



Project: AMEL (ΠΔΕΡ01-0098859)

Project Title: Green Hydrogen Advancement: Pioneering Anion Exchange Membrane Water Electrolyzer Solutions.”

Project summary:

Hydrogen is a clean energy source that can contribute significantly to reducing greenhouse gas emissions and dependence on fossil fuels. Water electrolysis, combined with renewable energy sources, has emerged as a key technology for green hydrogen production.

Alkaline electrolysis (AWE) and proton exchange membrane water electrolysis (PEMWE) are the most established among electrochemical water splitting technologies. However, the novel Anion Exchange Membrane Water Electrolysis (AEMWE) technology combines the advantages of both systems, representing a groundbreaking and sustainable solution for green hydrogen production.

The AMEL project focuses on advancing AEMWE technology through innovative materials and cutting-edge design strategies, aiming to reduce costs and simplify integrated hydrogen production systems. Specifically, AMEL strives to enhance performance and durability by developing and optimizing a high-efficiency prototype AEM electrolyzer and its system components.

The objectives set by AMEL include:

Integration of advanced catalysts with high efficiency and selectivity for the oxygen evolution reaction (OER) and hydrogen evolution reaction (HER), without dependence on critical raw materials or reliance on precious and rare metals such as platinum or iridium.

- Innovative electrode designs that enhance electrochemical surface area, gas/liquid management, and catalyst utilization, while minimizing losses and improving overall efficiency.
- Addressing issues related to electrolyte membrane durability.
- Development of a small prototype based on the improved materials. Scale-up and construction of a 0.5 kW stack.
- Construction of a test unit incorporating the developed prototype.
- Improvement and achievement of high stack performance with electrical efficiency >80%, along with robust operation under steady conditions and after start-stop cycling tests

The AMEL project represents a significant initiative for both Metacon, expanding its presence and innovation in the field of electrolysis, and the Region of Western Greece, strengthening research, innovation, and development in the area. AMEL not only addresses current technological challenges but also paves the way for sustainable and cost effective solutions, contributing significantly to the global transition to clean energy. Through a combination of advanced research and practical application, the project seeks, upon completion, to make hydrogen production more affordable and reliable, shaping a greener future.



Total project budget: 216.834,80

Metacon's budget: €130,407

Funding rate: 80%

Public contribution (Metacon): €104,326

Project duration: 24 months