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The network of Horizon Europe Cluster 5 National Contact Point.



Water circular economy in hydrogen installation

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European Hydrogen Week

European Hydrogen Week 2024
GREENET Pitch session
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Clean Hydrogen Partnership

The GREENET project has received funding from the EU Horizon Europe programme under Grant Agreement No 101069604

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➢Clean Hydrogen Partnership SRIA area: Cross-cutting issues (sustainability, LCSA, recycling, eco-design)

The purpose of the project idea:

Concept of **water circulation and preparation system for an electrolyzer supplied from renewable energy sources**

Description of the idea:

1) Developing a water preparation system of appropriate quality intended to power the electrolyzer and the hydrogen storage system.
2) Developing a multi-stage water purification system.
3) The laboratory hydrogen installation will include following systems: receiving hydrogen from the electrolyzer, compressing hydrogen, storing hydrogen, generating electricity with the use of a fuel cell. The parameters of individual systems will be specified, taking into account the scalability of the solutions adopted.
4) Possibility of closing water circuit in energy hydrogen installations by using industrial wastewater.

Where it can be implemented?

Hydrogen production and storage hubs, modular system for electrolyzer supply using tap or wastewater

Our role: Consortium partner

Water circulation system

Deionized H_2O (requirements):
conductivity not higher than 0.1 µS/cm

Parameters of elecricity:
400 ÷ 500 W, 220/230 VAC
50/60 Hz

Source of water
eg. rain, sewage, tap water

Requirements:

conductivity not higher than 1200 µS/cm

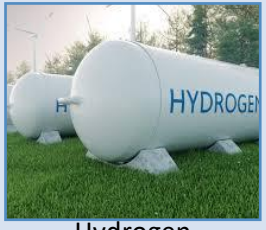
hardness not higher than 250 mg $CaCO3/dm^3$

iron concentration not higher than 0.2 mg/dm^3

Water treatment system

Hydrogen production, compression and conversion

Electrolyser



Hydrogen compression & storage system

Fuel cell

Water

Water circulation system

Expertise & experience

Department of Control Systems

The research of the **Control Systems Research Group** is focused on, among others, the design and implementation of:

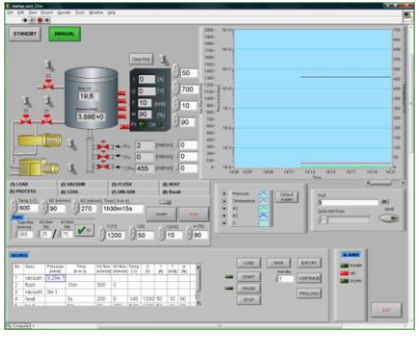
- microprocessor systems, including real-time strict systems,
- specialized electronic devices in the area of control and power supply systems,
- technological process control systems,
- control systems for research and testing devices,
- DC supply systems.

The laboratory's equipment includes mainly:

- tools in the field of programming engineering and microprocessor technology, including DSP signal processors and FPGAs,
- a surface mount laboratory,
- a set of devices for measuring high-power waveforms,
- software tools for identification, modeling, and simulation of control systems,
- SCADA and HMI software tools,
- EMC laboratory (Accreditation No. AB 1476).

Current project: 2022 – 2025 – Research project entitled "System for closing the water circulation in a hydrogen energy installation", principal investigator: Łukasiewicz Research Network - Institute for Sustainable Technologies, fund no. 1/Ł-ITEE/CŁ/2022

View on the prototype of water treatment system



Screen of proces visualization (example)

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