Genevos
EFFICIENT INNOVATIONS

HYDROGEN POWER SOLUTIONS

ENABLING ZEVS FROM 15 KW TO MULTI-MW

Hydrogen Power Module ‘HPM’

The plug & play power solution for marine

ACCELERATING THE ZERO CARBON TRANSITION

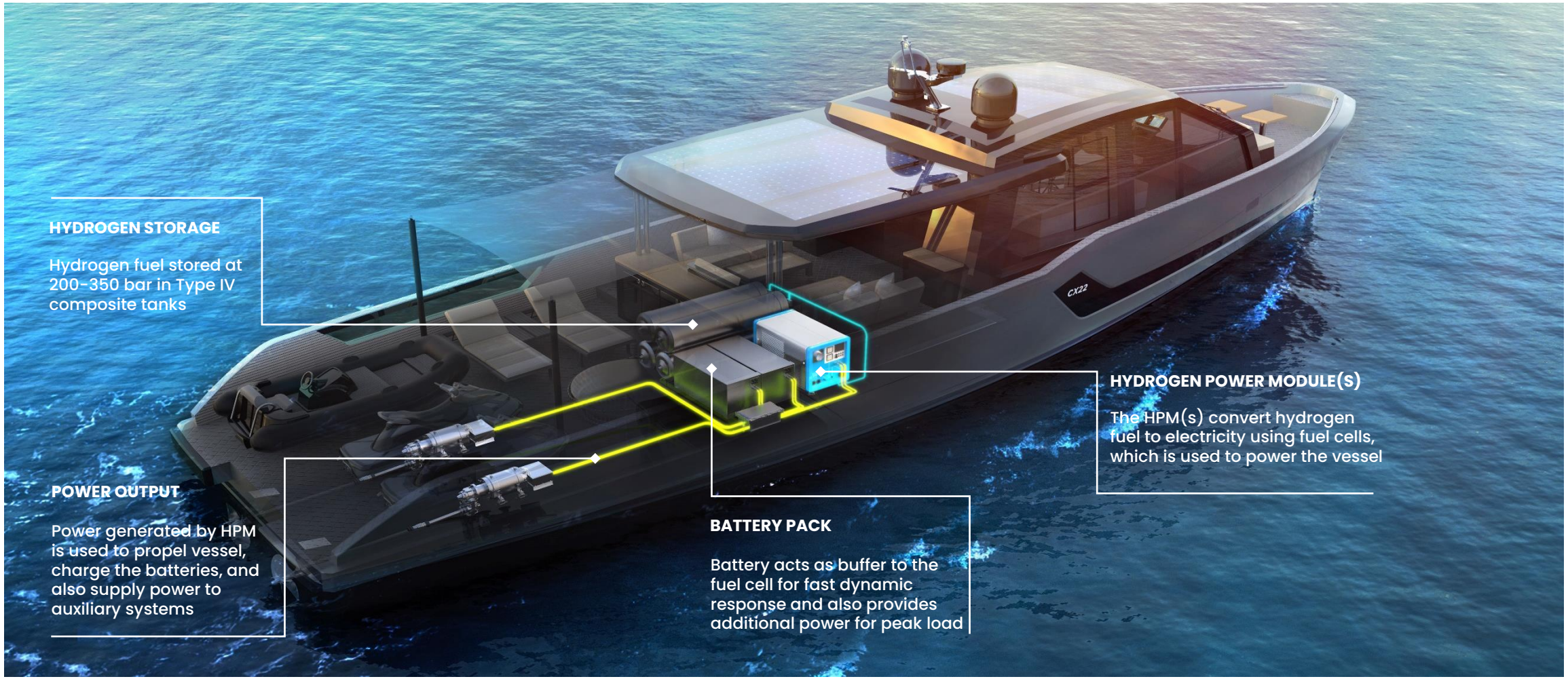
Genevos’ award-winning drop-in marine fuel cell revolutionises maritime power by offering an environmentally friendly solution with high scalability and redundancy.

FEATURES

- **Zero emissions** no vibration and low noise
- **Practical** compact and low weight
- **Stackable** to high power
- **Modular** enabling high redundancy
- **Marinised** protection against humidity & salinity
- **Durable** resistant graphite plate technology
- **Certified** for use on commercial vessels
- **Plug & play** fully integrated balance of plant
- **Efficiency** through adaptive power management

Hydrogen-Electric System

Providing a low weight, zero emission propulsion solution for vessels

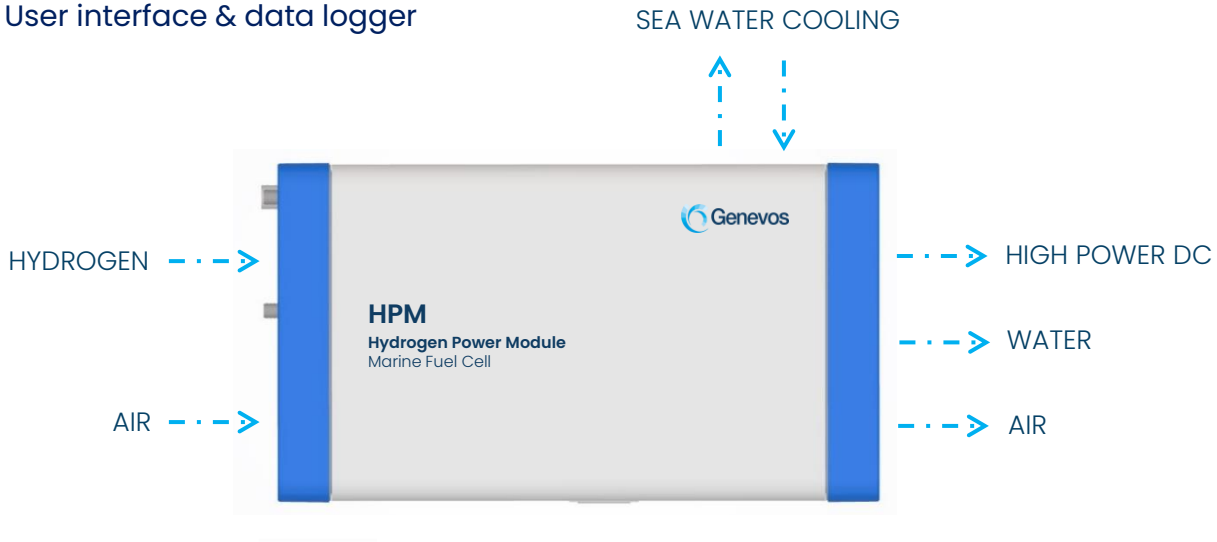


Drop-in Fuel Cell Solution

Genevos' plug & play marine power solution

COMPONENTS/SYSTEMS INTEGRATED

- Hydrogenics (Cummins) graphite PEM fuel cell stack
- Air filtration and compression
- Cooling system with heat exchanger
- DC-DC converter
- Energy Management System
- Safety monitoring system
- User interface & data logger



Scalable Power Solutions

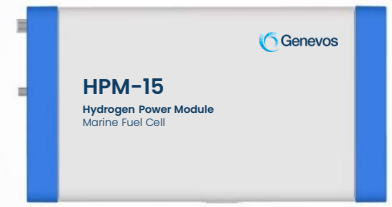
Modularity to enable power systems tailored specifically to vessel

Genevos offers 15kW, 40kW and 80kW modules. The 80kW modules can be stacked to provide power solutions up to megawatt scale.

HPM-80 MODULE

HPM-40 MODULE

HPM-15 MODULE



HIGH POWER SYSTEMS

- Stackability – 80kW stackable to create 160kW to 1MW+ systems
- High redundancy - failure of a module does not impact system functionality
- Optimised durability – through advanced system control
- Optimised fuel cell efficiency - through advanced system control

HPM Technical Specifications

A compact and low weight solution designed for vessels

TECHNICAL DATA	HPM-15	HPM-40	HPM-80
Continuous Peak Power (BOL)	13.5 kW	40 kW	78 kW
Rated Power (EOL)	11.5 kW	35 kW	70 kW
Output Voltage (Controllable)	48 V_{dc}	230 - 450 V_{dc}	400 - 900 V_{dc}
Weight	100 kg	190 kg	330 kg
Peak Net Efficiency	52 %	54 %	55 %
Dimensions (L x W x H)	111 x 71 x 42 cm	130 x 80 x 50 cm	140 x 80 x 80 cm
Communication	CAN bus		
FC Stack Estimated Lifetime	> 20,000 hrs		
Fuel	Gaseous Hydrogen ISO14687-2		
Ambient Air Temperature Operation	-25 to 45°C		
Environmental Rating	IP55		

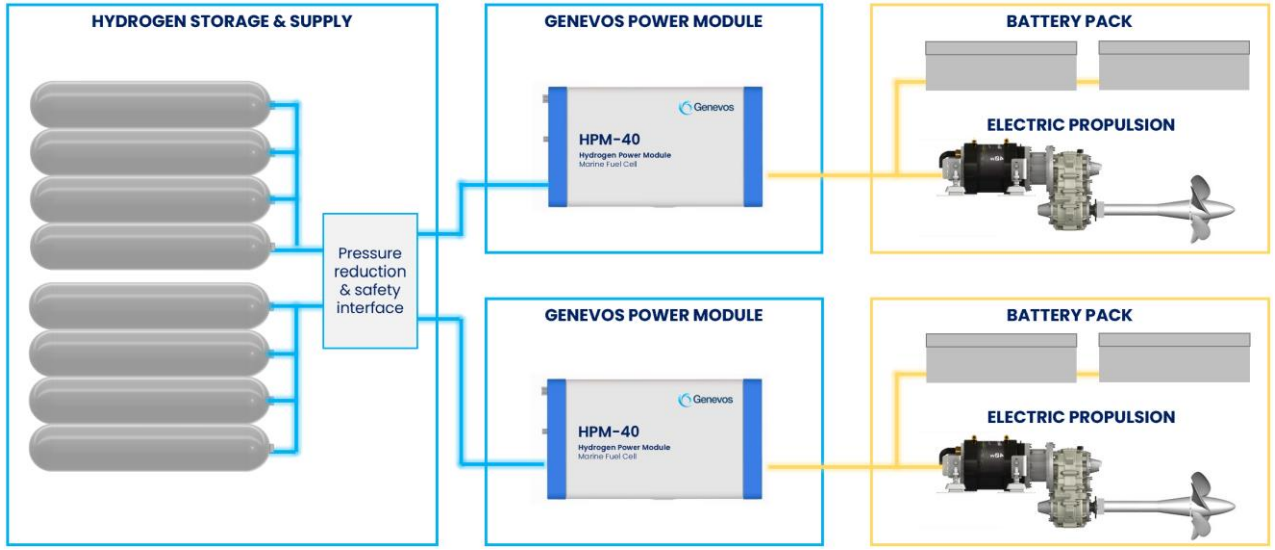
Low Power Applications

Water taxis and pleasure craft: 15 kW - 200 kW vessels

HPM-15

HPM-40

LOW POWER SYSTEM



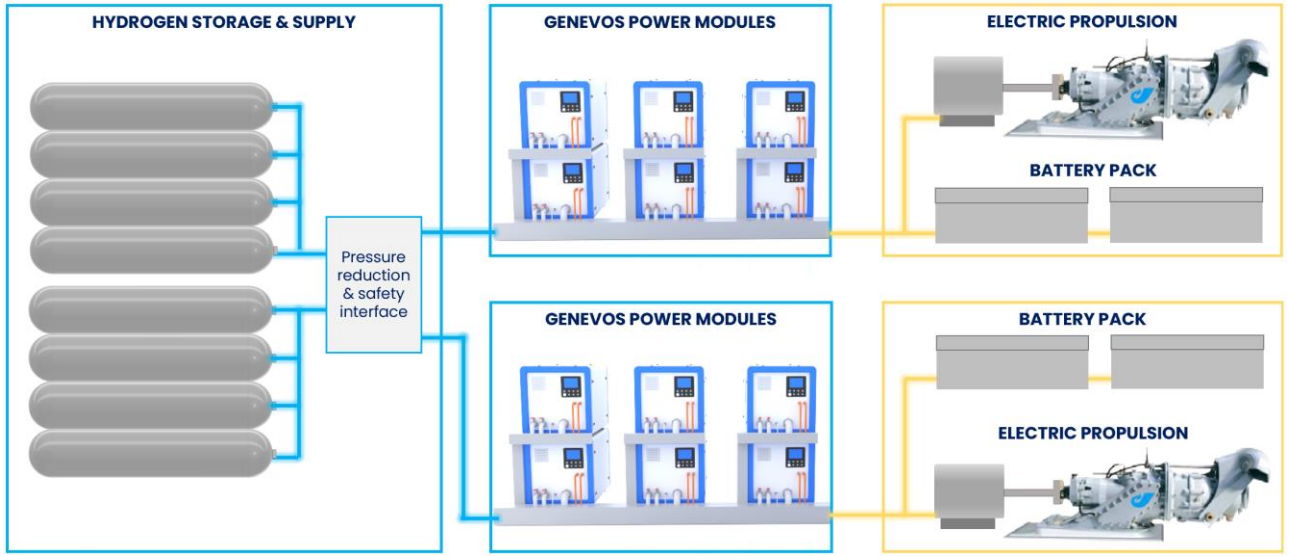
VESSEL EXAMPLES

High Power Applications

Commercial marine applications: 200 kW – 5 MW vessels

HPM-80

HIGH POWER SYSTEM

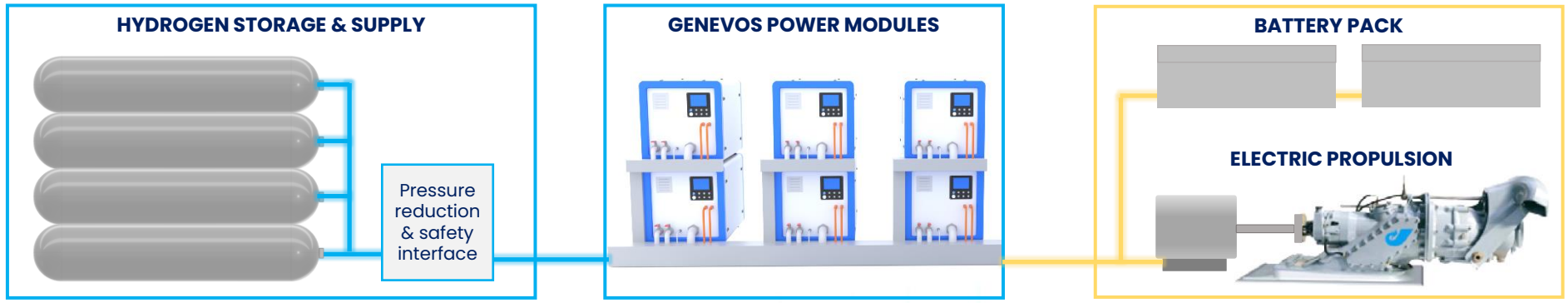


VESSEL EXAMPLES

Compatibility with Future E-Fuels

Modularity enables compatibility with liquid e-fuels for future retrofits or new vessels

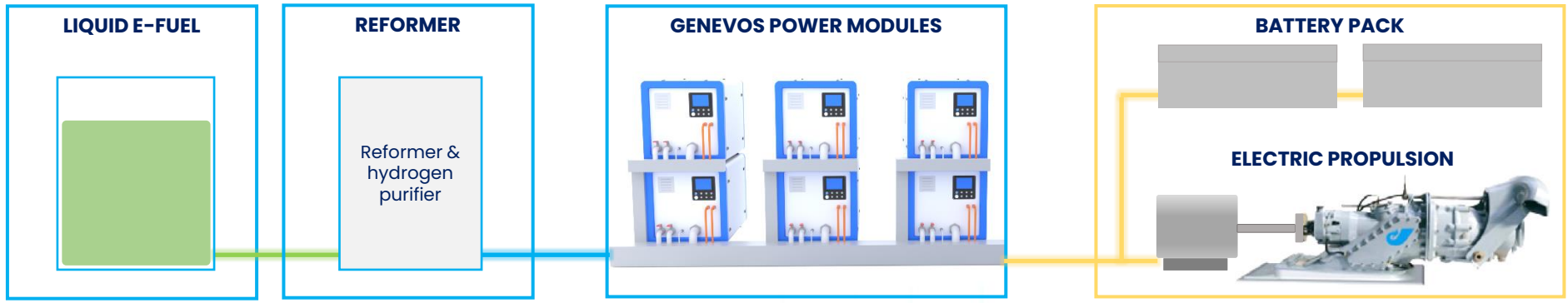
COMPRESSED HYDROGEN



FUELS

- Green hydrogen
- Blue hydrogen

HYDROGEN E-FUELS



FUELS

- Methanol
- Liquid hydrogen
- LOHC
- Ammonia

HPM Benefits

Accelerating the clean power transition

ADVANCED

- Hydrogenics (Cummins) graphite stack technology, world-leaders in hydrogen fuel cells
- Marinised - resistant to saline environment

ENVIRONMENTAL

- Zero emissions: No CO_2, NO_x or SO_x
- No vibration, low noise
- High recyclability (>90%)

EFFICIENT

- Up to 55% net fuel efficiency - twice that of a diesel genset
- Advanced energy management optimising fuel efficiency
- 4 – 6 times lighter than batteries

PRACTICAL 'PLUG & PLAY'

- Rapid refuelling
- Low maintenance
- Modular - multiple units to attain required power
- Fully integrated system for practical installation

Technology Comparison

A scalable cost-effective zero-emissions solution for marine

Comparison of different powertrain technologies, based on a 30 kW marine propulsion system with a 12 hour range.

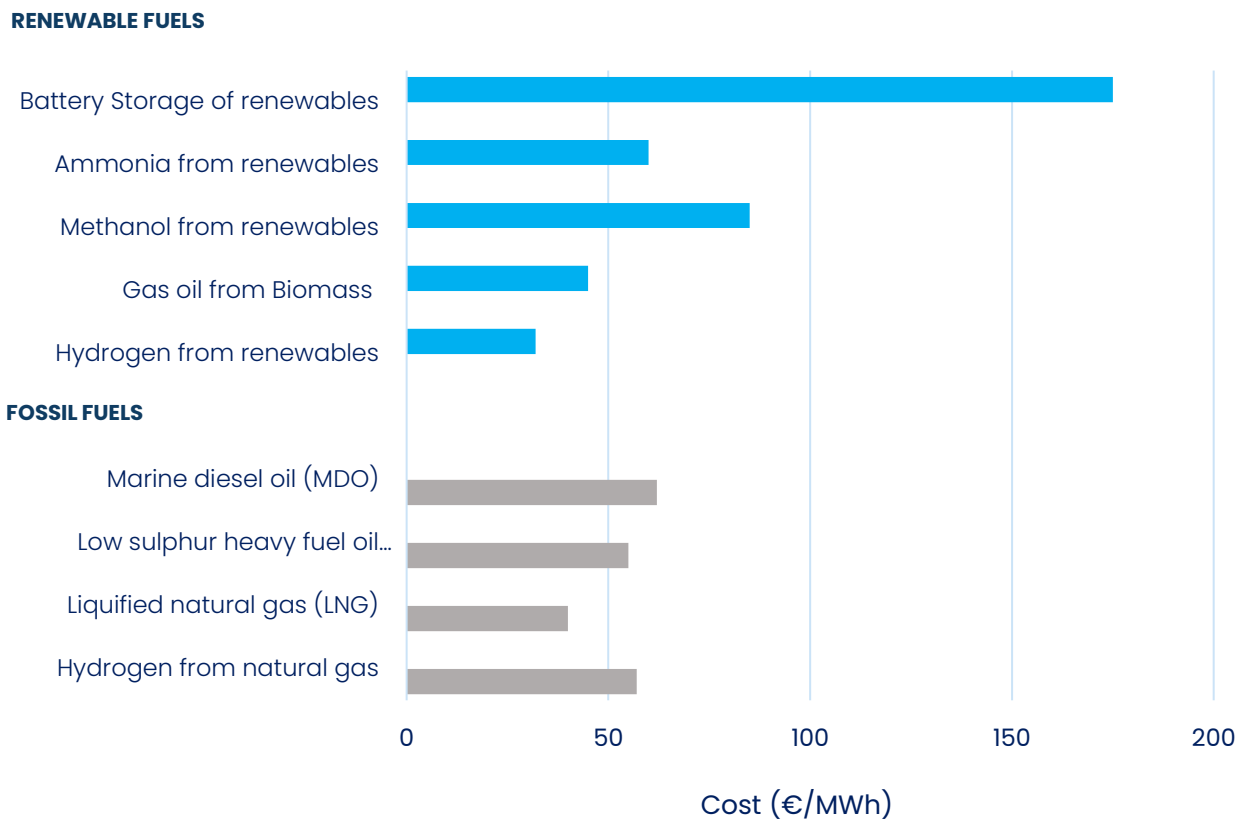
	LIFETIME (YRS.)	EFFICIENCY	REFUELLING TIME	WEIGHT (GENERATOR + FUEL)	EQUIPMENT COST	COST OF OWNERSHIP (5 YRS.)	TOTAL VOLUME
HYDROGEN	15 - 20		15 mins				
BATTERY	5 - 10		5 - 10 hrs				
DIESEL	15 - 20		15 mins				

The Genevos HPM is around 1/3 of the weight of a typical diesel generator

Hydrogen - A Vital Future Fuel for Marine

Incentivising global H2 infrastructure to access clean hydrogen

PROJECTED FUEL COSTS – 2030 ^



PROFITABLE

- Payback after 6 years with over 20% of savings after 10 years in operation relative to diesel system
- Cost of equipment is 50% less than all-lithium battery system for 20 hr system range

^ Source: Zero-Emission Vessels - Transition Pathways 2019

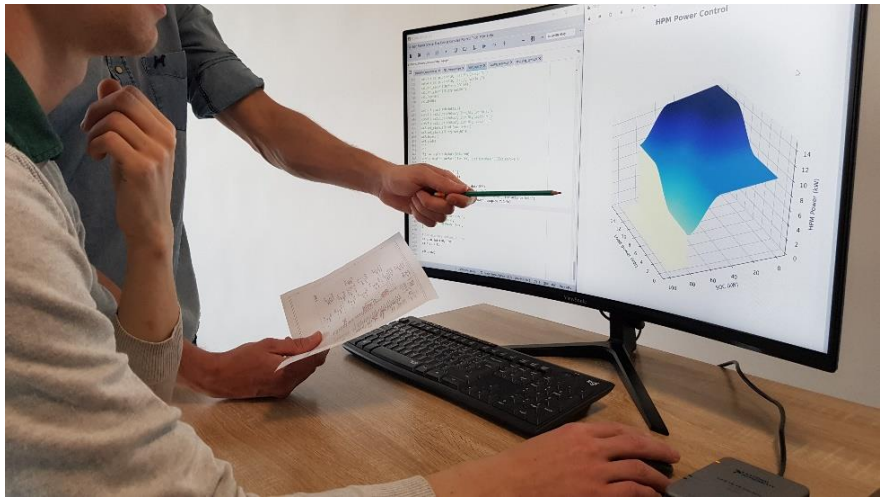
Engineering for Efficiency

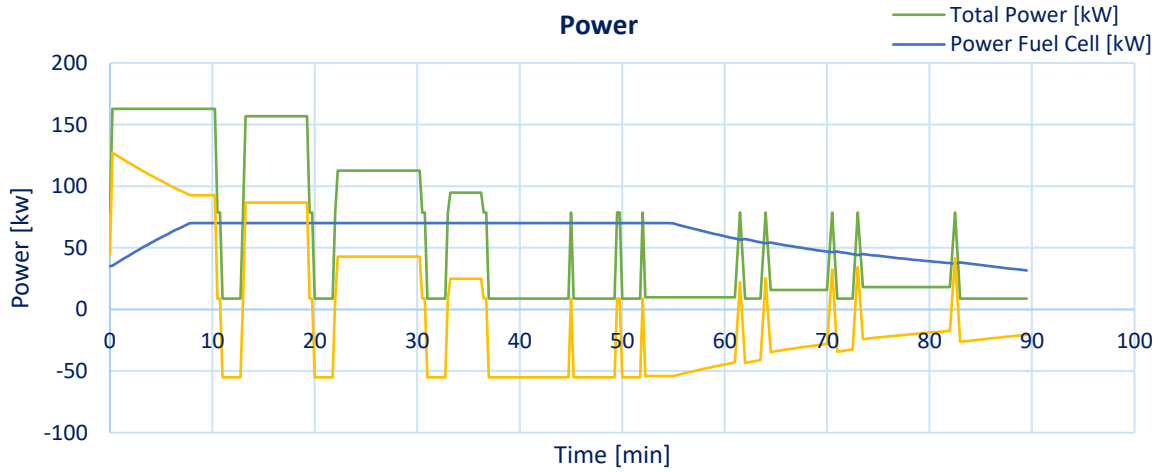
Systems integration support and preliminary system specification

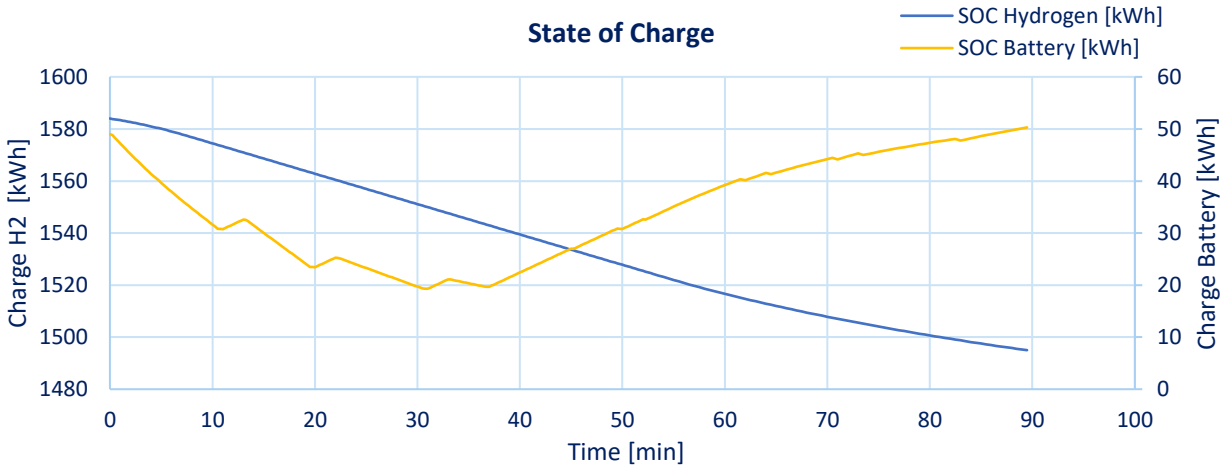
Genevos offers design consulting services for clients exploring hydrogen applications, applying their in-house simulation tools and expertise in power management, control and hydrogen

SERVICES OFFERED

- Preliminary sizing study based on vessel operational profile to size fuel cells, battery and storage requirements
- Optimisation to total cost of ownership or weight
- Power management strategy optimisation
- Engineering support for vessel gas integration







Partners & Associations

Collaborating for the clean transition

Genevos
EFFICIENT INNOVATIONS

GLOBAL SERVICE

Cummins

PROPULSION

TRANSFLUID industrial & marine

Bellmarine powered by Transfluid

GREEN HYDROGEN

Pôle Atlan Tech La Rochelle

Lhyfe

CERTIFICATION

LR

PROJECT

Région Nouvelle-Aquitaine

bpifrance

R&D

Imperial College London

EIGSI École d'Ingénieurs La Rochelle · Casablanca

NETWORKS

European Clean Hydrogen Alliance

RACE TO ZERO

SME Climate HUB

Cluster Maritime Français
Cap sur la croissance bleue

Scottish Hydrogen & Fuel Cell Association

France Hydrogène
Engagée pour la transition écologique

AFBE Association Française pour le Bateau Électrique

Contact Us

Find out more about how to decarbonise your vessel or fleet

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