Breakthrough engineering for a better world

Process Automation

Our product brands:
IMI VIVO

IMI VIVO - A SAFETY DRIVEN DESIGN FOR PEM ELECTROLYSERS

IMI

Alessio Giardinelli
Sales BD Manager
IMI Process Automation

IMI Plc

Global presence with products sold in over 100 countries

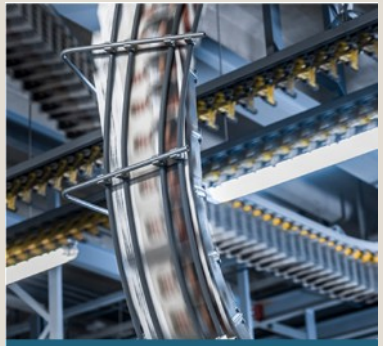
£2.21bn
Revenue 2024

FTSE 100
London Stock Exchange

~10,000
Employees

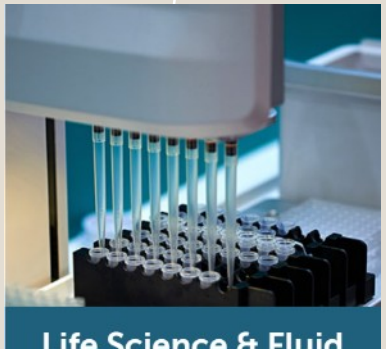
50
Countries worldwide

Process Automation



Industrial Automation

Climate Control



Life Science & Fluid Control

Transport

Automation

Life Technology

- Aligned to applications and customers
- Leveraging engineering capabilities
- Reduced complexity

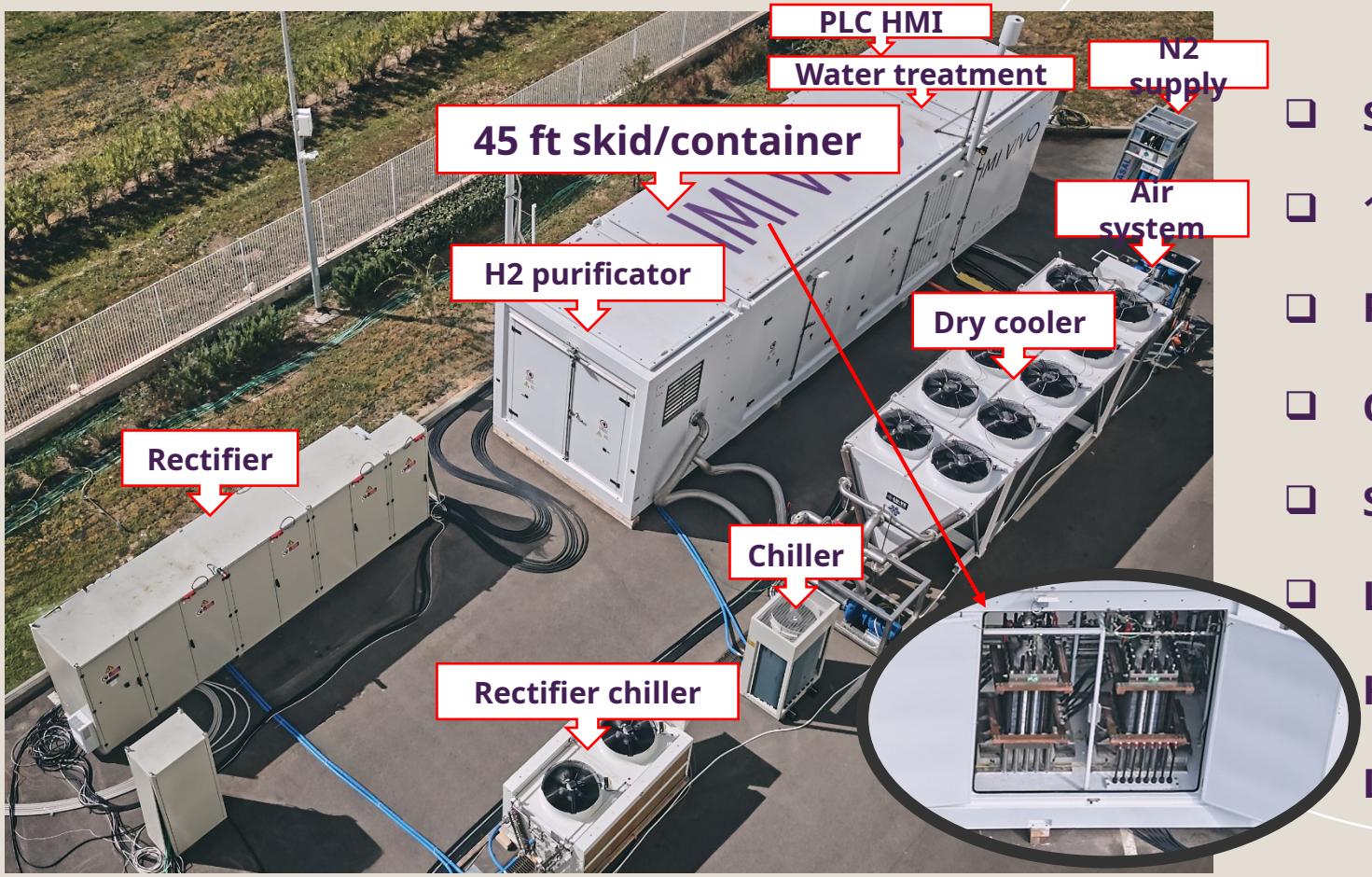
Our History

From IMI Remosa to IMI VIVO

- 1955 – Founded in Cagliari as service company
- 1980 – FCC & Expander valves, world leader
- 1993 – Listed by UOP as supplier
- 2002 - In-house control systems & actuators
- 2012 – Acquired by IMI plc
- 2020 – launches IMI VIVO for hydrogen
- 2022 – New plant and dedicated area for IMI VIVO
- 2025 - Electrolyzers capacity per year >50MW

Our Products

IMI VIVO PEM Electrolyzer



- Skid/Containerized turnkey plant
- 1MW - 5MW single skid (50MW modular config.)
- Power consumption <58kwh/kg H_2
- Customization (e.g. O2 use, heat recovery)
- Safety Driven design (SIF / SIL / HAZOP)
- Life assistance service
- Remote digital control
- Dedicated R&D team

Safety Oriented Design

HAZOP and SIL Classification

HAZOP Study

- ❑ Identified and mitigated potential hazards
- ❑ Systematic review of process design
- ❑ Risk reduction and safety improvement recommendations

SIL Allocation

- ❑ Defined Safety Integrity Levels (SIL 1–4) for each SIF
- ❑ Based on failure likelihood and consequence severity
- ❑ Ensured appropriate safety measures

ATEX Compliance:

- ❑ Full compliance for all equipment in designated zones
- ❑ Achieved negligible hazard zone via ventilation and leak simulations

Consequence	A	B	C	D	E
I	H	H	H	MH	ML
II	H	H	MH	ML	L
III	MH	MH	ML	L	L
IV	ML	L	L	L	L

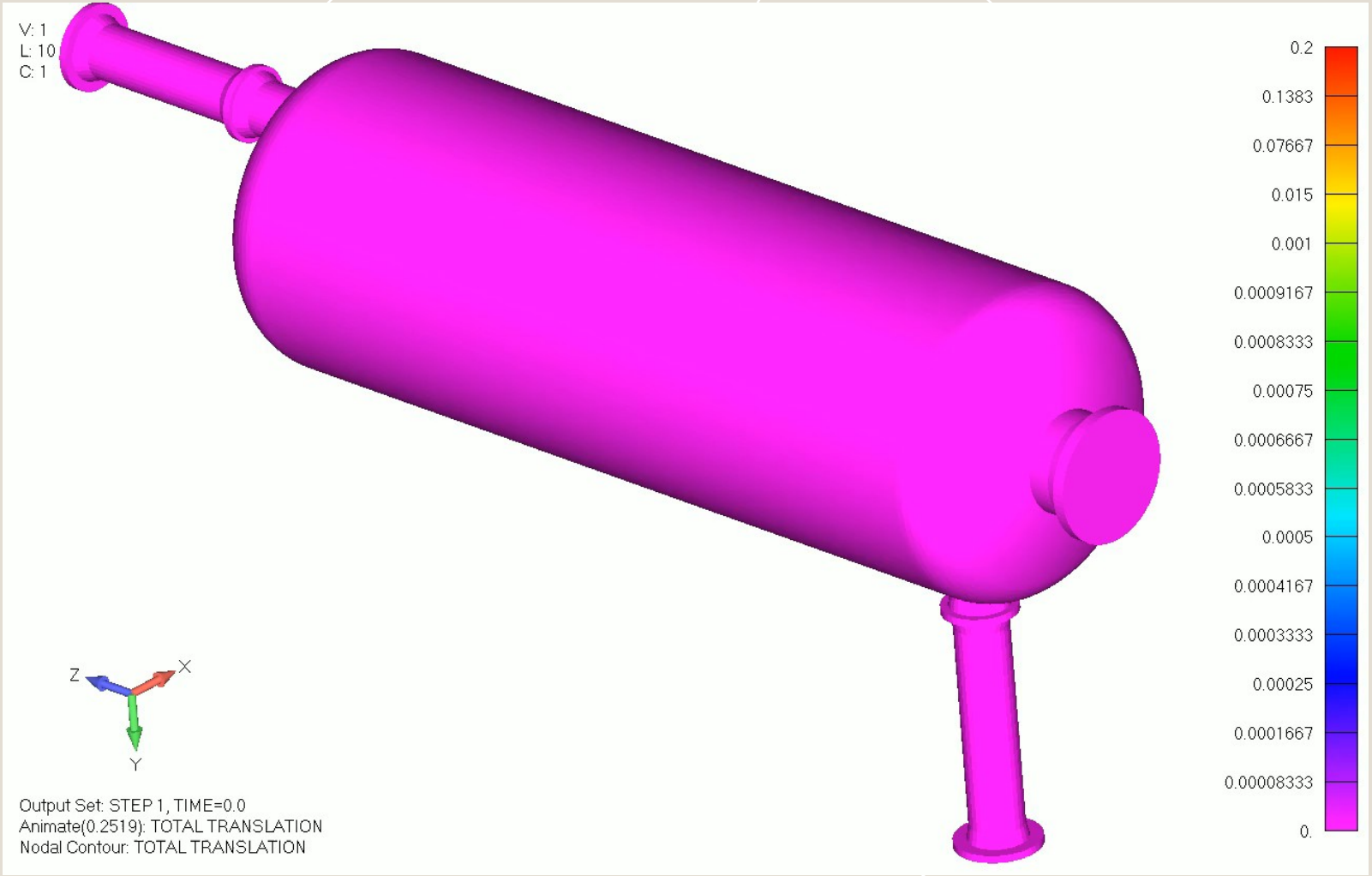
INDEX

Case study

Simulation of a O2 Separator Explosion

FINITE ELEMENT ANALYSIS

- Used to verify the mechanical integrity of the vessel
- Dynamic Transient Finite Element Analysis, timestep <0.001 s.
- The shockwave starts at t=0 from an arbitrary ignition point and propagates at sonic speed
- Material Stresses and displacements are then checked to ensure a safe and resilient design.

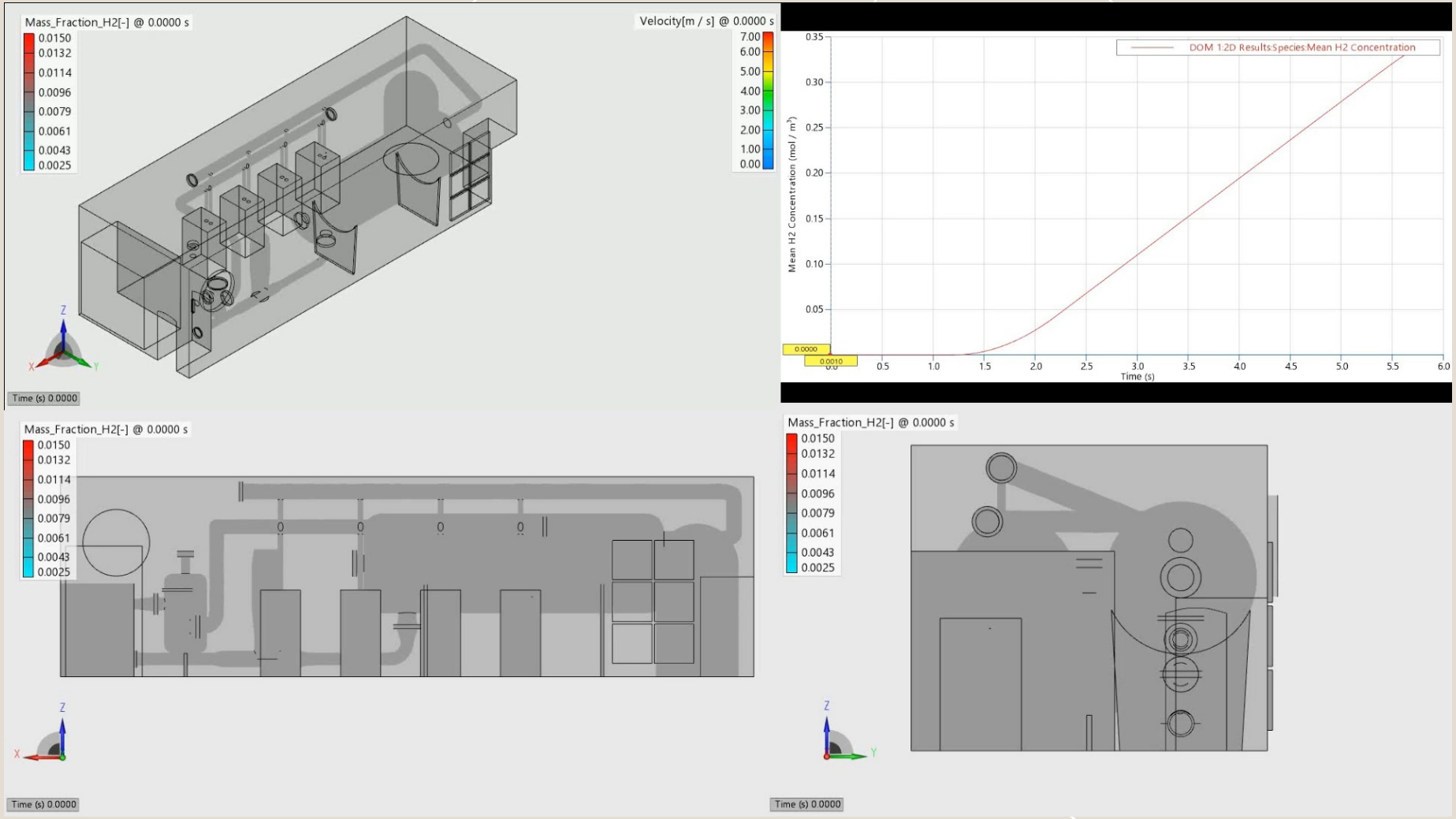


Case study

Simulation of H2 leakage from the Stack

CFD ANALYSIS

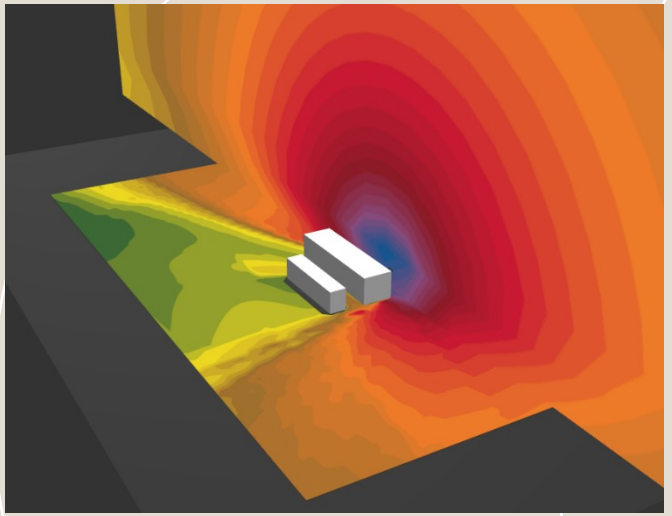
- 0.001s adaptive time step, 900k cells, multispecies H2+Air
- Simulates the leakage of H2 from a component inside the container
- Allows the designer to verify the location and the power of the venting fans used to avoid the generation of an explosive area.

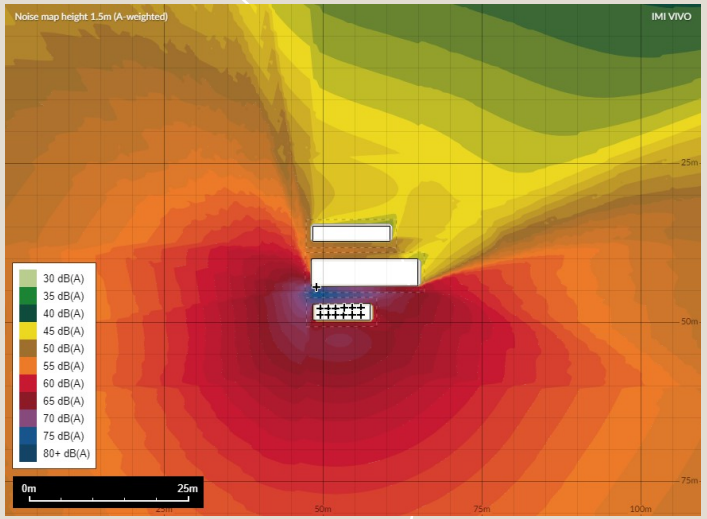


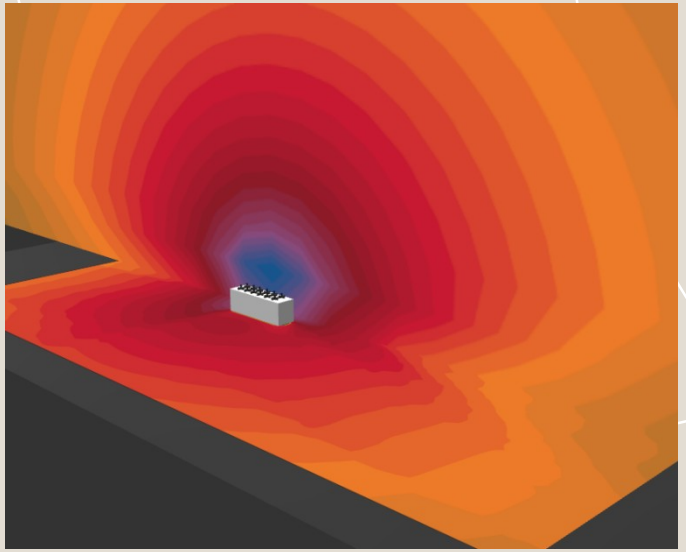
Noise Calculation

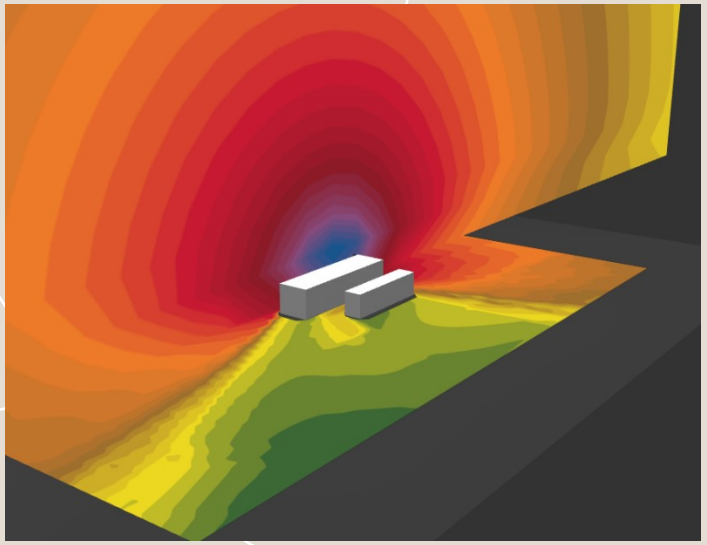
Optimize noise levels to comply with site-specific regulatory limits.

- ❑ **Electrolyser near buildings may raise noise concerns**
- ❑ **Noise simulation predicts SPL (Sound Pressure Level) across the site**
- ❑ **Main noise sources: fans, motors, venting**
- ❑ **If SPL exceeds limits, install sound barriers.**









Manufacturing load until June 2026

Production challenge

- Exponential growth in production load in the last 5 years
- 22 new electrolyzers planned until June 2026
- 55 MW total pipeline
- 95% for mobility application, 5% industry
- 12 units currently under simultaneous production
- Strong delivery times maintained
- High reliability and performance ensured

Remosa facility test bench

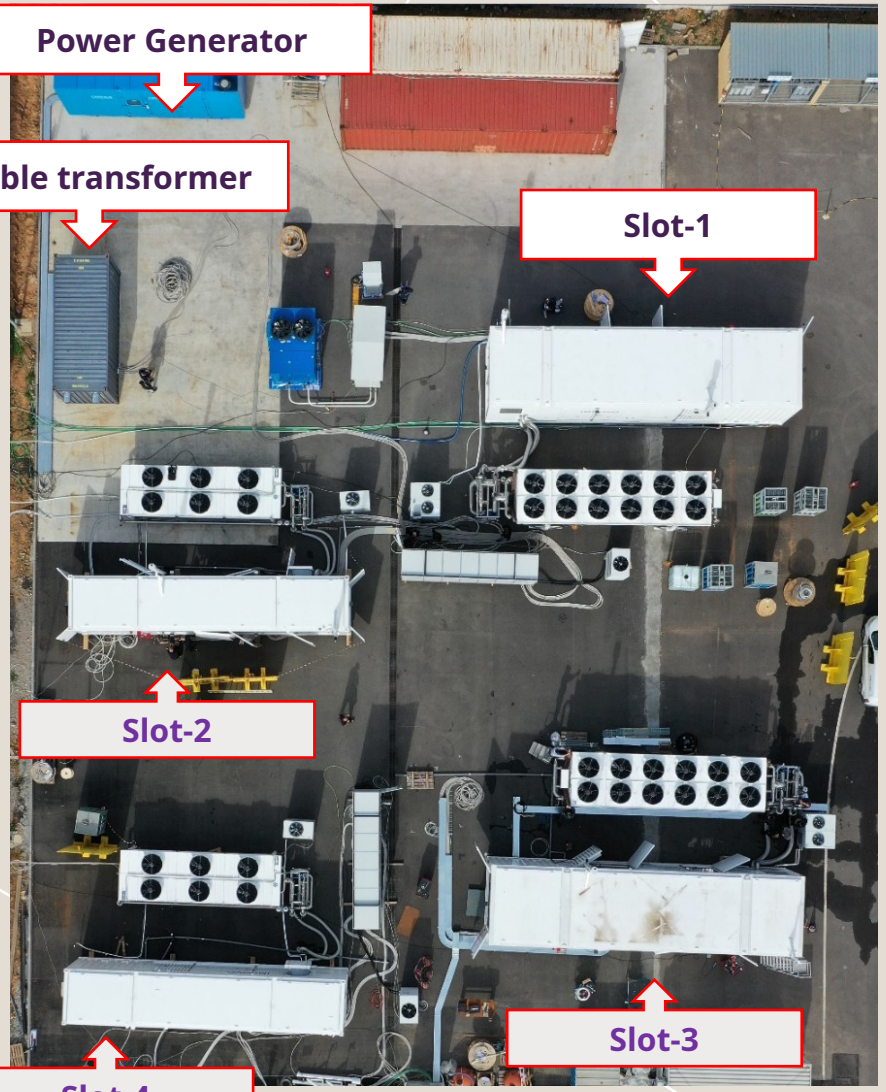
Test Workflow & Layout

KEY ATTRIBUTES

- ❑ 4 bays and 1 active H_2 test at a time
- ❑ Max power 1MW
- ❑ Flexible Transformer and rectifier
- ❑ Crane access for all unit, shared auxiliaries

ACHIEVEMENTS

- ❑ 1 full test cycle/week
- ❑ Up to 3 units in parallel (pre/post-test)
- ❑ Continuous rotation, steady shipping
- ❑ High level of safety during H_2 production



References

Green Hydrogen Projects and Applications

Translational Energy Research Centre (TERC) (UK)

Institute for Advanced Automotive Propulsion Systems (IAAPS) (UK)

- 2 X 500kW PEM Electroysers
- 100 Nm3/h @30barg
- Storage system 3000Nm3
- H_2 propulsion research and building heating
- Connected to the solar array

SARPOM, Trecate Refinery (Italy)

- 4MW PEM Electroysers
- 800 Nm3/h @40barg
- Refinery Transition from gray hydrogen
- Powered by 7MW solar installation
- Special power supply

Fraunhofer Institute (Germany)

- 250kW PEM Electroysers
- 50 Nm3/h
- 5% H2 blend with natural gas
- Thermal heating

Thank you!

imivivo@imi-critical.com

Alessio Giardinelli
Sales BD Manager
IMI Process Automation