



**15th South East Europe
Energy Dialogue**

20 June 2024, Thessaloniki

SUMMARY

1. HDF Energy quick introduction
2. HDF Energy's proposal for Greece & Cyprus: The Renewstable®
3. HDF Energy's relation with the UE

HDF ENERGY, A GLOBAL PURE PLAYER IN HYDROGEN

H2 INFRASTRUCTURE



Development, operation & ownership of large-scale hydrogen infrastructure



Electricity production



Green hydrogen production

MULTI-MW FUEL CELL TECHNOLOGY



Design and mass production of high-power fuel cells



Power supply

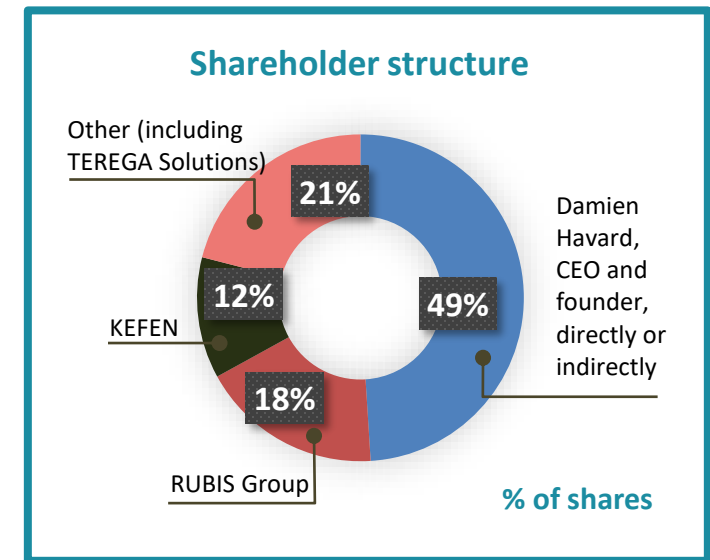
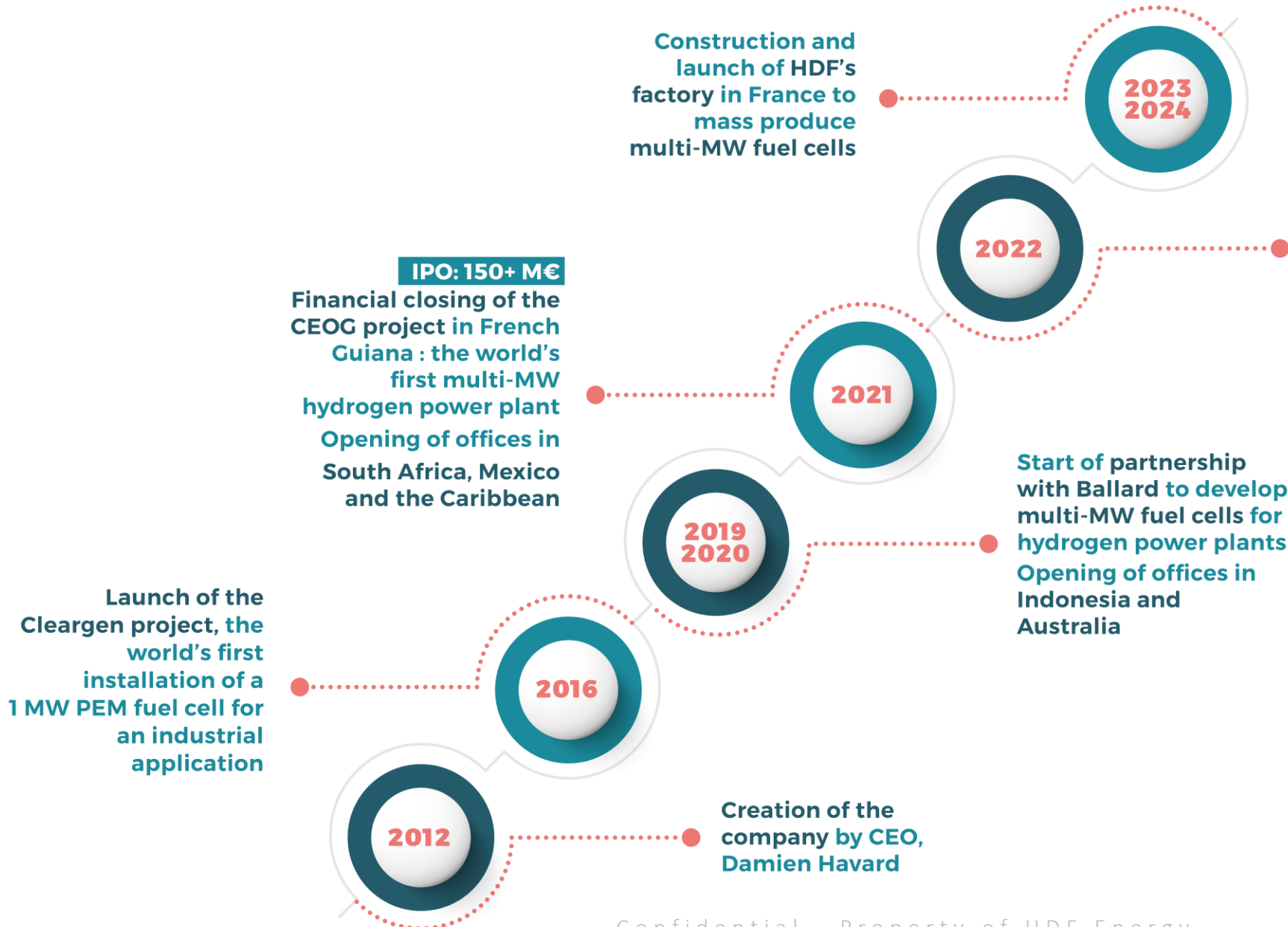


Marine

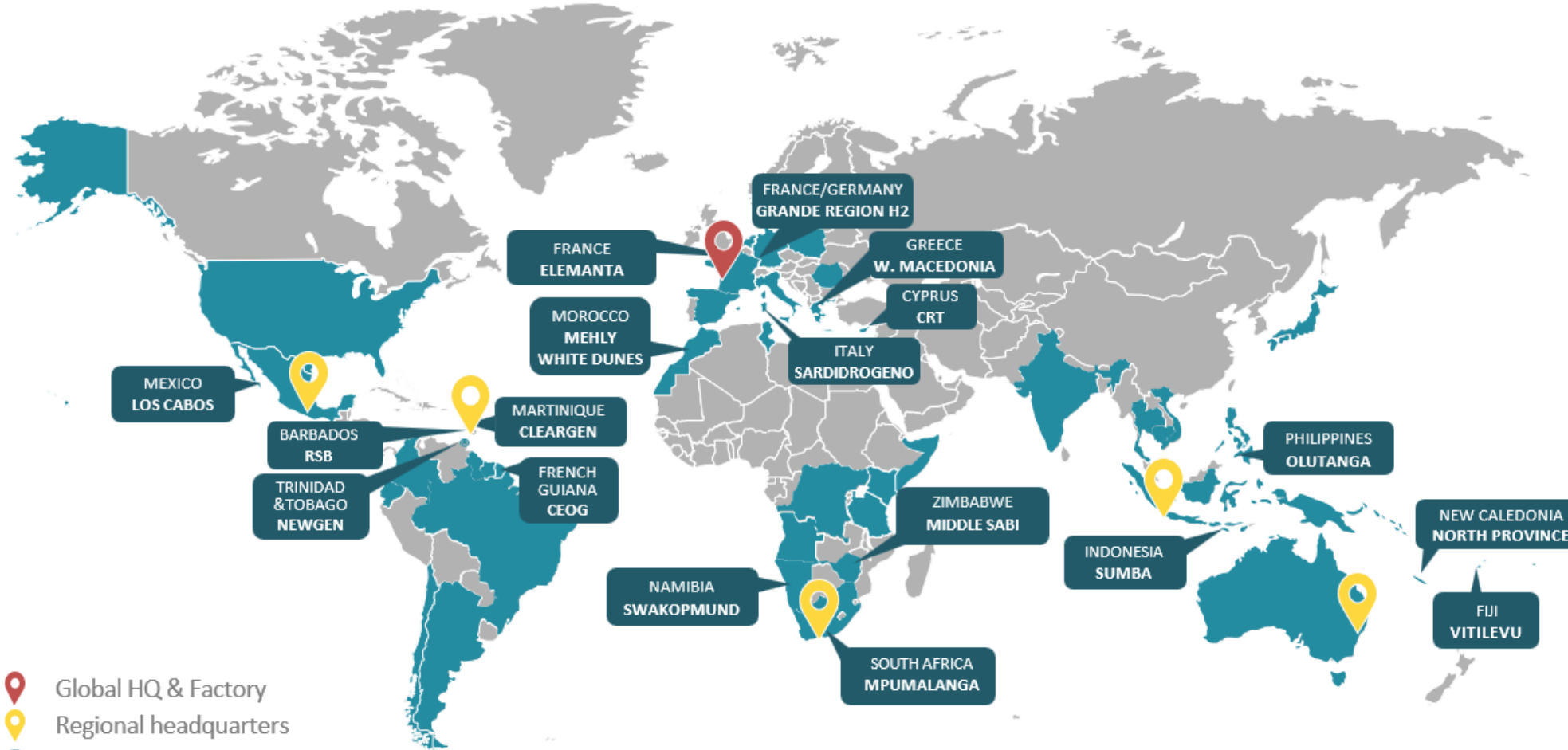


Rail

ESTABLISHING A SOLID INTERNATIONAL COMPANY



GLOBAL LEADER IN HYDROGEN INFRASTRUCTURE WITH STRONG LOCAL PRESENCE



Present in **30+ countries, 5 continents**



€ 5 billion projects under development



30+ different nationalities among staff

- Global HQ & Factory
- Regional headquarters
- Local presence
- Main projects

TECHNICAL AND PROJECT EXPERTISE ACROSS THE ENTIRE H₂ VALUE CHAIN



POWER PLANT DESIGN

Feasibility studies, power plant modelling, site selection



PROJECT & TECHNICAL LEAD

Basic and FEED engineering capabilities, project management consulting, permitting management, grid connection



PROJECT FINANCING

Financial modeling, project finance and equity investment, project structuring, asset management, contract negotiation / management, M&A, CSR (ESG) management



OPERATIONS

Testing & commissioning, remote control, EMS, supplier qualification, maintenance and operation, optimization of performance, asset management



MULTI-MW FUEL CELLS

R&D and innovation, modular product development, advanced manufacturing processes, supply chain management & optimization, certification

A TEAM OF HYDROGEN INFRASTRUCTURE EXPERTS

100+

multicultural, global and local talents

having amassed extensive experience gained at key companies from the oil&gas and renewables industries

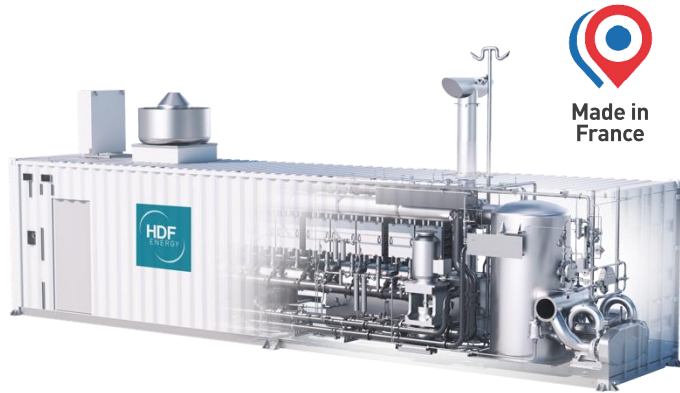


HYDROGEN PROCESSES

production, clearing, transport, storage & use

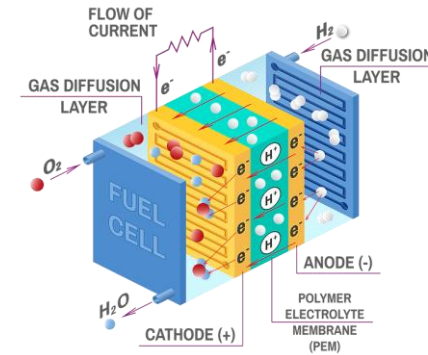
THE WORLD'S LARGEST FUEL CELL SYSTEM DESIGNED FOR ENERGY INTENSIVE APPLICATIONS

HDF'S FUEL CELL SYSTEM



- ✓ 1 to 10 MW unit capacity
- ✓ PEM Technology
- ✓ Modular design
- ✓ Emission free
- ✓ 25+ years lifetime
- ✓ Quick start-up and immediate response to fluctuations in power demand
- ✓ Easy maintenance
- ✓ Low operating costs
- ✓ Safety and CE certified

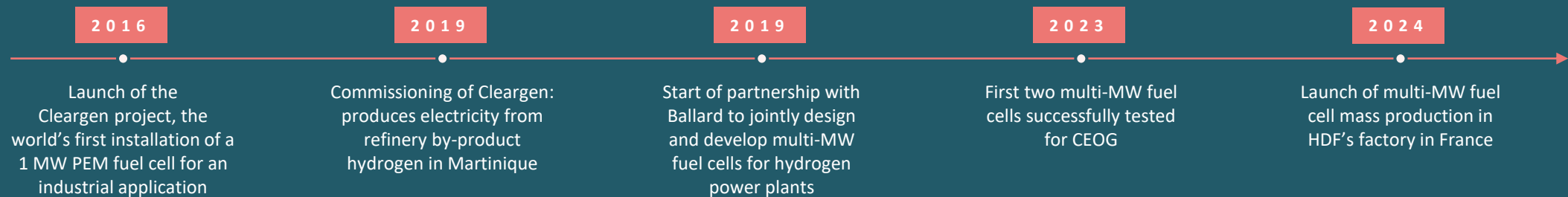
PEM* TECHNOLOGY



- ✓ High power density
- ✓ Mature technology
- ✓ High efficiency (> 50%)
- ✓ Long durability (> 30 000h)

* Proton Exchange Membrane

KEY MILESTONES – FUEL CELL DEVELOPMENT



OUR GIGA FACTORY IN FRANCE: THE WORLD'S FIRST MASS PRODUCTION PLANT FOR MULTI-MW PEM FUEL CELLS



Annual production capacity
1 GW by 2030



Employees
+500 by 2030



Location
Bordeaux, France



Factory size
7 000 m²
(phase 1)



Operational
In 2024



Environmental certification

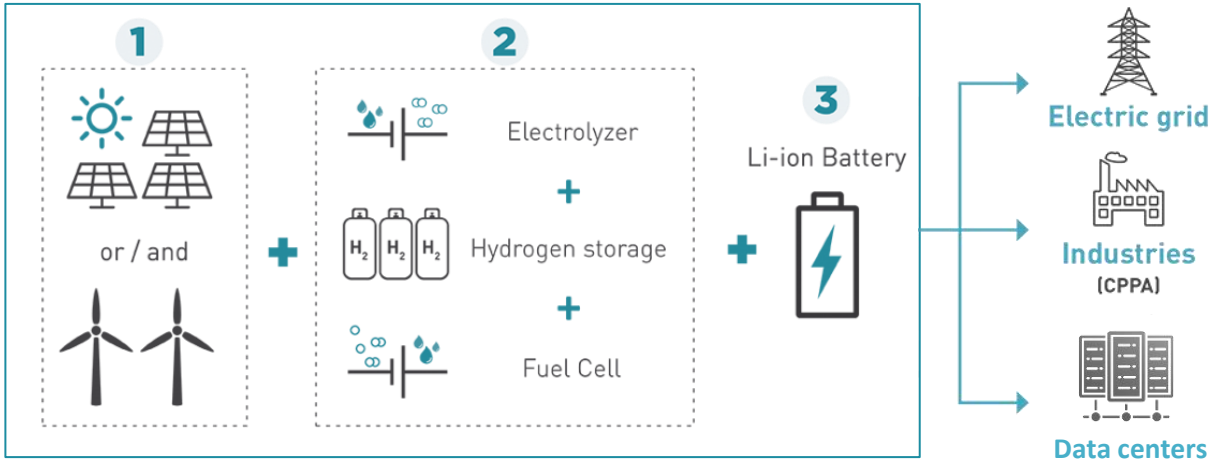
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HDF ENERGY SOLUTIONS

RENEWSTABLE®

POWER TO POWER



- Enabling 100% renewable energy penetration while enabling the decommissioning of fossil fuel power plants
- No need for a fuel supply chain and/or fuel imports
- Dispatchable power plant

HYPOWER

H2 TO POWER



- Suitable for cold-ironing and berths with difficulties connecting to the power grid
- Long-term potential for greening peak-shaving power (replacing CCGTs).
- The development of hydrogen pipelines and large-scale storage infrastructure is required.

RENEWSTABLE®, A STRONG TRACK RECORD IN PROJECT DEVELOPMENT

IN ADVANCED DEVELOPMENT STAGES

RSWK – Namibia



Solar PV
85 MWp

Storage Capacity
230 MWh

Power Generation
142 GWh/year
baseload

LOS CABOS – Mexico



Solar PV
152 MWp

Storage Capacity
280 MWh

Power Generation
189 GWh/year
Baseload

SUMBA - Indonesia

First project
to be duplicated in +20 locations
across the country



Solar PV
30 MWp

Storage Capacity
67 MWh

Power Generation
47 GWh/year
Baseload

RSB – Barbados



Solar PV
50 MWp

Storage Capacity
120 MWh

Power Generation
60 GWh/year
baseload

UNDER CONSTRUCTION

CEOG, the world's first MULTI-MW hydrogen power plant



KEY FIGURES

Solar PV
55 MWp

Storage Capacity
128 MWh

Power Generation
50 GWh/year
Baseload

Electrolysis
16 MW
World's 2nd
largest capacity

Power Supply
for 50 000
inhabitants

Power Purchase Agreement
25 years

Total Investment: 170 M€

Commissioning: 2026

OFFTAKER



EQUITY INVESTORS



LENDERS

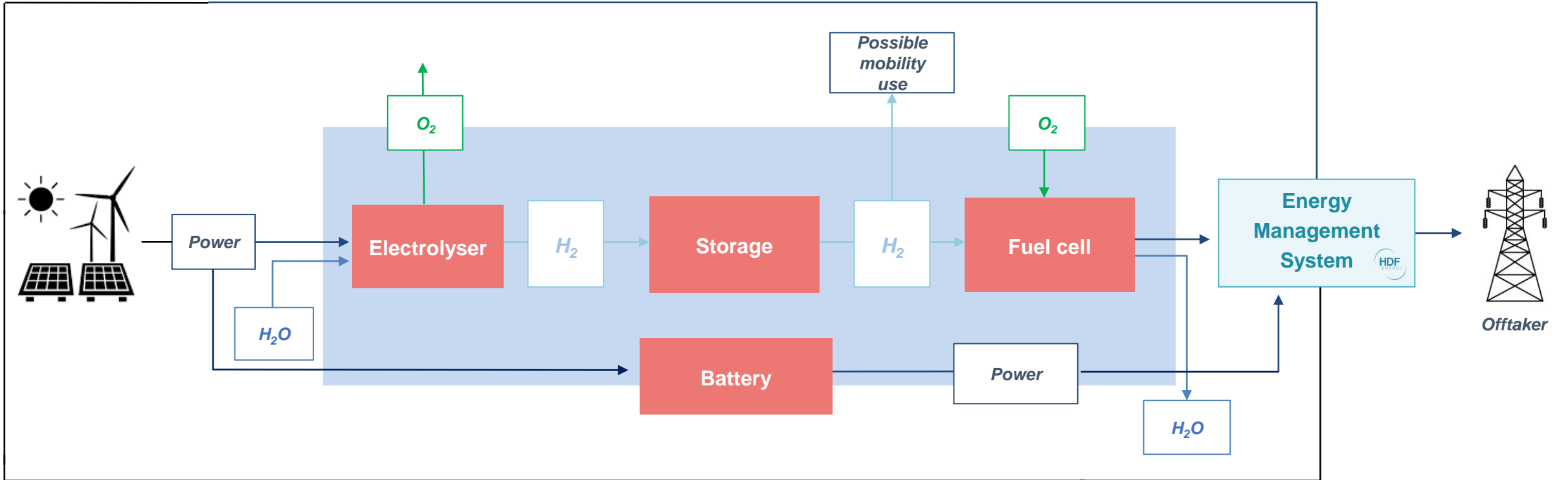


EPC
SIEMENS energy

LENDERS



Plant main characteristics



NON-INTERMITTENT RENEWABLE ENERGY SUPPLY

KEY FEATURES

Power flexibility and adaptability:

- Adaptive output without altering power characteristics.
- Adaptive reactive power capability: beyond 0,8 lag/lead supply or consume reactive power -compared to 0,9 lag/lead grid.
- Quickness of output adjustment (faster than diesel).
- Short circuit management: capable of operating for some time during a grid fault to allow tripping.

Low frequency grid status:

- Maintain its power output constant even in case of lower frequency on the grid, supporting it (better than what diesel does - no need for inertia wheels).

Resilience to bad weather:

- Through long-term H₂ storage, the Renewstable ® can guarantee its production profile even when its green energy production is worse than its 20-year average.

No long maintenance on subcomponents:

- Modular, made of aggregation of small units The plant is never completely off and doesn't need to be stopped for sustained period of maintenance.

DURING PLANT OPERATION

Islanding mode:

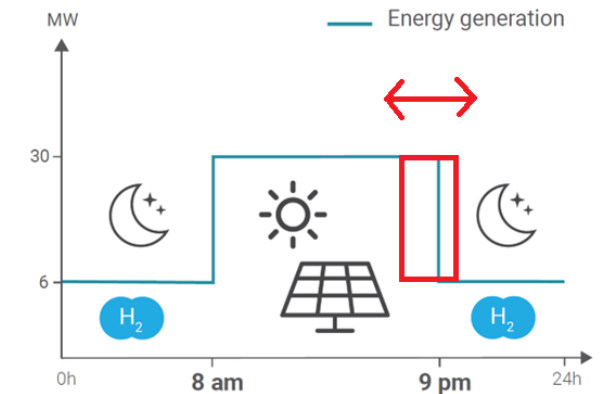
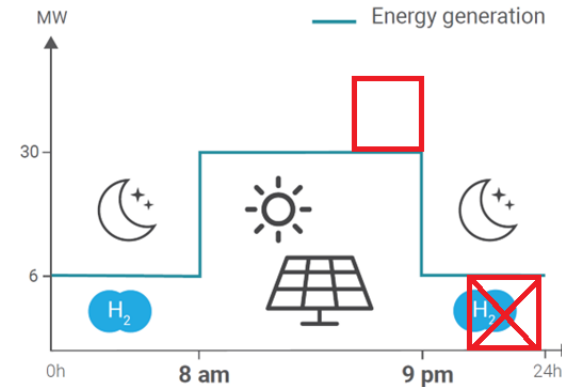
- Islanding mode is possible.
- Possible to maintain critical services powered (e.g. hospitals)

Black start capability:

- Can kick start the grid alone (in island mode).

Flexible operation patterns:

- Flexible operation patterns, without modifying the injection point.
- Possible to daily or seasonally adjust the evening/ morning peak power.



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HDF Energy's Engagement with the European Commission



Globally

Engaging with **DG INTPA**

Presence in three key regions: Latam, Africa Middle East, and Asia Pacific.

Global Gateway Label



Africa: Namibia (Swakopmund)
Caribbean Islands: Barbados(RSB)

European Investment Bank (EIB)



LOI signed, participation in Namibia (Swakopmund Project)
Ongoing discussion for other projects

Europe

Engaging with **DG ENER**

HDF Energy has initiated contact with DG ENER, aiming to establish a more fluent relationship in the future.

Engaging with **DG GROW**

HDF Energy has been prenotified for IPCEI support for HDF industrial plant

IPCEI

Important Projects of
Common European
Interest

Engaging with **DG MOVE**

Pilot Project (Elemanta): Cold Ironing in Port of Rouen, France

Contact



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