

Post-Doctoral Research: Design and Experimentation on Electricity Consumption to Induce Flexibility

Affiliated Laboratory: GAEL

Context

The post-doctoral researcher will benefit from a stimulating and dynamic environment and will be included in the consumption axis of the GAEL laboratory, particularly within the experimental platform. Additionally, they will be integrated into the FlexTase project. The FlexTase project is funded under the PEPR TASE (Advanced Technologies for Energy Systems). This 60-month project starts from the technical and social nature of flexibility. It is an interdisciplinary project combining research in electrical engineering and economics. The research conducted during this post-doc will be carried out in close collaboration with electrical engineering sciences. The decarbonization of our uses necessitates a shift towards electric energy and the development of renewable energies. However, energy production from renewable sources is intermittent and cannot adapt to consumption. It is therefore crucial to encourage consumers to adapt their consumption to production rather than the reverse. Flexibility is an issue that calls for technical innovations to orchestrate a balance between production and consumption, in the face of the intermittency of renewable energies (solar, wind, etc.), as well as the risk of congestion or the limits of available production means. Moreover, flexibility also requires social innovations to involve and engage the stakeholders in the energy chain, from managers to consumers, who are part of the energy system and its operational dynamics.

Mission:

The mission will focus on setting up laboratory and field experiments, as well as analyzing and disseminating the results. The research conducted in this post-doc will address residential electricity consumption and aim to develop and test tariff and non-tariff incentives to make demand more flexible. Candidates should have either an experimental economics background with experience in setting up experiments involving nudges or a background in public policy evaluation with knowledge and application of evaluation econometrics methods. Research themes related to energy or the environment would be a plus.

More specifically, the post-doctorate will involve the implementation of laboratory and field experiments, as well as the analysis and dissemination of results. The research conducted in this post-doc will focus on residential electricity consumption and aim to develop and test tariff and non-tariff incentives to increase demand flexibility. A first laboratory experiment will seek to represent behaviors and trade-offs in a collective self-consumption operation, where individuals are encouraged to share a common resource such as energy and cooperate for its management. Several contracts and pricing models will be tested to determine which ones achieve the highest level of social optimum. A second series of experiments will be conducted directly in the field with households to enhance flexibility in their consumption and will build upon a previous study conducted with 165 consumers (Llerena et al., 2022). Monetary and non-monetary incentive mechanisms will be employed. The GAEL laboratory and the Energy

Transition Observatory are now recognized as trusted third parties by ENEDIS and can access household electricity consumption data, thanks to the LINKY meter, provided that households consent. The post-doc will participate in designing these experiments, processing the data, and drafting the corresponding research articles.

Main Activities:

- Literature review on field and laboratory experiments related to electricity consumption and, more generally, on behavioral incentive mechanisms such as "nudges"
- Design of experimental protocols for laboratory and field settings
- Implementation of field experiments, creation of questionnaires, and participant recruitment
- Data collection, cleaning, and analysis related to the experiments
- Writing research articles related to the experiments

Expected Skills:

- PhD in economics (behavioral economics, experimental economics, and energy or environmental economics) preferred
- Skills in designing and conducting laboratory and field experiments
- Proficiency in data collection and analysis, including microeconometrics for evaluation
- Familiarity with econometrics software (R, Stata, or Python)
- Knowledge of OTREE will be valued
- A specialization in energy economics or behavioral incentive mechanisms such as nudges would be a plus

Compensation:

Starting from €3,020 gross per month, depending on experience.

Duration:

This position will be hosted within the GAEL laboratory, Grenoble University Campus in Saint Martin d'Hères.

The expected duration is **18 months**.

Start date as soon as possible.

Applications:

The application file should include the following elements:

- CV
- Cover letter
- One or two work documents or publications

Applications should be sent as a single PDF file named with the candidate's name and the email subject [Surname_PostdocFlexTase] to beatrice.roussillon@univ-grenoble-alpes.fr, daniel.llerena@univ-grenoble-alpes.fr, and adelaide.fadhuile@univ-grenoble-alpes.fr.

Interviews will be organized on a rolling basis, and the position will be filled as soon as possible.