

The Ideas to Industry Lab

Advancing Innovation and Applications in Electrolysis and Fuel Cells

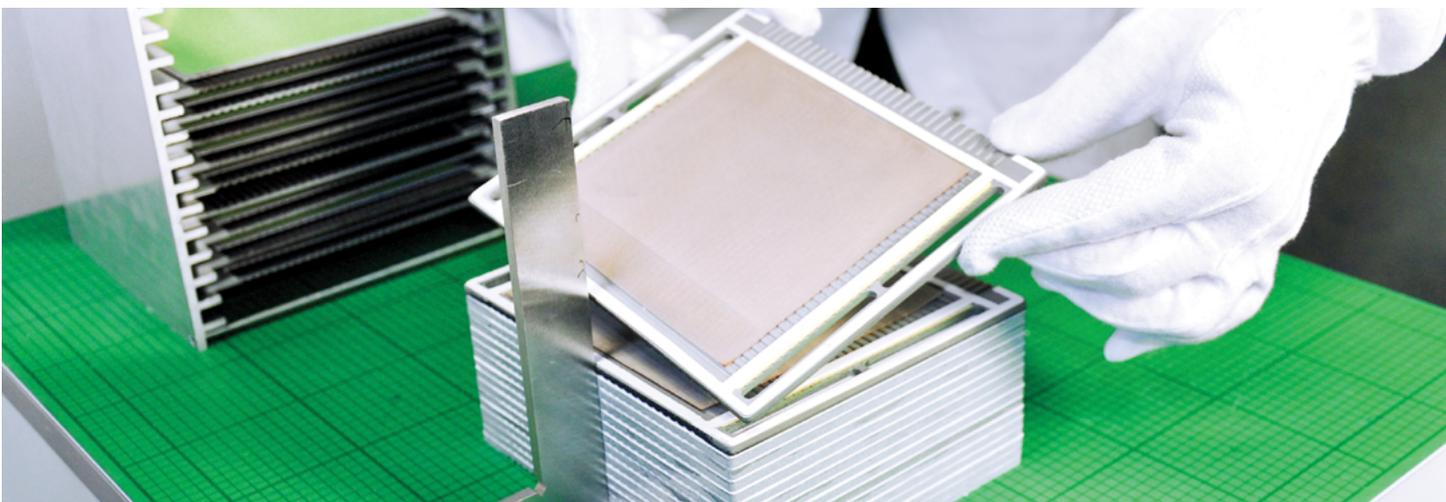
Development and optimisation of Solid Oxide Cell (SOC) systems for the generation and utilisation of hydrogen, syngas and ammonia

The Vision

The Ideas to Industry Lab was established to create a bridge between world-class fundamental research and impactful, industry-ready solutions for some of the world's most urgent challenges. With a shared commitment to innovation, the partnership brings together German precision and ceramic excellence with Australian applied engineering and regional insight.

Our vision is to create a flagship international collaboration that:

- Develops integrated, scalable solutions in water treatment, electrolysis and fuel cells, industrial testing (NDT), advanced manufacturing, and energy storage systems
- Accelerates translation of research and industry-led pilot projects into commercial technologies, public infrastructure, and clean energy ecosystems
- Provides shared access to laboratories, testing facilities and IP
- Trains the next generation of engineers, researchers and technical specialists via joint R&D and PhD programs
- Demonstrates how globally distributed collaboration can drive sovereign capability and environmental resilience



SOC Stacks for fuel cell and electrolysis application. © Fraunhofer IKTS

Why it Matters

From climate adaptation to critical minerals, industries and governments around the world face mounting pressure to transition to clean, intelligent and resilient systems.

Water scarcity, carbon emissions, and infrastructure degradation are not just technical challenges – they are global imperatives. By combining Fraunhofer IKTS's deep technology platforms with ECU's regionally relevant, industry-aligned research, The Ideas to Industry Lab delivers **Global Science with Local Solutions:**

- Practical, deployable innovations for Australian industries and communities
- High-tech exports of German–Australian IP to global markets
- Stronger economic and academic ties between Europe and the Asia-Pacific
- A collaborative blueprint for future international research alliances

This partnership is about more than research – it's about delivering impact that is local, sustainable and global.

Electrolysis and Fuel Cells

Powering the Energy Future

Electrolysis and fuel cells are central to the green hydrogen economy. The Ideas to Industry Lab will pioneer electrolysis innovations that transform renewable energy and water into hydrogen. With the focused technology of solid oxide electrolysis cells (SOEC) also syngas production is possible utilising CO₂ as additional feedstock. The technology also offers the advantage of reverse operation as fuel cell (SOFC). Besides the high-temperature SOC technology also low-temperature electrolysis and photocatalysis is focused.

Expertise:

- High-Temperature SOC Stacks (SOEC/SOFC)
- Alkaline Membrane Electrolysers (AEMEL)
- Electrolysis, Fuel Cell and PtX Systems (development, process demonstration and dynamic operation)
- Reverse SOC Systems for Energy Storage
- System Modelling and Techno-Economic Assessment
- Waste Heat Recovery and Utilisation
- Water Treatment for Use in Electrolysis

Impact: Applications include regional hydrogen hubs, industrial decarbonisation, and renewable energy storage.



Small-scale plant for demonstration of a coupled process for co-electrolysis and Fischer-Tropsch synthesis. © Fraunhofer IKTS



Department of
**Energy and Economic
Diversification**

The Ideas to Industry Lab is supported by the Western Australia Government, through the Department of Energy and Economic Diversification

Partner with us

The Ideas to Industry Lab is structured to foster deep, sustained, and outcome-driven collaboration with industry partners across Australia and internationally. It integrates ECU's strengths in systems engineering, clean energy and infrastructure with Fraunhofer IKTS's capabilities in ceramic systems, electrochemical technologies and material diagnostics.

Whether you're a start-up scaling clean-tech innovation or a large enterprise modernising your operations, The Ideas to Industry Lab offers structured pathways to research integration and technological advantage.

Let's build a future together

Coordinators

Dr Gregor Herz

Fraunhofer IKTS

Email: gregor.herz@ikts.fraunhofer.de

Mr Steve Elias

Edith Cowan University

Email: s.elias@ecu.edu.au

Technical Specialists - Electrolysis and Fuel Cells

Dr Erik Reichelt

Fraunhofer IKTS

Email: erik.reichelt@ikts.fraunhofer.de

A/Professor Yasir Al-Abdeli

Edith Cowan University

Email: y.al-abdeli@ecu.edu.au

www.ikts.fraunhofer.de

www.ecu.edu.au

