Fuel cell micro-CHP Demonstration

The **ene.field** project is demonstration project of fuel cell based micro-CHP systems (combined heat and power). The project will deploy up to 1000 systems across Europe.

Fuel cell micro-CHP products have a higher power-to-heat ratio than conventional technologies, making them suitable also for future building concepts such as low-energy and passive houses. Experts estimate that, based on the expected electricity generation mix in 2020, a product of this type retrofitted to a typical family home will save between 21% and 40 % of greenhouse gas emissions compared to a conventional condensing boiler.

ene.field

PACE

Pathway to a competitive European Fuel Cell micro-CHP Market

As work package leader, DTU is responsible for the analyses carried out in the project. These analyses include performance and barriers, cost and environmental assessment, requirements for standardizations, grid connections and smart grid potential.

Building on the experiences from ene.field a spiritual successor, **PACE**, was launched in 2016. PACE aims to deplay 2,650 Fuel Cell micro-CHP units. DTU is leader of a work package on performance validation.

The project is supported by the European Commission's Fuel Cells and Hydrogen Joint Undertaking Programme (FCH JU).

SOFC and SOEC Development

DTU Energy has a range of activities in the areas of Solid Oxide Fuel and Electrolyser Cell development. A sample of these projects include:

ECo - Efficient Co-Electrolyser for Efficient Renewable Energy Storage: This project concernes development and testing of co-electrolysis cells and stacks

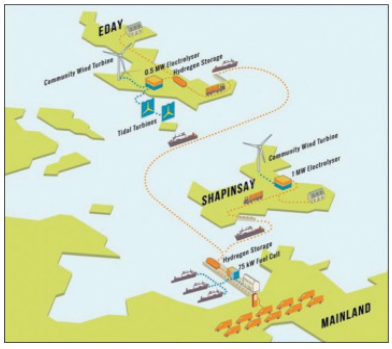
INSIGHT - Implementation in Real Sofc Systems of Monitoring and Diagnostic Tools Using Signal Analysis to Iincrease Their Lifetime: A project on development of novel cell and stack dianostic tools

BALACE - Increasing Penetration of Renewable Power, Alternative Fuels and Grid Flexibility by Cross-vector Electrochemical Processes: A project on development of reversible Solid Oxide Cell technology.

Electrolysis Demonstration

Together with 12 partners from six EU countries, DTU Energy is participating in the major research and development project **BIG HIT** (Building Innovative Green Hydrogen systems in an Isolated Territory: a Pilot for Europe)

Over the next five years, the isolated Orkney islands noth of Scotland will provide the venue for demonstrating and developing the hydrogen community — the production, sotrage, and subsequent use of hydrogen to meet the residents' heating, electricity, and transport needs.



DTU Energy's task in the BIG HIT project is to demonstrate the environmental benefits of the new technology as well as the impact on the surrounding society — e.g. in the form of jobs. In addition, DTU will calculate the financial viability of this form of energy storage.

SOFC and SOEC Testing Procedures

The purpose of the **SOCTESQA** (Solid Oxide Cell and Stack Testing, Safety and Quality Assurance) and Stack-Test projects is to develop industry-wide uniform test protocols for high temperature solid oxide and PEM cells and stacks respectively. In SOCTESQA test protocols have been be developed for SOFC (solid oxide fuel cells), SOEC (solid oxide electrolysis cells) as well as combined SOFC/SOEC technologies. In Stack-Test test procedures have been developed for stationary, portable and transportation applications of PEM technology.

In SOCTESQA DTU lead a work package on combined SOEC/SOFC testing and in Stack-Test a work package on durability testing procedures.

Both projects were supported by the European Commision's Fuel Cells and Hydrogen Joint Undertaking (FCH JU). SOCTESQA was additionally supproted by EUDP (Danish Energy Agency) and Stack-Test by Energinet.dk.

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The FCH Test Center is part of the Department of Energy Conversion and Storage at the Technical University of Denmark (DTU). The department has 250 employees, more than half of whom are working on fuel cells and electrolysis.

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