

Green Hydrogen – industrial implementation

Paola Granados Mendoza – Technology Manager, HyCC / Member of the WPEE

European Summer School Electrochemical Engineering – Cagliari 2025



Agenda



Part I: Hydrogen economy

Part II: Scaling up water electrolysis technology

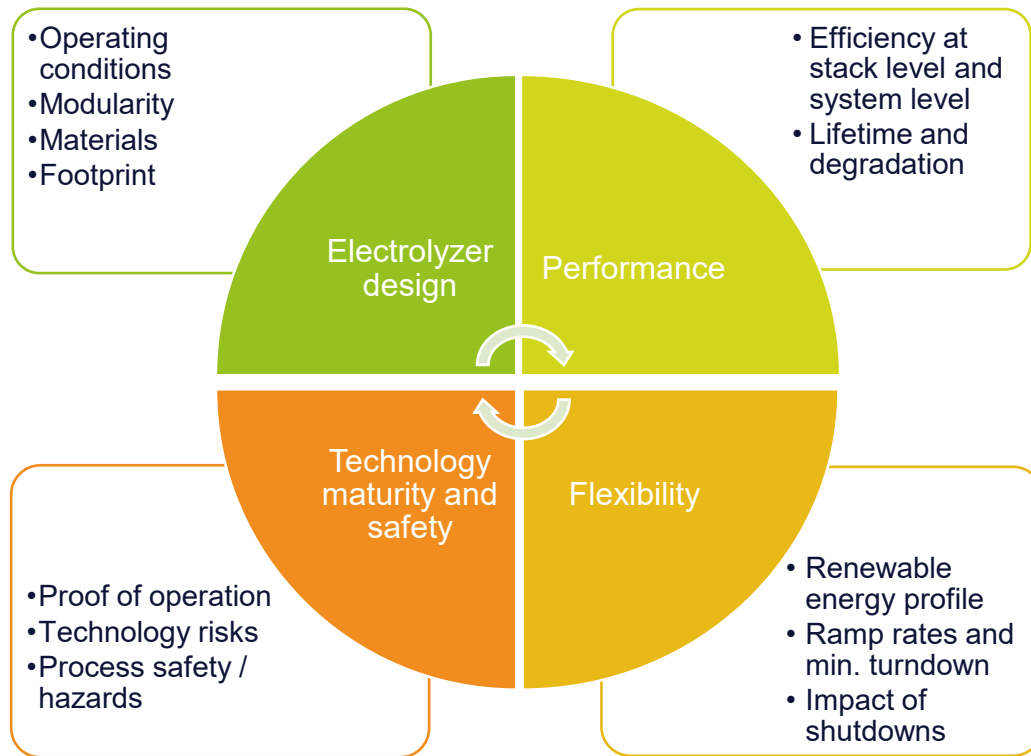
Part III: Case studies

PART II: Scaling up water electrolysis technology



Learning objective:
Uncover what it takes to turn advanced
electrolyzers into scalable, real-world
solutions.

Technology selection criteria



LCOH
(€/kg)



Technology maturity and process safety

The PEACE project develops a technology that utilizes a pressure vessel stack concept capable of reaching more than 50 bar in a dual-stage pressurization approach.

Goal: develop a technology of high-pressure alkaline electrolysis (AEL) to substantially reduce hydrogen production costs, enhancing the competitiveness of the hydrogen economy.

- Major PEACE KPI's
 - Pressure: >50 bar
 - Performance under pressurization: < 1.8 V at 1 A/cm²
 - Voltage efficiency (LHV): 70%
 - Degradation rate: <0.11%/kh
 - Minimal load: 14% of nominal load



The project is supported by
the Clean Hydrogen Partnership and its
members.



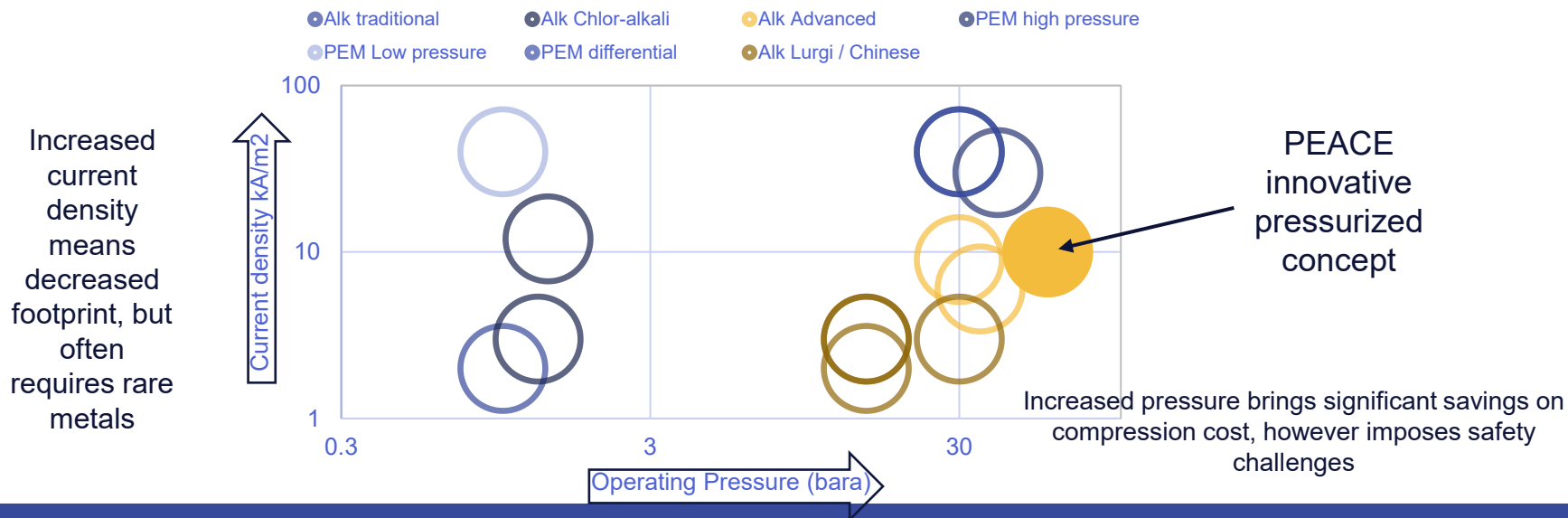
Co-funded by
the European Union

Business case focus

With this innovative dual-stage pressurized stack concept the levelized cost of hydrogen (LCOH) can be reduced by:

- Operating **efficiently at higher current densities without noble metals**
- Operating **safely at higher pressures**, enabling better integration with downstream processes
- Leveraging high pressure operation into higher system efficiencies, considering also downstream processes

Market overview of electrolyzer technologies



Proof at scale

- Individual electrolysis products available in the market have different TRL's^[1].
- Implementation in large scale electrolysis plants requires typically TRL >8.
- If manufacturers change key items such as electrode coatings or cell designs, these need to be tested at scale.



GigaWatt Scale Electrolyser: Artist Impression (2020)

[1] For Technology Readiness Level (TRL) definitions refer to: Malkow, K.T., et.al.; EU harmonised terminology for hydrogen generated by electrolysis; EUR 30324 EN, 2021.

[2] Photo source: ISPT GW electrolyser project, 2020