Post-doc position:
Characterisation of energy flexible buildings at the district scale

Workplace: LaSIE (Laboratory of Engineering Science for Environment), La Rochelle University, France.
Type of contract: 1-year contract
Starting date: February-March 2018

Job description

Energy flexibility, the key to a smarter power grid. Energy flexible buildings can support the integration of renewable energy sources in the national energy mix by modulating their energy use. Modulating the heating energy use of new and existing buildings could provide 10 to 20 GW of flexible load in France. Despite a large potential identified, a number of issues prevents the deployment of this technology: communication, privacy, cost-effectiveness, control and reliability of the response.

The ANR project CLEF (Control strategies for Large scale aggregation of Energy Flexible buildings). This project focusses on the last two issues and will test indirect control strategies to maximise the flexibility potential and coordinate the response of energy flexible buildings. The use of an indirect controller will ensure that the objective of matching production and demand is achieved at the aggregated level, though allowing some degrees of freedom at the building scale. However, the main challenge of indirect controller is to get a reliable estimation of the capacity available, in order to trade the capacity on the electricity market. The case study for this project is the Atlantech low carbon district, located in La Rochelle. The project starts in January 2018 and will last for 3 years. The project coordinator is the Laboratory of Engineering Science for Environ-ment (LaSIE, La Rochelle) and partners from G2Elab (Grenoble) will bring their expertise in the modelling of electrical networks. Further information: http://lasie.univ-larochelle.fr/2018-2021-CLEF-ANR.

Objectives of the research work. A first part of this project will consist in developing and validating the model of the Atlantech district, taking into consideration the diversity of buildings, users and simulating explicitly the electrical grid. Based on this integrated modelling, different control strategies will be developed and tested. The modulated energy uses are the space heating, the hot water preparation and the white goods. Sensitivity studies will also be performed to observe the variability of the potential.

Keywords: demand response; smart-grid; energy flexibility; building physics; occupants; electrical grid; control

Qualifications

Candidates should have a PhD degree in Science. We are looking for a candidate who has knowledge in the field of modelling, building physics, control and optimisation. Experience in programming is required (e.g. Python). The candidate must master English language with proficiency, and basic knowledge of French language would be appreciated. Finally, the candidate should be curious and autonomous.

Application procedure and contacts

Please submit your online application no later than November 30, 2017. Applications must include: a detailed curriculum, a cover letter, recommendation letter(s), a list of publications and the PhD diploma. Forward your electronic application to:

Jérôme LE DREAU (La Rochelle University, LaSIE laboratory) – jledreau@univ-lr.fr – +335 46 45 72 66