Aix-Marseille University
AMSE – EDF R&D PhD grant
2023-2026
Call for applications

The Aix-Marseille School of Economics (AMSE) and EDF R&D are inviting applications for a three-year PhD grant starting in October 2023.

The AMSE - EDF R&D Foundation PhD grant will be operated under a research partnership between both institutions (CIFRE agreement). The PhD candidate will be enrolled in the AMSE PhD program and co-supervised by AMSE faculty members and EDF R&D researchers. The PhD candidate will work at the EDF R&D premises (Palaiseau) in contact with AMSE.

Research project summary

The research project consists in evaluating the impacts of energy demand management actions, for example: impact of energy sobriety plans, replacement of a heating system by a more efficient one, use of our digital services, thermal renovation of housing, price variations or replacement of old appliances with newer ones that consume less energy. See details on next page.

Required qualifications

Applicants must hold a Master prior to September 2023 from an institution that provides a level of training in economics and data science at least as good as that of the AMSE master and they must have achieved a first class standing in this Master. Excellent skills in machine learning, Python programming and in econometrics are required. Applications are welcome from both French and non-French nationals. Ability to work in French and English is necessary.

Monthly salary

The monthly salary is around € 3,000 (gross, i.e. before social contributions and income taxes, variable according to the profile). AMSE PhD program yearly tuition fees amount about € 400.

Application package

- A detailed CV and a cover letter.
- Detailed transcripts of bachelor- and master-level grades (applicants who do not have access to their official grades for the ongoing academic year need to request their institution to send them directly together with a certificate of achievement [the latter might be sent by June 30, 2023 latest]).
- At least one reference letter (from a reference who does not belong to the AMSE), which must be sent directly and confidentially.

Application procedure

All documents must be sent as PDF files to the AMSE PhD program secretariat (bernadette.vouriot@univ-amu.fr) by **April 8, 2023** latest. The subject of the mail must be "YOUR_NAME – EDF RD PhD Grant Application". The first two items must be included in a single PDF file, following the order given above. The name of the file must be "YOUR_NAME – EDF R&D PhD Grant Application.pdf".

Selected applicants might be invited for interviews in the presence of both institutions. Applicants will be notified about final decisions by **July 17, 2023 latest**.

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Extended summary of the research project

In our industrial context, we are not in a position to carry out controlled random experiments (impossibility to forbid or force a thermal renovation, a price change or a change of appliances). For this reason, we use methods based on observable data. The problem with these methods is that the treatment group is made up of volunteers and thus risks generating a selection bias between the treated and the control group.

Indeed, several unobservable variables influence electricity consumption, such as ecological awareness, the quality of the renovation work, etc., which may bias the estimation of the treatment effect. Therefore, the challenge of these methods is to construct a counterfactual corrected for the selection bias.

We now have an advantage: for customers who give their consent, the smart meters allow us to collect the consumption curve at 30 min or daily intervals, thus reflecting their behavior.

The idea of this project is to use the shapes of the curves to capture the effect of behaviors and therefore of unobservable variables; and thus create synthetic control groups inspired by the work of Guido Imbens and the Van Der Schaar laboratory of UCLA (feature extraction, dimension reduction, generation of latent variables by Deep Learning). As the consumption curves are noisy, volatile, and measured at high frequencies, we will have to adapt the previously mentioned work to our problem, which will contribute to the originality of this research project.

For more information about the research project:

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