

HYDROGEN GENERATOR

Interdisciplinary Project 2024

Introduction:

In locations isolated from electricity, diesel generators are utilized although they are well known for polluting the environment. The aim of this project is to develop an **environmentally friendly** and noise-restraining alternative power generator.

Goal:

- Creating a **self-sustaining power generator** that utilizes **hydrogen** as an energy source for a **fuel cell**, which in turn charges a battery.
- Implementing a remote control system using **WIFI** and **Home Assistant**.

Description:

In this project, **15 Students** of different bachelor degrees (Infotronic Systems Engineering, E-Government, Environment and Energy, Media Communication and Computer Sciences as well as Mobility and Logistics) worked together on the planning, design, construction and the safety assessment of the system in collaboration with **OMEXOM GmbH**. The workers and apprentices of **OMEXOM** developed the electrical cabinet and assisted with the wiring.

Materials:

- Battery (UP5000)
- Fuel cell (H-500)
- Hydrogen storage
- Inverter (MultiPlus-II 230V)
- Construction elements
 - Aluminum profiles
 - Gas tubes

3D printing was used to produce holders, such as those for the hydrogen storage. On the software side, Home Assistant served as the brain of the project, working alongside MQTT, an Internet of Things data network. Various **ESP microcontrollers** were connected to the central hub of information, the **Raspberry Pi 5**.

Results/Outlook:

The generator has been operated successfully. Next steps include collecting data from the fuel cell, battery and inverter.

On **May 22nd**, Omexom and the university group obtained the **“Hochschulpreis 2024 der Wirtschaftsförderung Kreis Kleve”**.

The demonstrator was presented at **OMEXOM GmbH** on **July 1st** to stakeholders from business, science and politics.

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