

**UMI SOURCE-Université Paris-Saclay/Climate Economics Chair
Internship position**

***Power system optimization with socio-economic
objective functions***

Context

This position is funded by PowDev project (PEPR TASE). The main objective of this project is to evaluate and optimize the resilience of power systems in the context of a massive insertion of renewable energies. It aims to elaborate a comprehensive and integrated set of decision-support tools by considering extreme events in present and future climates, the complexity of the power grid, and socio-economic scenarios. Particularly, the PowDev project seeks to achieve the following tasks:

- Simulate, characterize, and analyze the scenario of a blackout in the case of a power system with massive renewable energy (PSMRE), including extreme weather events arising from climate change under present and future projections, realistic electrotechnical and field knowledge, inherent grid complexity including interactions with other critical infrastructures, economics, and societal impact models.
- Propose a quantitative and systemic framework to optimize the resilience of a PSMRE. We specifically focus on addressing possible remedial solutions in the design and operational phases to maximize the system's resilience against major blackouts.

Mission

The researcher hired will work in the mathematical optimization team EDGE in Bordeaux, in collaboration with the **UMI SOURCE** economic department of **Université Paris Saclay**, UVSQ, IRD. The recruited person will help produce models and algorithms for various variants of blackout countermeasure optimization, where the objective function involves social welfare metrics (such as equity and fairness).

The tasks will be the following: a literature review on power system optimization and socio-economic objective functions, proposing models based on the literature for variants of the problem with various approximations for the grid dynamics and different objective functions, and assessing the quality of the models using benchmarks produced by other project partners.

Profile

This position is aimed at master's students/engineering students in operational research fields. The candidate must have organizational comfort, autonomy, and the ability to work in conjunction with the various interlocutors of the Chair. The candidate must know the electricity or at least energy markets. An energy economics course would be ideal. Good knowledge of database management would be a plus.

This internship could be the start of a PhD at EDGE in University Bordeaux with co-supervising at University Paris-Saclay and the Chair.

Duration: Starting March-April 2025 for a **6-month period – ON SITE**

Internship location: 3 days at Université Paris-Saclay, UVSQ, 47 Bld Vauban, 78280 Guyancourt and 2 days at Climate Economics Chair, Palais Brongniart, 28 Place de la Bourse, 75002

Including at least 2 months at TEAM EDGE in University Bordeaux.

Paris Saclay University Salary: €4.35/hour (i.e. around €600/month)

Contact and documents: send CV, Cover letter **plus** Master 1 grades and Master 2 grades available in **ONE PDF ONLY** to claire.berenger@chaireeconomieduclimat.org indicating the internship offer's **(only 2 applications maximum on all CEC internships offers)**

Application closure: January 17, 2025

Interviews from January 20, 2025

Final response to applicants: February 10, 2025