

Duferco

Engineering

Hydrogen for Mobility:

DUFERCO VIEW

HYDROGEN EXPO - September 2024

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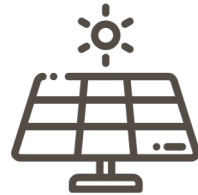
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DUFERCO: WHO WE ARE

STEEL



ENERGY



INNOVATION



SHIPPING

Duferco

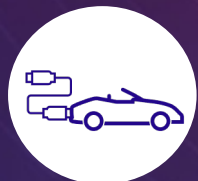
The Duferco Group, founded in 1979, is an international holding company established to operate mainly in the steel sector, but which over the years has developed diversified activities in various sectors at an international level.

PROFIT 2023
450 Mln\$

REVENUE 2023
circa 27.6 Mld\$

EMPLOYEES
+2,400

DUFERCO ENERGIA



ELECTRICITY AND GAS

+370.000

served clients



PRODUCTION OF RENEWABLES

90 GWh

Photovoltaic and hydroelectric



ENERGY EFFICIENCY

+100

Completed projects since 2020



E-MOBILITY

+35.000

Re-charging points in Italy



TRADING

+105 TWh

Traded volumes only in 2023

DUFERCO ENGINEERING

Duferco
Engineering

PROVIDING

- Feasibility Study and Business Evaluation
- Innovation – Industrial Application
- R&D on Energy Transition Technology
- EPC and O&M Services (Value of the project Managed up to December 2023 750 M€ achieved and 160 M€ in progress)



H2 – RELEVANT EXPERIENCES

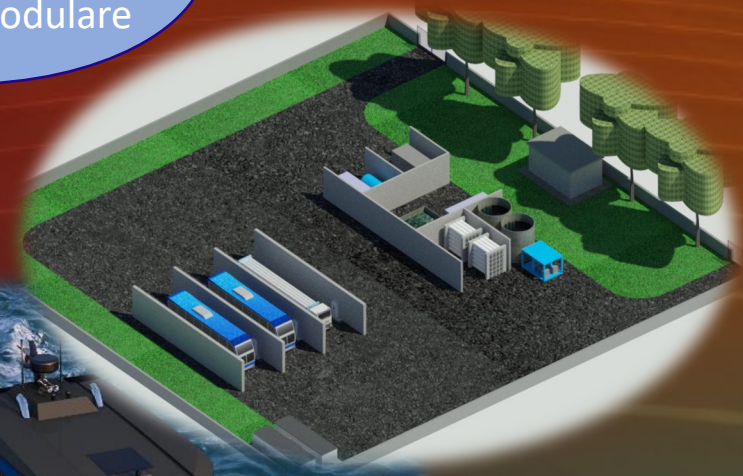
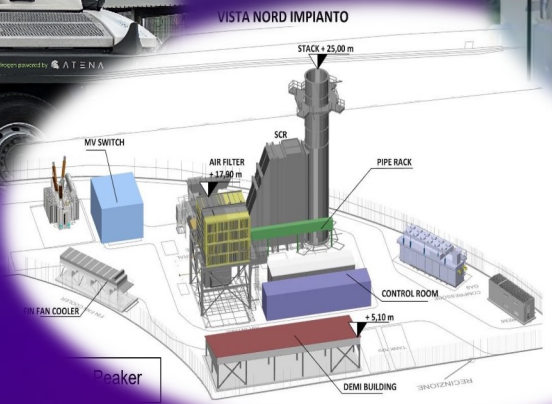
Heavy Duty
Decarbonisation

Power Plant
H2/NG Blend

H2 Project
Consultancy
Service

BIIM – Battello
Innovativo
Ibrido Modulare

Hydrogen Valley -
Sicilia



H2 – RELEVANT EXPERIENCES



Heavy Duty
Decarbonisation

- Progetto su Area Duferco
- In Collaborazione con ATENA

~45 t/y

H2 produced

~1 MW

Electrolyzer
power

3.5
MWh

Batteries' capacity

180
Kg

H2 stocking capacity

30 bar

H2 stocking pressure



H2 – RELEVANT EXPERIENCES

Power Plant H2/NG Blend

- Progetto su Area Duferco
- In Collaborazione con CNR – SNAM – Meridionale Impianti - DeNora

58 MW

Installed power

~ 15.500 Nmc/h

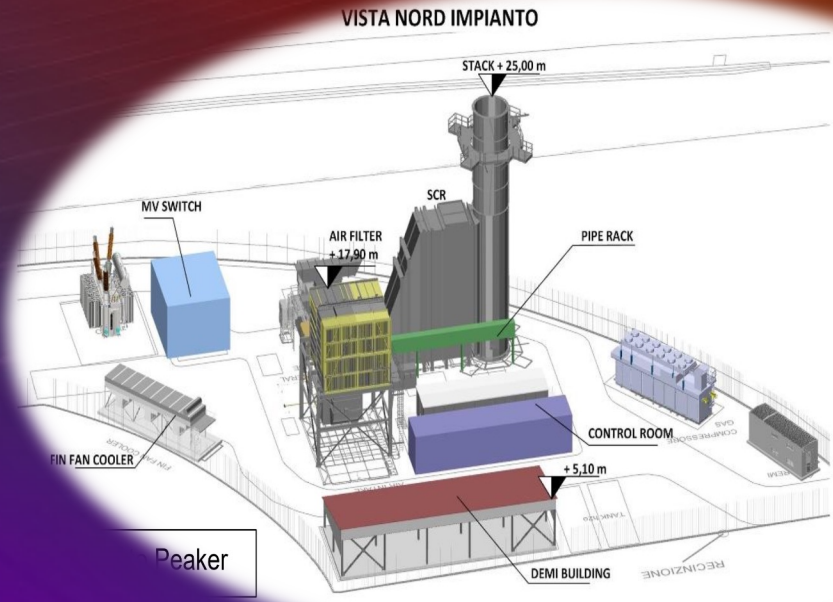
Hourly consumption

420°C

Smoke's temperature

16x10⁶ Nmc

Estimated yearly gas consumption



H2 – RELEVANT EXPERIENCES

H2 Project
Consultancy
Service

~1 MW

Electrolyzer power

~25 t/y

H2 produced

100 m³

H2 stocking capacity

1.400
MWh

Renewable Energy

32 bar

H2 stocking pressure

~ 12.0 M€

Expected investment



H2 – RELEVANT EXPERIENCES: BIIM – Battello Ibrido Innovativo Modulare



BIIM is a boat that, in addition to operating with 2 100 kW diesel engines, can navigate in hybrid mode through a **VHD module equipped with 2 30 kW electric motors that allow full electric, silent, and zero-emission operation.**

The 2 electric motors are powered by salt batteries and a **45 kW fuel cell**, which in turn is powered by **hydrogen stored in 2 metal hydride tanks.**

Finanziato da REGIONE LIGURIA

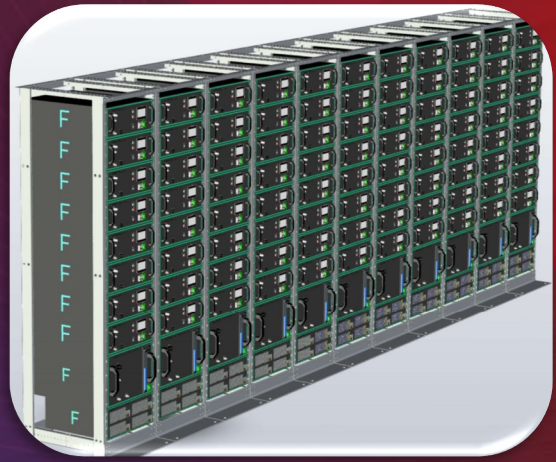


Lenght	12.95 m
Immersion	0.87 m
Displacement	19 t
Diesel engines	2 x Nanni N4.140 (99.4kW)
Electric engines	2 x 30 kW OEMER LQ 132 P
Max. speed	10 knots
Cruiship speed	8 knots
Tank's size	2 x 400 litres
Salt batteries	6 x 22.5 kWh
Fuel cells	1 x PEM 45 kW
Hydrogen storage	2 x metal hydrides 3kgH2

H2 – RELEVANT EXPERIENCES: Hydrogen Valley Giammoro (Sicilia)

- Partner: Nippon Gases, Caronte
- Finanziato PNNR

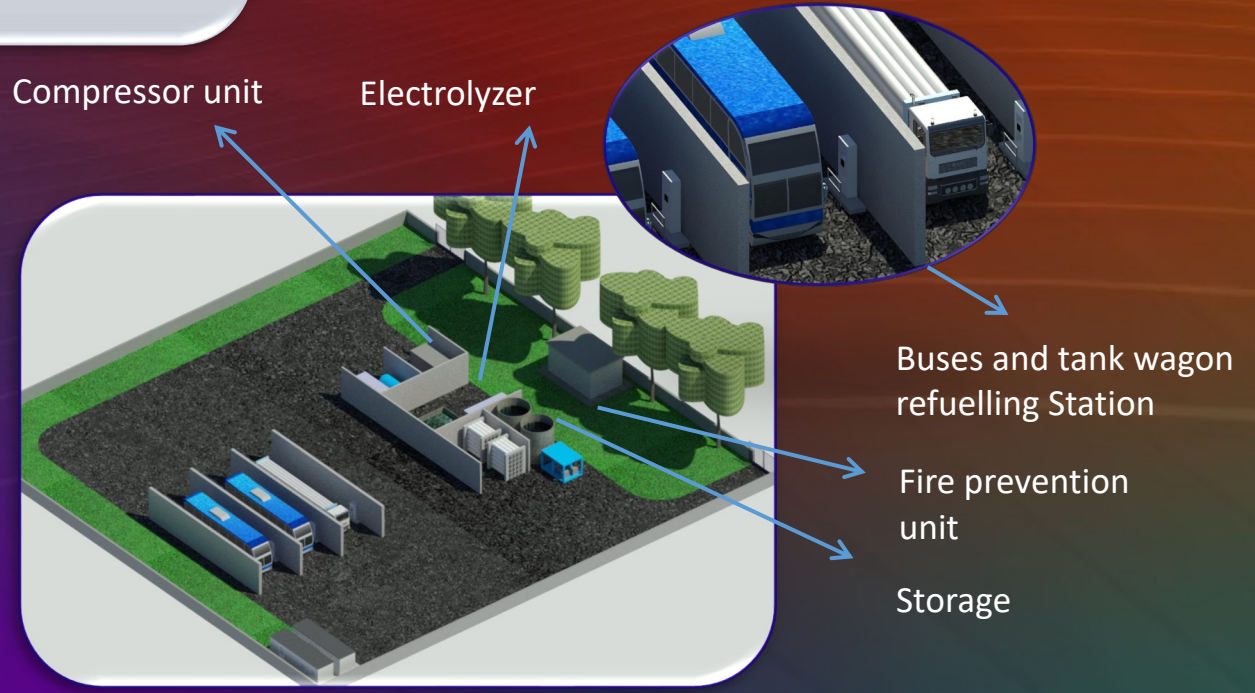
- ~100 t/y H2 production
- 1.1 MW Electrolyzer power
- 400 Kg H2 Storage
- 4 MWp PV Plant power
- 7.3 MWh Battery Capacity
- 10 ML€ Project Value



Electrolyzer

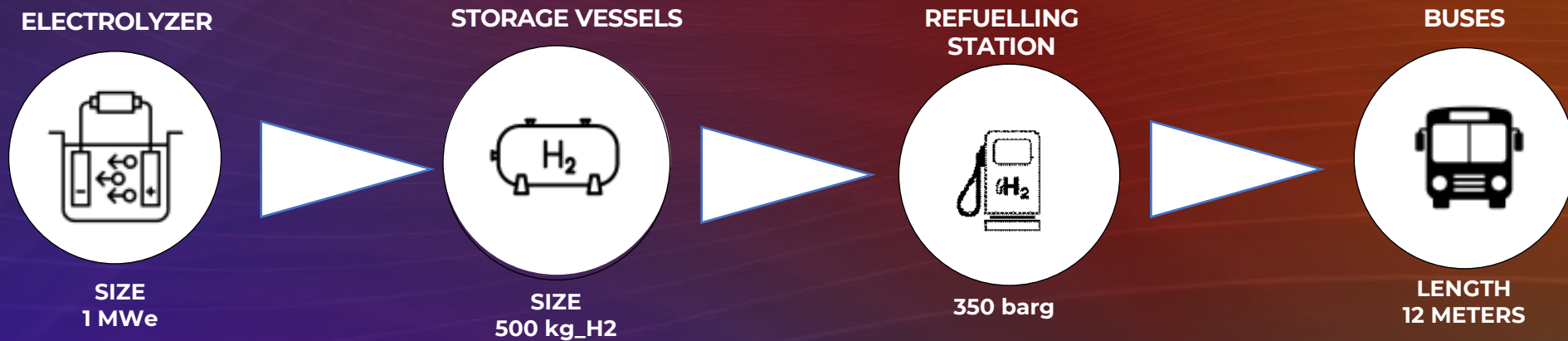


H2 Storage



H2 – RELEVANT EXPERIENCES: Hydrogen Valley Giammoro (Sicilia)

- Developing carbon free Transportation Solution H2 Based
 - Intercity Bus transportation – Hilly route



H2 – RELEVANT EXPERIENCES: Hydrogen Valley Giammoro (Sicilia)

ASSUMPTIONS

- ✓ Renewable hydrogen from water electrolysis and green electricity
- ✓ The renewable hydrogen plant works 4.500 hours per year.

Annual renewable hydrogen production \approx 100 ton



Possibility to refuel daily up to 8 buses



LCOH: 7,3 € / kg (H2 plant)



0,71 € / km