

# AMPS

## AUTOMATED MASS PRODUCTION OF SOC STACKS



|                                           |                                                                                                                                                                                                                   |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project ID                                | 101111882                                                                                                                                                                                                         |
| PRR 2025                                  | Pillar 7 - Supply Chain                                                                                                                                                                                           |
| Call Topic                                | HORIZON-JTI-CLEANH <sub>2</sub> -2022-04-01                                                                                                                                                                       |
| Project Total Costs                       | 8 711 520.00                                                                                                                                                                                                      |
| Clean H <sub>2</sub> JU Max. Contribution | 6 606 098.26                                                                                                                                                                                                      |
| Project Period                            | 01-06-2023 - 31-05-2027                                                                                                                                                                                           |
| Coordinator Beneficiary                   | TEKNOLOGIAN TUTKIMUSKESKUS VTT OY, FI                                                                                                                                                                             |
| Beneficiaries                             | ROCKSOFT OY, DOSETEC EXACT OY, SMARTAL ENGINEERING OY, SITEC AUTOMATION GMBH, SITEC INDUSTRIE TECHNOLOGIE GMBH, HAIKU TECH EUROPE BV, ELCOGEN OY, FINCOAT OY, AKTSIASELTS ELCOGEN, VUTS AS, POLITECNICO DI TORINO |

<https://www.amps-project.eu/>

### PROJECT AND GENERAL OBJECTIVES

AMPS project brings together the leading European companies across the Solid Oxide Fuel Cell and Solid Oxide Electrolyser manufacturing value chain. The project includes automation companies and manufacturing equipment producers as well as a cell manufacturer and a stack manufacturer. The project is motivated by their strong commitment to develop their products and services and commence real mass-manufacturing.

AMPS has the following objectives:

- Automated high-speed cell production with integrated quality control.
- Automated high-speed interconnect plate production and coating with integrated quality control.
- Automated high-speed stack assembly with integrated quality control.
- Complete component tracking and optimised mass-manufacturing by using virtual twins.
- Assessment and demonstration of target stack manufacturing cost of < EUR 800 /kW<sub>el</sub> at a production volume of 100 MW/year.
- Establishment of a European supply chain of solid oxide cell manufacturing equipment.
- AMPS advances beyond the state-of-the-art by developing several automated manufacturing solutions that significantly reduce cycle times, enabling the scale-up of stack production to exceed 100 MW per year.

- To develop, demonstrate and validate in actual production lines mass-manufacturing and quality control methods to produce solid oxide cell components and stacks at low cost and high volumes.
- To perform circularity and life cycle assessments of the developed technologies, processes and methods.

### PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

Preparation of "Project Quality Management Plan PQMP", "Ethics Plan", and "Project Data Management Plan PDMP" which provide a solid base for future technical and scientific work.

- Development of a method to recycle cell production waste.
- Design of automated raw material handling for nickel oxide.
- Design of automatic cell heat treatment process for mass production.
- Specification and requirements for the interconnect laser welding process.
- First draft of the "Hydrogen Safety Planning".
- Preliminary validation of cell production waste reduction method; additional tests will be done to achieve a stack production of 100 MW/year.

### FUTURE STEPS AND PLANS

The next steps are the validation of automated raw material handling in cell production and the definition of methods for automated handling of stack components.

### NON-QUANTITATIVE OBJECTIVES

- To target the main barrier currently slowing down large-scale deployment of solid oxide fuel cells/ solid oxide electrolyser technologies.

### PROJECT TARGETS

| Target source            | Parameter                                                                                                | Unit                               | Target | Achieved to date by the project | Target achieved? |
|--------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------|--------|---------------------------------|------------------|
| Project's own objectives | Automated high-speed cell production with integrated quality control.                                    | Yield-%                            | > 95   | 75                              |                  |
|                          | Automated high-speed bipolar/ interconnect plate production and coating with integrated quality control. | Degree of automation-%             | 90     | 75                              |                  |
|                          | Automated high-speed stack assembly with integrated quality control.                                     | Reduction of stack assembly time-% | > 80   | 20                              |                  |
|                          | Complete component tracking and optimised mass-manufacturing by using virtual twins.                     | Component tracking accuracy-%      | > 99   | N/A                             |                  |
|                          | Stack manufacturing cost.                                                                                | €/kW                               | 800    | N/A                             |                  |