



### Sustainable

Optimising stack components and plant design for enhanced energy efficiency and reduced resource demands.



### Cost-effective

Lowering the electrolyser's CAPEX and OPEX through smart design of materials, components, stack, and system.



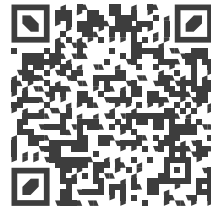
### Scalable

Ensuring the scalability potential of water electrolyser production to multi-gigawatt (GW) levels in Europe before 2030.



The project contributes to the **European Hydrogen Strategy** of the European Commission to maintain its leadership position in water electrolysis technologies and innovations.

## Follow our progress



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## Our partners

The consortium brings together nine partners from seven EU countries, including leading European research centres specialising in hydrogen technologies, as well as key industrial partners.

Coordinator



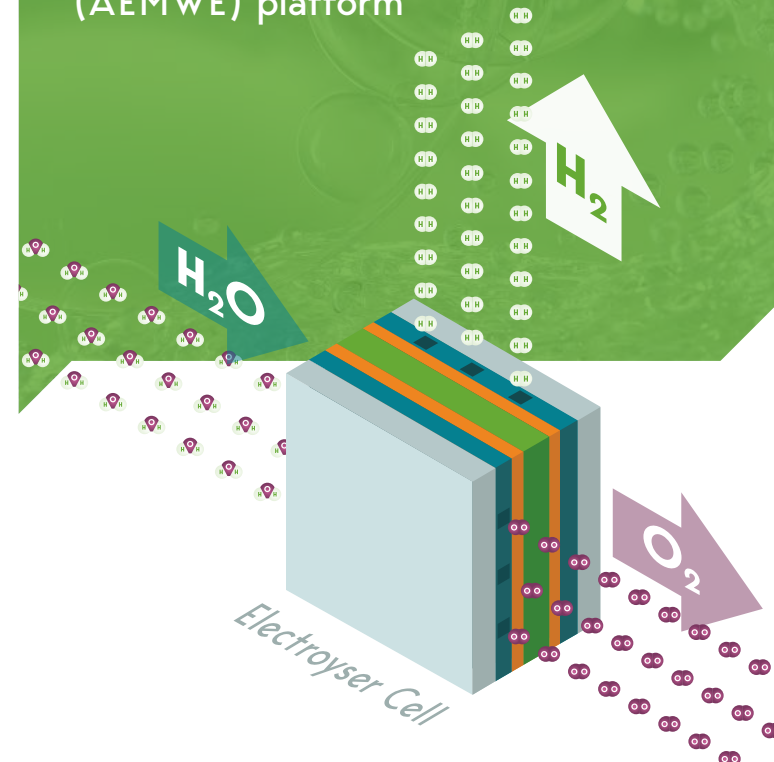
Co-funded by the European Union

The project is supported by the Clean Hydrogen Partnership and its members. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or Clean Hydrogen Partnership. Neither the European Union nor the granting authority can be held responsible for them.



# Redefining Green Hydrogen Production

The next-generation anion-exchange-membrane water-electrolysis (AEMWE) platform



# Innovative electrolyser technology

HYScale is a multinational, industry-driven, interdisciplinary EU-funded project focused on upscaling innovative, high-performing CRM and PFAS-free materials and components for Anion Exchange Membrane Electrolysis (AEMEL).

A central objective is to build the first **single-stack 100 kW AEM electrolyser prototype** that fully implements these sustainable materials.

The project also addresses mass production challenges through an innovative and cost-effective design.

HYScale is working on integrating the stack into a functional low-cost and highly efficient electrolyser system and validate it in an industrially relevant environment (TRL 5).

## AionFLX™ Membranes & Ionomers

- ▶ PFAS-free, partially recycled polymer backbone
- ▶ High OH<sup>-</sup> conductivity and > 1,000h durability at 0.1 M KOH without detectable degradation proofed
- ▶ Manufactured up to 1,000 cm<sup>2</sup> at once with batch-to-batch consistency for rapid scale-up

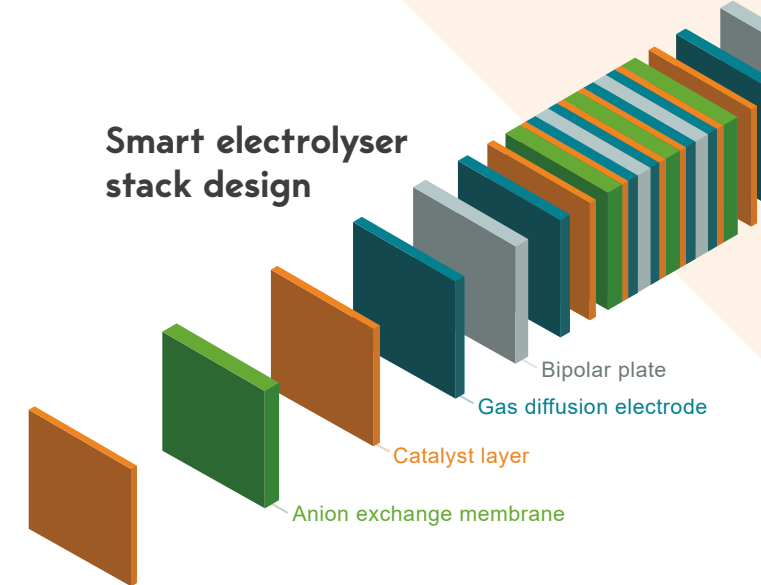
## Advanced CRM-Free Electrodes

- ▶ CRM-Free catalysts, catalyst inks and coating methods delivering excellent activity in near-neutral electrolyte
- ▶ Progressive upscaling to 400 cm<sup>2</sup> active area demonstrated, with optimised porous transport (Bekaert) layers

## Cost-Driven Stack Design

- ▶ Highly efficient Cell and Stack design for high current density operation to slash CAPEX
- ▶ Uses affordable bipolar plates & PTLs compatible with automated manufacturing

## Smart electrolyser stack design



## The HYScale solution

Target system CAPEX ≈ €400 /kW through simplified, mass-producible cell design

Operates in ultra-low ( $\leq 0.1$  M) KOH, reducing material stress and OPEX

100% CRM-free catalysts for both electrodes

PFAS-free AionFLX™ membranes & ionomers

>1 Acm<sup>2</sup> at stack level, shrinking plant size



HyGear electrolyser. Source: HyGear