



WEEX : HYDROGÈNE

WEEX 1

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| Lecturers : 0.0 | TC : 0.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

This course aims to increase the students awareness about energy ressources and their management. The students form a team of engineers engaged to analyze the feasibility of an energy autonomous residential aera with zero carbon emissions. The district is powered by solar panels and a long term hydrogen storage system. In order to achieve this goal, each team has to mobilize their technical knowledges and soft skills.

Keywords : Hydrogen production, Hydrogen storage, Fuel cell, Off-grid micro-grid, zero carbon emission residential aera

Programme

- Introduction to hydrogen systems for energy-autonomous residential area
- Study of PV technologies, electrolyzer and fuel cell
- Sizing of PV system, power electronics and hydrogen boiler
- Study of material properties for hydrogen storage
- Design of openings in the storage area to ensure security, selection of H2 and/or smoke sensors
- Technical and economic analysis of the PV + H2 system using HOMER Pro software
- Conference linked with the topic made by an external speaker

Learning outcomes

- C5N3 : Clever use of the available resources
- C2I2 : Evaluate the relevance of the obtained results. Question the proposed method regarding relevant criteria and hypothesis.
- C3N3 : Valorize the obtained results through good writing and speaking abilities
- C4I2 : Generate performances individually and in his/her team. Positive interactions during team work. The student is involved in team work and promote cohesion in his/her team. C2I3 : Think and act in an unpredictable environment. Identify issues according to an unknown long-term context.

Independent study

Objectifs : Propose a PV + H2 energy system for an energy-autonomous residential area

Méhodes : Team work
Flipped classroom in most of the activities
Deliverables regularly required

Core texts

Dawood, F.; Shafiullah, G.; Anda, M., *STAND-ALONE MICROGRID WITH 100% RENEWABLE ENERGY: A CASE STUDY WITH HYBRID SOLAR PV-BATTERY-HYDROGEN*, Sustainability, 2020
Evangelos Kalamaras, Meltiani Belekoukia, Zhengyu Lin, Bing Xu, Huizhi Wang, Jin Xuan *TECHNO-ECONOMIC ASSESSMENT OF A HYBRID OFF-GRID DC SYSTEM FOR COMBINED HEAT AND POWER GENERATION IN REMOTE ISLANDS*, Energy Procedia, 2019

Assessment