

MARTE

Sadarbības kopiena kā pamats reģionālai jūras
tehnoloģiju inovāciju ekosistēmai



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RTU

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H2-SEAS

EUROPEAN CLIMATE, INFRASTRUCTURE AND ENVIRONMENT
EXECUTIVE AGENCY (CINEA)
CINEA.C – Green research and innovation
C.1 – Horizon Europe Climate
GRANT AGREEMENT
Project 101157530 — H2-SEAS
Project name: Coastal Fishing Vessels Powered by Zero Emission
Hydrogen Fuel Cell Project acronym: H2-SEAS

**Coastal Fishing Vessels Powered by Zero Emission
Hydrogen Fuel Cell**

The initiative proposes a novel, fully-integrated hydrogenelectric fishing vessel to accelerate a sustainable and accessible transition to clean and efficient power for smallscale fishing fleets

Based on hydrogen fuel cell technology, the prototype will demonstrate increased energy efficiency and an environmentally friendly solution for the marine environment: zero emissions and low sound pollution

The project will be implemented by the design, construction, and operational demonstration of a hydrogen-electric fishing vessel, to test and validate its resilience in the harsh marine environment.



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Project partners



Riga Technical University



SEI Tallinn



Genevos



ATOZ Group (A2Z)



Vidzeme University of Applied
Sciences

WP1 Overall management

WP2 Regulatory aspects and Marine environmental impact

D2.1 – White paper on technical, social, legal, regulatory and policy barriers to small-scale fisheries decarbonisation

D2.2 – White paper on technical, social, legal, regulatory and policy barriers to small-scale fisheries decarbonization (Update)

D2.3 – H2-SEAS environmental impact (interim version)

D2.4 – H2-SEAS environmental impact

WP3 Zero Emission solution

D3.1 – Hydrogen system sizing

D3.2 – Hydrogen storage and supply

D3.3 – Hydrogen Power Module

D3.4 – Hydrogen distribution system

WP4 Ship building

D4.1 – Vessel's specification and requirement

D4.2 – Construction of the vessel's prototype

D4.3 – Integration of hydrogen fuel cell powering system and electric propulsion into the hull

D4.4 – Global testing of the hydrogen fuel cell powered vessel to verify interoperability between different components

WP5 Demonstrations at sea

D5.1 – Organisation of demonstrations at sea

D5.2 – Hydrogen supply plan

D5.3 – Assessment of demonstrations at sea

D5.4 – Hydrogen supply plan (update)

D5.5 – Testing protocols for demonstrations at sea

WP6 Dissemination, exploitation and communication

D6.1 – H2-SEAS Dissemination and exploitation plan

D6.2 – H2-SEAS Dissemination and exploitation plan (update 1)

D6.3 – H2-SEAS Dissemination and exploitation plan (Final release)

D6.4 – H2-SEAS visibility-Website

D6.5 – Scientific publications

D6.6 – Training plan and training activities

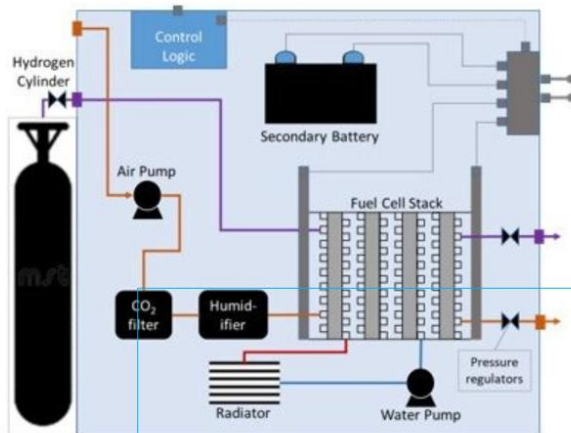
D6.7 – Synergy with relevant EU projects and other initiatives



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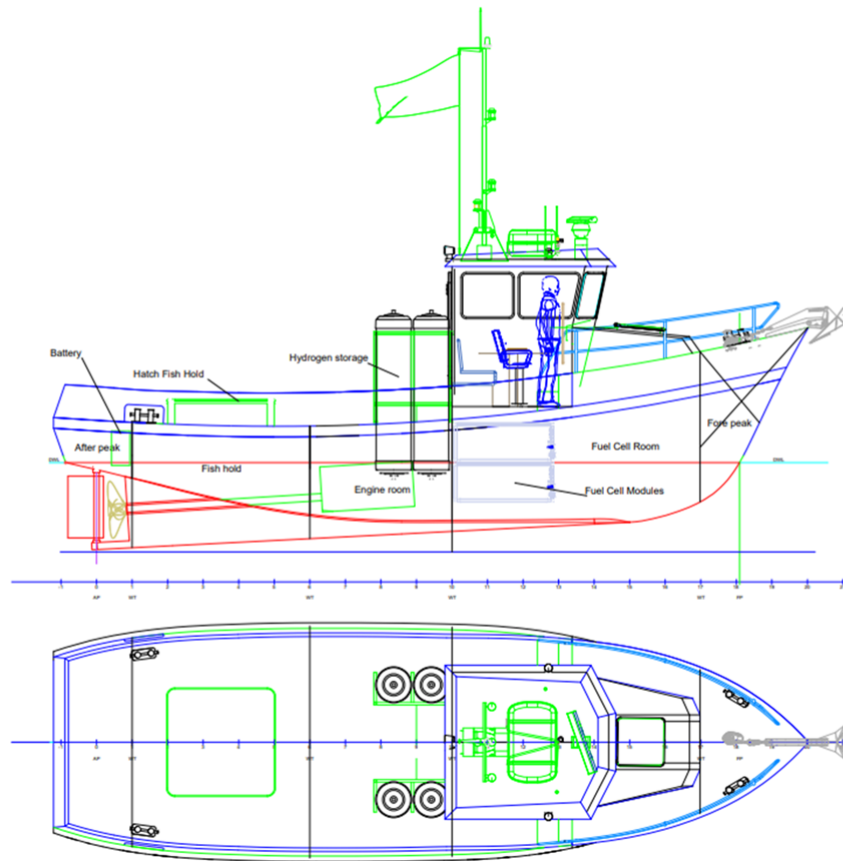


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Alternative to Thermic-powered engine Hydrogen-powered engine:

- No emission
- No noise
- No smell
- Reliable (much lower maintenance needs and long lifetime)
- Electrical efficiency > 35% (if use heat > 80%)
 - *Fuel Cells* : Chemical Energy $\Rightarrow$ Electrical Energy
 - *Thermic Engine* : Chemical Energy $\Rightarrow$ Heat $\Rightarrow$ Mechanical Energy $\Rightarrow$ Electrical Energy
- Scalable construction for needed power (Multiple cells in a stack can be used to provide higher voltages)
- Can be multi-fuel (H₂, Natural gas, propane, LPG or biogas)



PRINCIPAL PARTICULARS

Main dimensions:	
Length overall, m	11.20
Length hull, m	10.60
Beam overall, m	3.36
Beam hull, m	3.05
Depth at bow, m	3.16
Depth at stern, m	2.36
Draft hull, m	0.82
Draft with skeg, m	1.26
Maximum displacement, t	9.6
Maximum speed, kn	14
Range, nm	
Total power	1x100 kW
Crew	2 - 3
Fish Hold Capacity	6.42 m ³

GENEVOS SAS

HPM-40 Gen2 40kW HYDROGEN POWER MODULE OVERVIEW

The Hydrogen Power Module (HPM) is a marinized, clean-power generator for use onboard vessels either for powering auxiliary systems or for powering an electric propulsion system for a vessel. Its intended application is not limited particularly fishing vessels, and so can be applied to offshore, coastal, inland and subsea vessels. The HPM transforms hydrogen gas into electrical energy at a compatible output voltage for the vessel's battery / propulsion system, whilst being sufficiently robust to operate in harsh marine environments. It is designed as a plug-and-play power solution, for which the HPM has fully-integrated auxiliary systems (balance of plant) including air compression, hydrogen supply, cooling system with heat exchanger, DC-DC converter, and energy management system for power hybridisation control. The HPM additionally includes a safety management system to be able detect, contain and ventilate leakage, and to shut-off the fuel supply automatically if needed. The HPM is designed to be installed above or below deck in a safe space, with the enclosure of the unit defining the limits of the fuel cell space. Ventilation and exhaust ports are required to be led directly from the HPM to the outside of the vessel via transfer pipes.





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Cylinders

For the vessel design calculation 2 Luxfer cylinders GH27108 to store hydrogen were selected. This cylinder specially design for store gas in maritime environment and has follow specification:

Approval -HGV2

Service Pressure (bar)- 350

Diameter (mm)-685.8

Length (mm)- 2762

Weight (kg)- 225

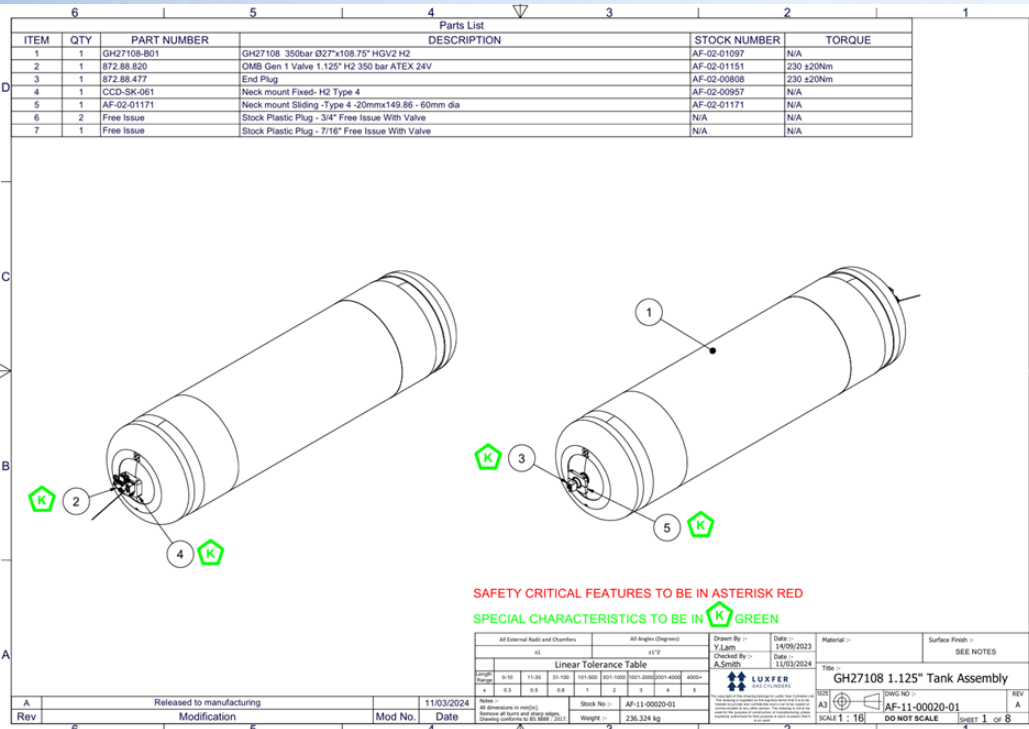
Water Volume (l)- 796

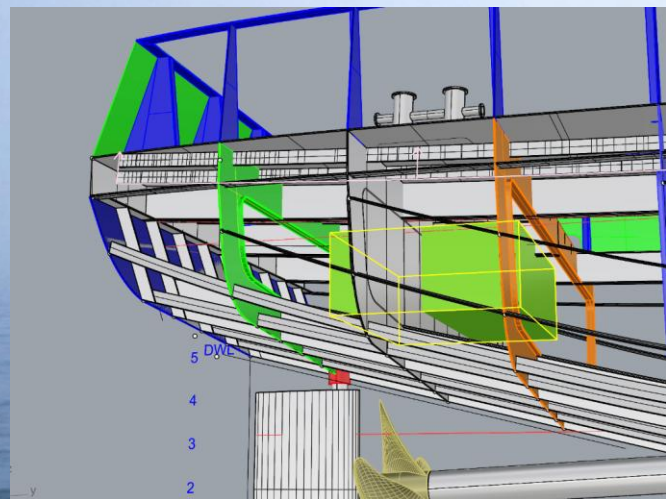
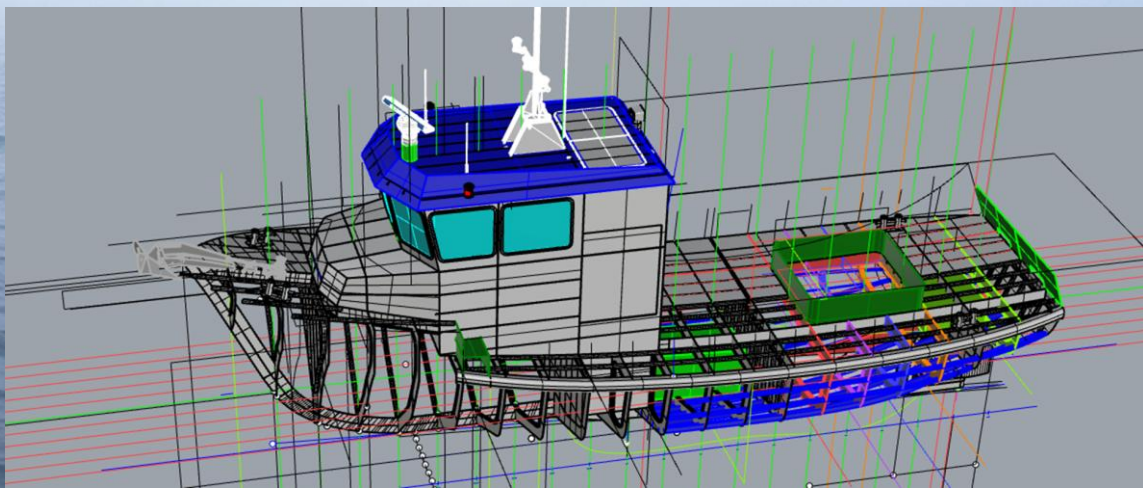
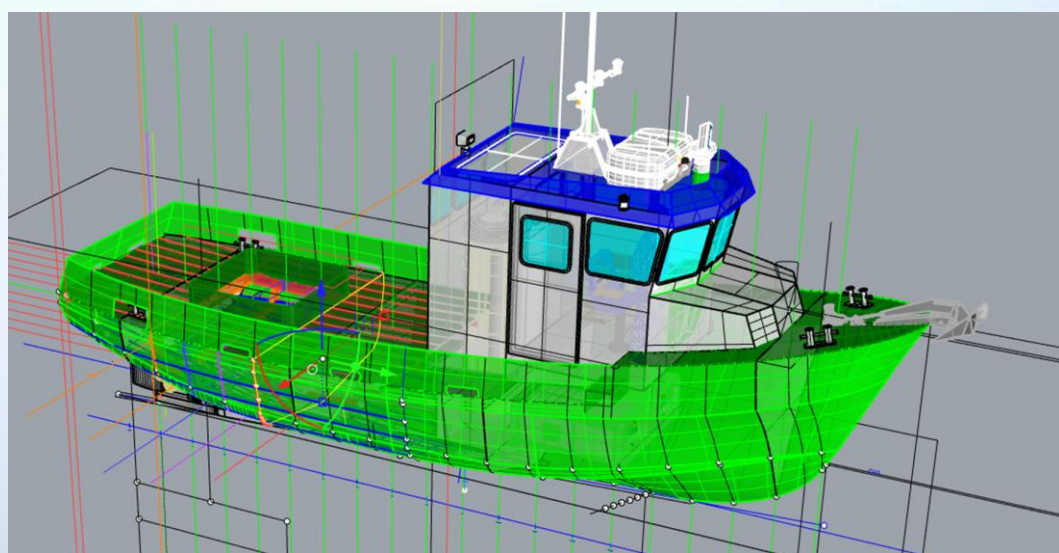
Total weight tank and fuel (kg)-244.1

H2 capacity (kg)- 19.1

Neck mount-Yes

Thread size- 1.125-12UNF-2B



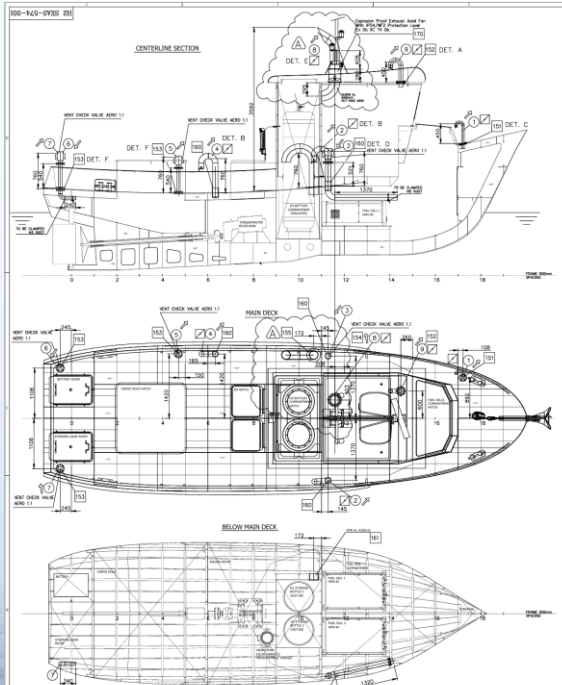




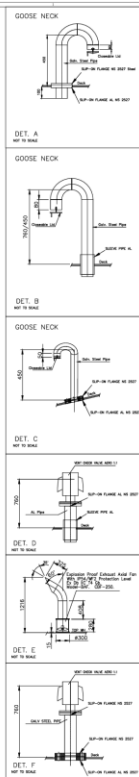
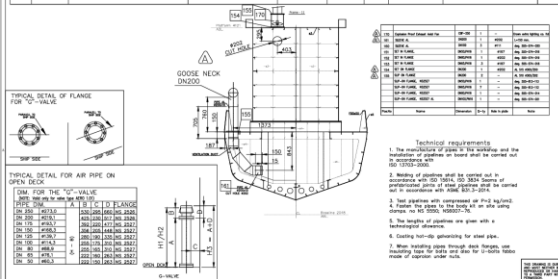
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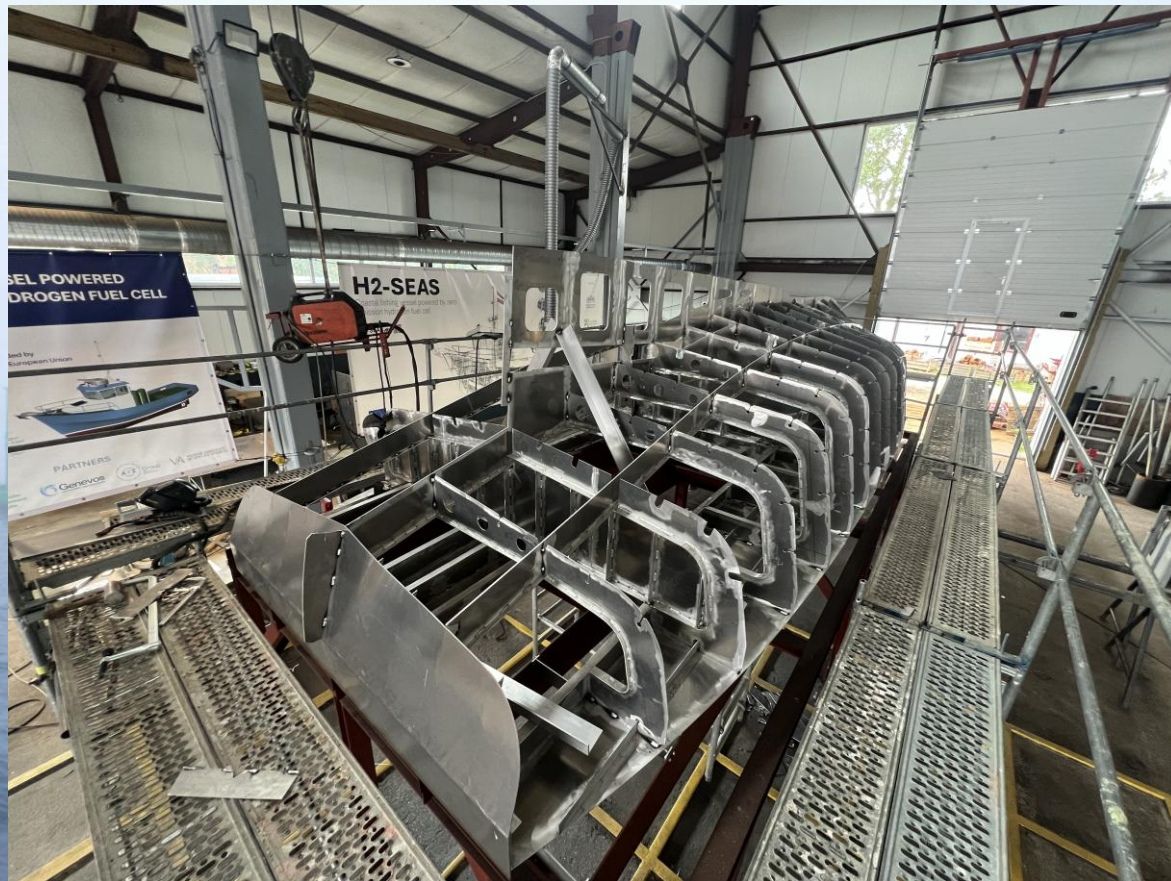
ATOZ[®]
GROUP



POS.	TYPE	FROM	TO	FORCASTIC DECK	NOM. SIZE	HEIGHT	DETAIL	DOCT	REMARKS	POS.
01	EXHAUST	FORECASTIC DECK	FORECASTIC DECK	NO 8 1/2	450	C	#1050-3	DALY STEEL PPK		01
02	EXHAUST	GENERATORS FUEL CELLS ROOM	OPEN DECK	NO 10 1/2	760	B	#1050-5	AL PPK		02
03	SUPPLY	OPEN DECK	GENERATORS ROOM	NORS 800	HEAD	760	C	#1050-5	AL PPK	03
04	EXHAUST	GENERATORS ROOM	OPEN DECK	NORS 800	HEAD	760	B	#1050-5	AL PPK	04
05	SUPPLY	CARGO HOLD	CARGO HOLD	NORS 800	HEAD	760	F	#71-17.1	DALY STEEL PPK	05
06	SUPPLY	MAN HOLD	STORAGE CARGO ROOM	NORS 800	HEAD	760	F	#17-17.1	DALY STEEL PPK	06
07	EXHAUST	STORAGE CARGO ROOM	STORAGE CARGO ROOM	NORS 800	HEAD	760	F	#17-17.1	DALY STEEL PPK	07
08	EXHAUST	H2 BOTTLES COMPARTMENT	TOP WHEELHOUSE	N225	FIN 40	3592	C	#200-10	AL PPK	08
09	EXHAUST	WHEELHOUSE	TOP WHEELHOUSE	NO 8 1/2	450	A	#188-9.3	DALY STEEL PPK		09

[illegible]





Demonstrations at sea

1. Riga (Latvia) 06.26

2. Parnu (Estonia) 08.26

3. Boulogne (France) 09.26

Organisation of
demonstrations
at sea



THANKS

