DEcentralised Cloud labs fOr inDustrialisation of Energy materials

Discover our partners!

DECODE

FORSCHUNGSZENTRUM JÜLICH (FZJ)

Who are we?

The Institute for Energy and Climate Research (IEK) at FZJ focuses on energy technologies and infrastructures based on renewable energy sources, and seeks to mitigate the effects of climate change.

What is our role in the project?

Within the IEK, three sections will contribute:

- **Theory and Computation of Energy Materials** as coordinator.
- **Electrochemical Process Engineering** will provide experimental data for the use case PEM water electrolysis to verify transferability.
- The **Institute Erlangen-Nürnberg for Renewable Energy** will perform various testing and characterization activities in supporting use cases.

www.fz-juelich.de

JÜLICH
Forschungszentrum
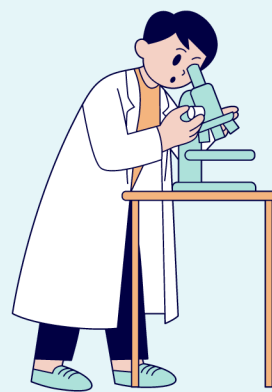
Robert BOSCH GmbH

Who are we?

The Bosch Group is a **leading global supplier of technology and services**. Mobile & stationary fuel cells as well as electrolyzers are part of its strategy. The product portfolio ranges from **fuel cell and electrolyzer stacks** to **system components** and up to complete fuel cell power modules for commercial vehicles.

What is our role in the project?

Our main contributions are related to the **identification of hitherto unrecognized knowledge gaps, the assessment of characterization and modelling tools** for applicability to industrial use cases as well as the coordination and KPI definition of the PEFC demonstration use case.

www.bosch.com

BOSCH

## HTE GMBH, the High Throughput Experimentation Company

Who are we?

HTE is a designer of screening testrigs for chemistry and also a supplier of research service using proprietary technology.

What is our role in the project?

HTE supplies a 4-fold screening testrig for fuel cell and electrolysis operation including data workflow with database.

DEC DE

www.hte-company.com

hte

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Nel Hydrogen
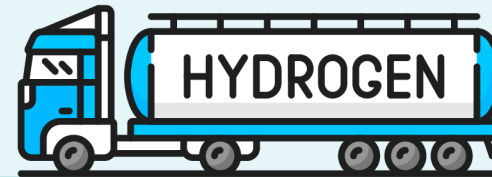
HYDROGEN

Who are we?
Nel Hydrogen is a global, vertically integrated and dedicated hydrogen company that delivers optimal solutions to produce, store and distribute hydrogen from renewable energy.

What is our role in the project?
- The new characterisation methods and powerful modelling developed as part of DECODE will help Nel to **accelerate the deployment and commercialisation of next-generation batteries and electrolysis systems**.
- Our role will be **to integrate industrial-grade components** and **carry out line and end-of-line testing for PEM and alkaline water electrolysers**.

nelhydrogen.com

nel

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CEA – Commissariat à l'énergie atomique et aux énergies Alternatives

Who are we?

CEA is a French government-funded research organization. The Laboratory for Innovation in New Energy Technologies and Nanomaterials (**LITEN**) is working on **energy R&D**, and has a unit dedicated to **energy for transport and stationary application**. Since 2010, CEA-LITEN is also conducting LCAs and Techno-economic assessments on **materials for renewable energy applications**.

What is our role in the project?

CEA-LITEN contributes to the general workflow of DECODE, and especially:

- Manufacturing of baseline components for **Proton Exchange Fuel Cell** (PEFC)
- **Imagery** and **SANS** technics
- Modelling of some manufacturing steps of the **GDL**
- **Simulation of** mass, heat, electrical and thermal **transport properties**
- **Upscaling of GDL and CCL models** to performance models

www.cea.fr

cea liten

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Leiden University

Who are we?

Leiden University is a renowned public university in the Netherlands. Within the project, the **Leiden Institute of Chemistry** works on fundamental aspects of the kinetics of the relevant reaction on well-defined (modified) electrode surfaces.

What is our role in the project?

To perform work on well-defined model systems, to elucidate the general rules and laws behind the relevant reactions.

Universiteit Leiden
The Netherlands

CIEMAT – Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas

Who are we?

CIEMAT is a public research organisation focusing on energy, the environment and related technologies. Its main lines of action are the study, development, promotion and optimisation of different sources, their impact on the environment and the development of new technologies.

What is our role in the project?

We'll conduct **experimental characterisation methods** in different tasks. Moreover, we will lead the development of the **data management strategy, cloud communication, metadata definitions and FAIR adoption**. We'll design **analytical models** based on correlations in characterisation data, communicate with experimental facilities and draft guidelines to the DECODE network.

www.ciemat.es

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES

Ciemat
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas

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CNRS – Centre National de la Recherche Scientifique

Who are we?

ICPEES (Institut de Chimie et Procédés pour l'Energie, l'Environnement et la Santé) is a joint institute of the CNRS and the University of Strasbourg specialising in a wide range of processes linked to the environment and health.

What is our role in the project?

Within DECODE, we are working on:

- the developpement of **new modelling and experimental tools** to better understand the **local reaction environment** and the structure of porous media.
- the **integration of these new tools**, along existing ones, into the DECODE plateform and the different use cases study.

www.cnrs.fr

CNRS

DEC⬡DE

## INPT – Institut National Polytechnique de Toulouse

Who are we?

The **IMFT** (Institut de Mécanique des Fluides de Toulouse) is a joint research laboratory of the **CNRS**, the **INPT** and **Paul Sabatier University**. The "M&B Milieux Poreux et Biologiques" research group at IMFT works on pore-scale simulations and theoretical analyses of scaling.

What is our role in the project?

Our objective is to **develop numerical chains enabling the reconstruction of porous components** and **the characterisation of their transport properties** via numerical simulations.

For example, in the case of catalytic layers, the aim is to numerically generate CL microstructures as a function of the properties of the ink and the manufacturing process.

www.inp-toulouse.fr

TOULOUSE INP

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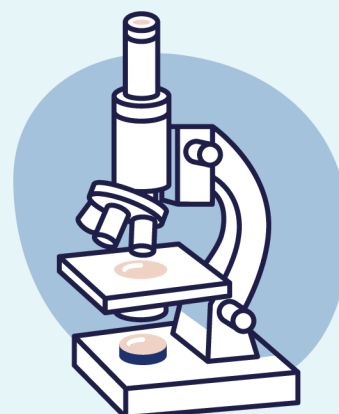
RWTH Aachen University

Who are we?

The **CCE** (Center for Circular Economy) at **RWTH Aachen University** pools trans- & interdisciplinary expertise regarding sustainable circular economy. The **WZL (Machine Tool Laboratory)** primarily deals with profitability analysis, sustainability modelling and assessment, and digital and sustainable transformation processes.

What is our role in the project?

Within DECODE, RWTH is responsible for the **holistic sustainability and circularity assessment**. This includes the analysis of suitable frameworks, the identification of methodology and data gaps, the conduction of comprehensive supply chain analyses, and the specification of the techno-economic KPI input for the business case.

RESEARCH

RWTHAACHEN
UNIVERSITY

DTU –Danmarks Tekniske Universitet

Who are we?

The section for **Autonomous Materials Discovery (AMD)** at DTU Energy focuses on developing theoretical and experimental methodologies to accelerate the discovery of novel materials.

What is our role in the project?

- Within DECODE, we are working on the **integration of theoretical and experimental models for predicting materials properties**.
- We will also contribute to the definition of **new modelling tools based on AI-accelerated ab-initio molecular dynamics simulations** to realistically model the electrochemical interface.
- In addition, thanks to our expertise in research data management, we will contribute to link DECODE with other EU initiatives.

www.dtu.dk

![DECODE logo]

HZB - Helmholtz-Zentrum Berlin für Materialien und Energie

Who are we?

The HZ Berlin is a research centre within the Helmholtz Association. Specialising in materials research. We, the imaging group, focus on multi-scale characterisation and advanced analysis of energy conversion materials.

What is our role in the project?

Our role covers materials science expertise, using synchrotron radiation, neutron imaging and FIB tomography with artificial intelligence tools. Our tasks include structural characterisation, MEA characterisation, development of method evaluation frameworks, liquid saturation analysis and development of imaging data models.

www.dtu.dk

HZB Helmholtz Zentrum Berlin

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Euroquality

Who are we?

Euroquality is a consulting company specialised in European projects setting up and management. Since 1997, Euroquality supports technological and methodological innovation within all organisations active in R&D.

What is our role in the project?

We **support the coordinator in the overall management and monitoring of the project**, providing tools adapted to the needs of the project.

We also **lead the working group on communication and dissemination activities** in order to reach as many people as possible across Europe and beyond.

www.euroquality.fr

euroquality
A WARRANT HUB COMPANY

PSI – Paul Scherrer Institut

Who are we?

The Electrochemistry Laboratory, is part of the Energy and Environment Research Division at the Paul Scherrer Institute. The laboratory comprises 5 interacting research groups that deal with almost all aspects of electrochemical energy storage and conversion.

What is our role in the project?

Our major tasks within the Decode project can be summarized as:

- electrochemical and operando charcaterisation of catalyst layers,
- neutron and X-ray based characterisation of microstructure and two phase transport in porous transport layers.

www.psi.ch

PAUL SCHERRER INSTITUT

PSI

SFU – Simon Fraser University

Who are we?

Simon Fraser University is a public research university in British Columbia, Canada, with three campuses, all in Greater Vancouver: Burnaby, Surrey, and Vancouver.

What is our role in the project?

Our research group will design and research innovative solutions for next generation ion-conducting materials and undertake experimental characterizations of the role of ionomer in catalyst layers, both of which are critical to DECODE.

www.sfu.ca

SFU

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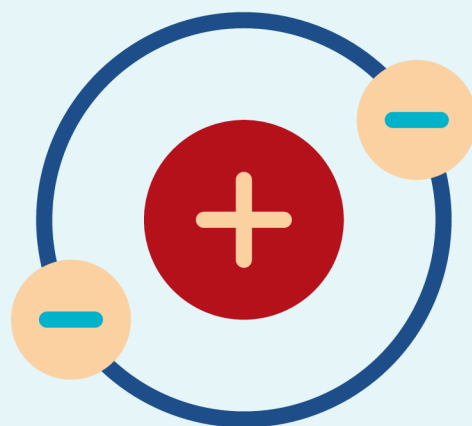
UNISTRA – Université de Strasbourg

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www.unistra.fr

Université de Strasbourg