea, rail and road transport worthiness. Once delivered in the operating environment, the system is then decanted and erected to form or support local power grids.

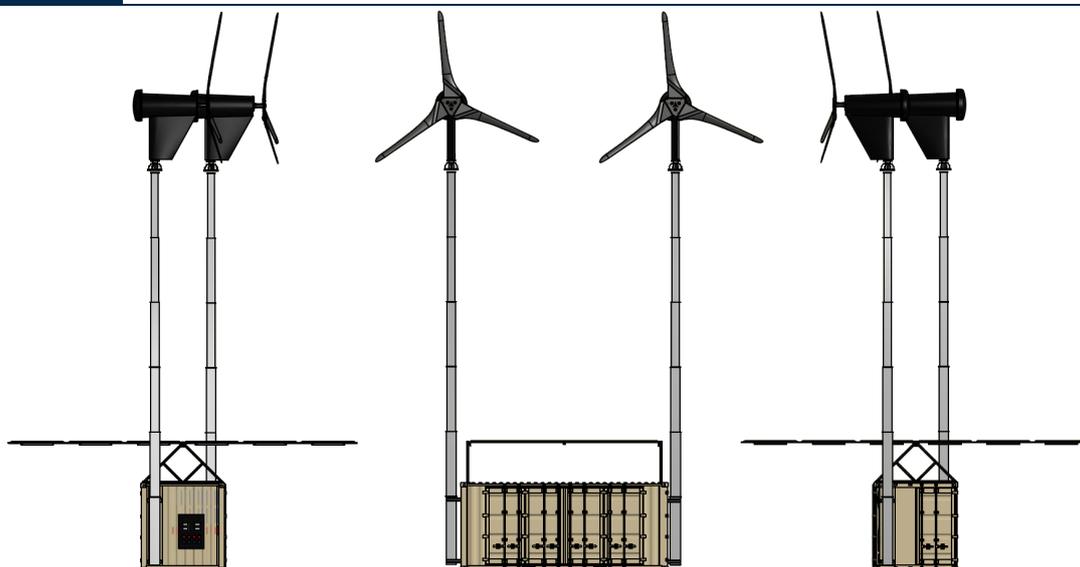


Deployable Renewable Power Infrastructure.



The CHPS is a rugged, deployable renewable power generation system designed to support remote locations, each component is proven in its own right in the most extreme environments from offshore platforms to research stations on Antarctica. Power is generated by the wind and solar systems, stored in the battery bank and delivered through the inverters and distributor systems. The integrated standby generator supports high demand loads and periods of low renewable output. The physical output panel is configurable to customer specification including the quantity and type of connectors required. The local control interface provides visual indication of power generation, consumption as well as status and fault indication. The interface is also available via a configurable Modbus 485 interface as well as remote telemetry via cloud based software for remote fleet management.

CHPS	
Rated Power	12kW Wind
	8.6kW Solar
	10kW Battery
	9.4kW Diesel
	40kW Total
Voltage	24V DC / 230V AC / 400V AC
	Other Voltage Options Available Upon Request
Frequency	50Hz / 60Hz / DC
Interfaces	Local Control Interface, Modbus 485 Interface, Remote telemetry
Operating Conditions	-46°C to +55°C
Weight	5500kg dry
Dimensions	L 6.06m x W 2.44m x H 2.6m



Advanced Expeditionary Wind Turbine.



The CMCA MHAWT-006: Military Horizontal Axis Wind Turbine provides a nominal output power of 6kw, with a cut in speed of 2.5m/s and no cut out speed, allowing for uninterrupted operation. The advanced pitch control and overspeed protection autonomously adjusts the blade angle as the wind speed increases, allowing self regulation and continuous operation. The innovative sail design of the nacelle body uses the wind energy to maintain down wind positioning. The nacelle is mounted atop a Mil Spec 30ft hydraulic telescopic mast, to allow rapid deployment without the need for cranes or winches.

The HMAWT-006 is proven as a stand alone system, supporting remote applications in extreme environments. The platform is suitable for container and building integration, stand alone operation as well as mobile trailer systems.



MHAWT-006	
Rated Power	6kW per turbine
Rotor	5.6m Diameter, Delta blade, Downwind, Active overspeed protection
Generator	24V Brushless direct drive permanent magnet generator
Cut in speed	2.5m/s
Cut out speed	Continuous operation
Mast	Extended height - 9.1m
	Retracted height - 2.3m
	Extender height with turbine and blade path 13.9m
Operating Conditions	-46°C to +60°C, survival speed 70 m/s
Weight	1325kg including mast
Applications	Container integrated, Building integrated, Trailer integrated, Stand alone



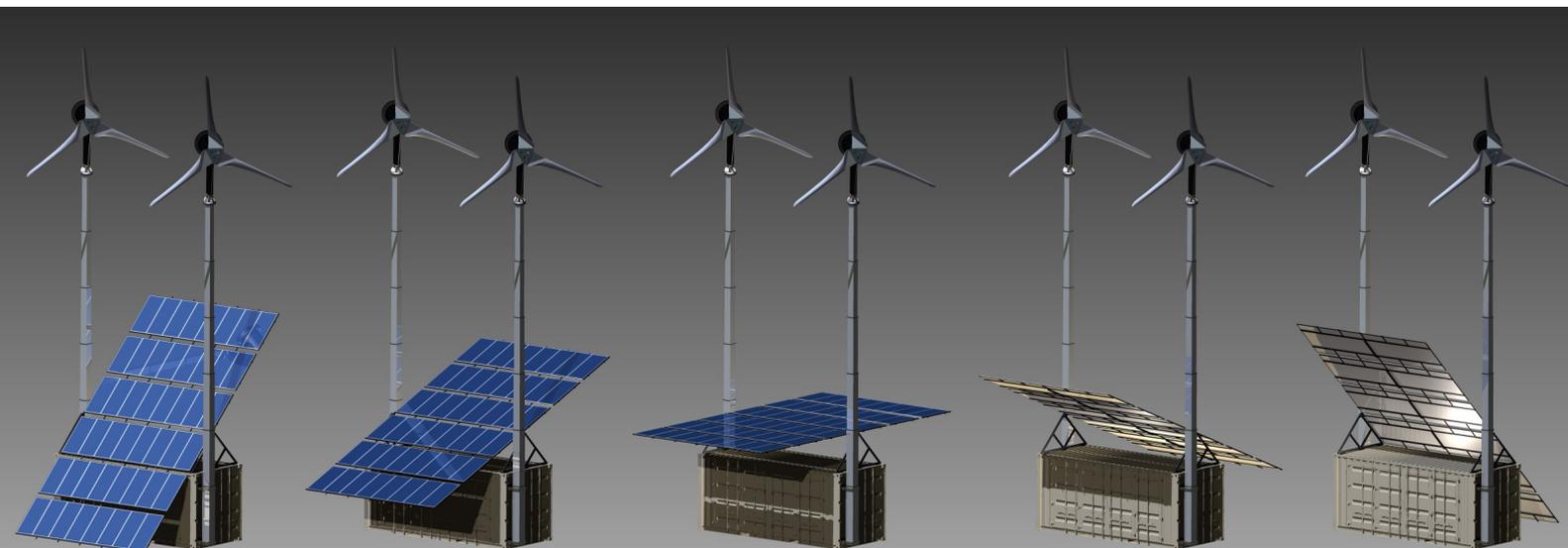
Innovative Container Solar Tracking Array.



The CMCA MPVA - 008: Military Photovoltaic Array is an 8.6kW solar system mounted to the CHPS roof, the system utilises an aluminium truss frame and actuator based tracking system to maintain a perpendicular face to the sun, generating power throughout the day. The positioning sensors locate the sun's from dusk until dawn and rotate the array to maintain maximum efficiency and prolonged power generation. The MPVA contains forty eight individual panels in parallel, providing a modular and uninterrupted power system. Should an individual panel require attention, the remaining array remains unaffected. The whole MPVA - 008 is modular and is stowed within the CHPS container and erected in manageable parts. The assembled layout contains airflow apertures to allow continued operation in high winds to accompany the MHWAT-006.

MPVA-008

Rated Power	8.6kW
Photovoltaic panels	24V 180W, 48 in total
Frame	Aluminium truss with cross beams and supports. Dual actuators for single axis tracking
Operating Conditions	-46°C to +55°C
Operational Dimensions	L 10m x W 5.7m x H 1.3m (in horizontal position)
Stowed Dimensions	L 1.7m x W 5.5m x H 0.1m (height per array panel)
Applications	Container integrated, Building integrated, Trailer integrated, Stand alone



Autonomous Stand-by Power.



The CMCA MPG-010, Military Packaged Generator utilises CMCA's proven and reliable diesel power generation technology, providing a nominal 9.4kW the MPG-010 is outstanding in efficiency and power quality. With an engine speed of 1500rpm and enclosed within a specialist designed sound attenuating chassis within the container, the MPG-010 is practically silent in operation. The multi stage fuel filtration and polishing system allows for operation on a range of fuels and the tier V rated engine complies with the latest emissions standards without exemption applications. The onboard fuel tank provides continued operation for up to 160hours, reducing the logistical requirements for the CHPS operation.

MPG-010

Rated Power	9.4kW,
Voltage	400V 3 Phase
Frequency	50 Hz / 60 Hz (@1800rpm)
Operating Conditions	-46°C to +55°C
Emissions	Euro Tier V
Fuels	UNI EN 590-2010 No 1 Diesel (US) – ASTM D 975-09 B Grade 1-D S 15 / 500 No 2 Diesel (US) – ASTM D 975-09 B Grade 1-D S 15 / 500 ARCTIC EN 590/ASTM D 975-09 B High Sulfur Fuel < 5000ppm (<0.5%) High Sulfur Fuel > 5000ppm (>0.5%) Military NATO Fuels F34, F35, F44, F63, F64, F65 Military US Fuels JP5 - JP8 (AVTUR) Jet Fuel - Jet A/A1
Fuel Capacity	450Litres



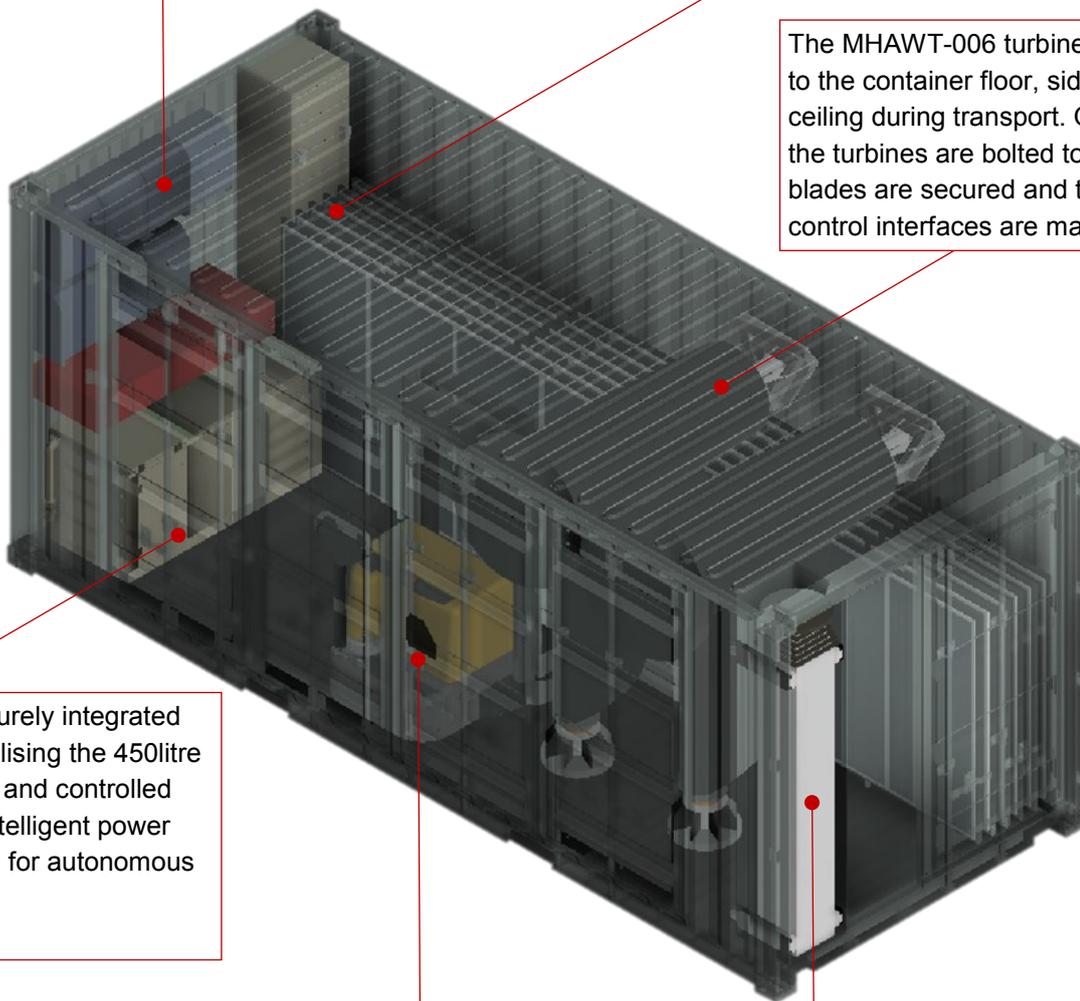
Self Contained & Rapidly Deployable.



The power inverters, control system and battery bank are positioned to provide easy access for inspection and maintenance. The intelligent control system manages the whole system to provide efficient power from each source. The configurable control and output panel is located on the external face of the container.

The MPVA-008 solar array panels and frame are securely stowed in a racking system, the panels and frame are decanted, and mounted to the container

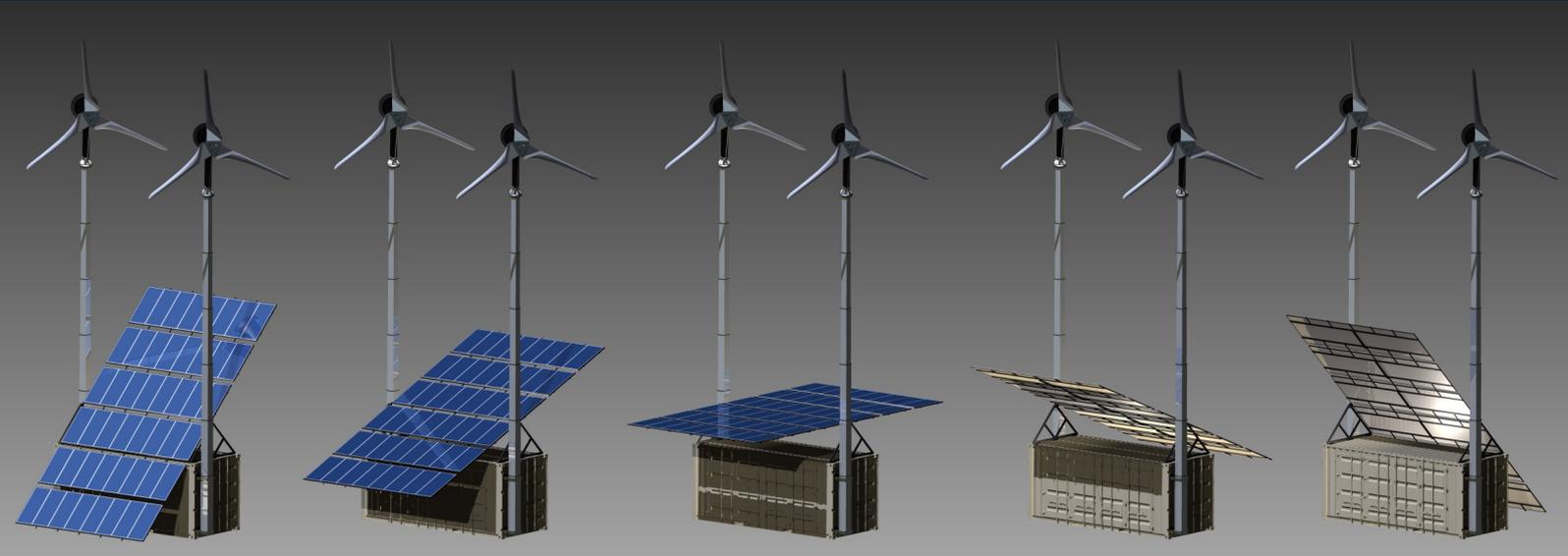
The MHAWT-006 turbines are secured to the container floor, side wall and ceiling during transport. Once deployed the turbines are bolted to the masts, the blades are secured and the power and control interfaces are made.



The MPG-010 is securely integrated into the container, utilising the 450litre fuel tank as a supply and controlled through the CHPS intelligent power management system for autonomous stand-by power.

A 24V, 1000kg capacity material handler is used to lift the two MHAWT-006 turbines onto the masts. The handler is also used to assemble the solar tracking array, eliminating manual handling and the need for external plant and lifting equipment. The handler is securely stowed with the container.

The Mil Spec hydraulic telescopic masts with a stowed height of 2.3m and a deployed height of 9.1m are projected from the container space envelope on linear sliders and secured in place.



Providing Innovative Solutions For Extreme Environments

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