

 **Fraunhofer**
IEE

**DERlab**
European Distributed Energy Resources Laboratories

Workshop, 08. November 2023

Market development of electrolysers
under consideration of system services

Workshop

Market development of electrolysers under consideration of system services

Agenda	
1:00pm – 1:15pm	Welcome <ul style="list-style-type: none">▪ Introduction into the topic, motivation and aims of this workshop▪ The project HyLeiT: Cost-optimized system technology and grid integration of systems for the production of green hydrogen
1:15pm – 2:15pm	4 presentations <ul style="list-style-type: none">▪ Bernhard Voll (SMA)<ul style="list-style-type: none">➤ Market overview and requirements from a manufacturer's point of view▪ Jochen Bard, (Fraunhofer IEE)<ul style="list-style-type: none">➤ Overview on international green hydrogen projects▪ Manuel Froschauer, Ioannis Theologitis (ENTSO – E)<ul style="list-style-type: none">➤ Electricity Potential of P2H2 technologies to provide system service▪ Paul Donnellan, Digvijay Gusain (Shell Projects & Technology)<ul style="list-style-type: none">➤ Operators point of view
2:15pm – 2:30pm	Questions / Answers
2:30pm – 2:45pm	Coffee break
2:45pm – 3:30pm	Discussions
3:30pm – 4pm	Conclusions and end of meeting

Workshop

Market development of electrolysers under consideration of system services

Motivation

- The rollout of hydrogen production in the next years will reach power levels with system-relevant significance for the power grid
- In order to maintain system stability, electrolysis plants need to meet grid code requirements (e.g. Demand connection code (DCC))
- Further requirements and system services are currently under discussions. Comparable with requirements for generators (RfG)
- Currently, the requirements depend on the project and can vary from country to country.

Aim of the workshop

The aim of this workshop is to look at the market prospects and project for electrolysis plants in different countries and to compile the requirements in terms of system services.

- How does the market develop for electrolysis plants and which international projects for green hydrogen are in preparation?
- Which system services must be provided at the grid interface by the rectifier?
- Which functions of the rectifier system are demanded by plant operators?

Project HyLeiT

Cost-optimised system technology and grid integration of systems for the production of green hydrogen

Project HyLeiT

Cost-optimised system technology and grid integration of systems for the production of green hydrogen

Profile

- Funding: Federal Ministry of Education and Research (BMBF)
- Part of the flagship project H2Giga: Serial Production of Electrolysers
- Duration: 01.04.2021 – 31.03.2025
- Project Partner
 - Fraunhofer IEE (Project lead)
 - SMA Technologies AG
 - Infineon AG
 - Technical University Dresden
 - University Bonn-Rhein-Sieg

Content and objectives

- Project content
 - Development of system-optimised rectifiers
 - Investigation of electrolysis stacks to build real-time simulation models for optimal power converter design
 - Grid integration of electrolysis plants (grid support, system services)
- Key objectives
 - New generation of power inverters for electrolysis plants
 - Cost reduction in system technology
 - Better DC power quality for the electrolyser
 - Grid compatibility and options for system services
 - Embedding in scenarios with 100% RE

Project HyLeiT

Classification within the flagship project H2Giga

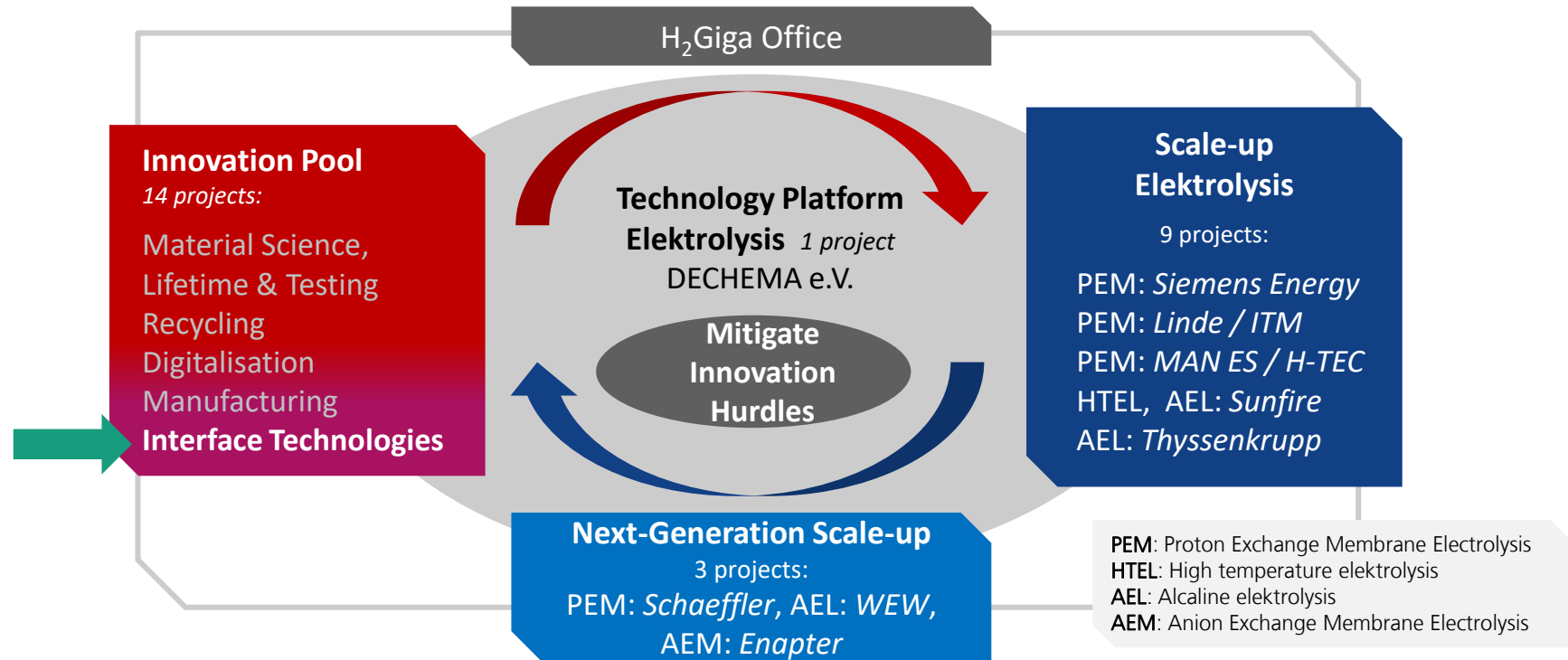
Innovation pool

→ Interface technologies



→ Power supply technologies for electrolysers

- Fraunhofer IEE (Project lead)
- SMA Technologies AG
- Infineon AG
- Technical University Dresden
- University Bonn-Rhein-Sieg



Project HyLeiT

Cost-optimised system technology and grid integration of systems for the production of green hydrogen

Situation today

Power supply for electrolyzers

- Mainly 12-pulse thyristor rectifiers
- High reactive power demand
- High system perturbations and filter demands
- Only limited system services possible
- Low efficiency under partial load conditions



Project aim

- Improved DC power quality for the electrolyser (especially for dynamic operating situations)
- Improved AC power quality at the grid connection point and provision of system services
- Increased reliability and safety
- Taking into account scenarios with 100% renewable energy
- Half the costs compared to the current state of the art (concerning rectifier system)

Contact

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Presentations

- Bernhard Voll (SMA)
 - Market overview and requirements from a manufacturer's point of view
- Jochen Bard, (Fraunhofer IEE)
 - Overview on international green hydrogen projects
- Manuel Froschauer, Ioannis Theologitis (ENTSO – E)
 - Electricity Potential of P2H2 technologies to provide system service
- Paul Donnellan, Digvijay Gusain (Shell Projects & Technology)
 - Operators point of view