THESIS OFFER
IRDL UMR CNRS 6027, Dpt Energies, Hydrogen
University of Southern Brittany, IRDL,
ENSIBS, 17 Boulevard Flandres Dunkerque, Lorient, France

The IRDL, energy theme (PTR4) is looking for a new doctoral student to participate in the implementation of the optimization of an ENR energy chain, complete or partial from production to consumption through storage and involving hydrogen.

Position title: PhD student in electrochemical, hydrogen and energy engineering

Project title: Optimization by evolutionary algorithm and piloting by automated learning of an ENR energy chain: production/storage/use (OptENRH2)

Project: The project concerns the intelligent storage and conversion of electrical energy by studying and optimizing part or all of a renewable energy chain (CER): production/storage/use in order to optimize its performance in a synergistic way.
For example, an upstream CER would make the link between solar production and hydrogen charging station, osmosis unit, electrolyser, dryer, compressor and tank.
Downstream, the CER "power train" chain formalizes the dialogue between a fuel cell, its hydrogen tank, its air supply, the lithium ion support batteries and finally the powered electric motor.
These subjects are in high demand by the Breton partners of IRDL for innovation-research and ENSIBS Lorient for training.
This thesis project wants to formalize the entire renewable energy chain (REC): from production to use in order to optimize its performance in a synergistic way. This mastery then makes it possible to consider the optimum sizing of the chain but also their intelligent control-command.
The intrinsically linked phenomena reside in these three parts of the energy chain can indeed correspond intelligently through the design parameters (dimensioning), the management of physical quantities (current, temperatures, chemical reactions, etc.), or even the operating strategy. (monitoring, control or optimal control of performance indices).
The complexity of the CER, its dimensionality (large number of parameters) and its multiphysical nature, make it difficult to optimize its operation by rational design of each sub-part (including dimensioning, control and management of performance). This is why we propose to formalize its optimal functioning in the form of a global and parallel optimization problem. This formulation should take into account the different dynamics of each component. This formulation must take into account the concomitant multiphysical phenomena, the different dynamics of each component and the design/operational constraints of the CEN.

Profile, skills: Energy engineering, IT, electrochemical

Place of work: IRDL, ENSIBS, 17 Bd Flandres Dunkerque, Lorient, France

- ⇨ ARED+CDE Project financing: 108 kEuros gross charge over 3 years, i.e. 36 kEuros/year for 3 years, i.e. 3 kEuros/month over 36 months.

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