POSTDOCTORAL FELLOWSHIP

OPEN POSITION

DESCRIPTION

The **post-doc researcher** will **be hosted by the BETA** (*Bureau d'Economie Théorique et Appliqué*) lab, that is the biggest Lab of the North-East of the France with researchers in Economics (and Management) as part of the LUE program and in close cooperation with the IJL (*Institut Jean Lamour*) lab is a fundamental and applied research laboratory in **material science**. The LUE (Lorraine University Excellence) program of the Lorraine university is based on new **transdisciplinary cooperation**, for coordination between research, training and innovation, as well as strong and sustained partnerships with private sector entities and local policy makers. Sustainable development based on renewable energy and hydrogen technologies is one of the main lines of the program.

The expected work consists in conducting a **macroeconomic study about hydrogen for the steelmaking industry**. Indeed, the development of hydrogen are essentially based on hydrogen for mobility and energy storage. The decarbonization of industry by hydrogen, and in particular the decarbonization of the steel industry, when mentioned, is generally not quantified. However, the probability of a rapid emergence of a Hydrogen economy *via* the mobility is quite low and the development of other sectors (heating systems with co-gen, industry) is needed. Finally, given the huge amounts involved, this use of hydrogen could change the energy and economic landscape of hydrogen, and this is what we propose to study.

The main stages of the study will be as follows:

- **Bibliography** on the production of steel with hydrogen from a technical, economic and environmental point of view – The subject is well known to the IJL on the first and third points, work on the second is scarce and must be critically evaluated.
- Definition of penetration **scenarios** (trajectories) for direct hydrogen reduction in the European and world steel industry – A direct hydrogen reduction unit can be combined, on site or on another site, with an electric steel plant, but it can also complement the blast furnace pig iron production in a conventional integrated plant. Hydrogen can be supplied from nearby electrolysis plant or distributed through a network. The consequences on investments, operating costs and environmental gains are not the same. The market uptake of the new process may vary considerably depending on the local context and macroeconomic constraints.
- **Economic modelling** of scenarios – Macroeconomic and environmental modelling approach and simulations derived from a Computable General Equilibrium Model integrating energy inputs and steel production, especially suitable here. Influence of economic factors (cost of CO2, cost of hydrogen. Influence of the hydrogen trajectory of the steel industry on the macro-economy of hydrogen and energy.
- **Environmental assessment** of the scenarios by life cycle analysis – Using the inventory results from the process modelling and LCA software, the environmental performance of the different scenarios will be compared regarding all relevant indicators, not just global warming.

POSTDOCTORAL FELLOWSHIP

OPEN POSITION

This work is in line with previous studies conducted by IJL (lead: F. Patisson) about hydrogen for steelmaking and from BETA about hydrogen economics. The work will be supervised by economists (BETA) and experts of hydrogen from IJL. The study will be also conducted in cooperation of H. Maisonnave from EDEHN.

Keywords: energy transition, hydrogen, industry, steelmaking, macroeconomic models, general equilibrium models (CGE)

TERMS AND TENURE

This two-year position will be based at the ***BETA,*** Baron Louis Street, https://g.page/MSHLorraine?share. The expected duration is 20 months and can not exceed 24 months in all cases.

The target start date for the position is ***1st January or February 2023,*** with some flexibility on the exact start date.

HOW TO APPLY

Applicants are requested to submit the following materials:
- A cover letter applying for the position
- Full CV and list of publications
- Academic transcripts (unofficial versions are fine)

Deadline for application is ***30th November, 2022***. Applicants will be interviewed by an Ad Hoc Commission by ***15th December, 2022***.

Applications are only accepted through email. All document must be sent to ***Olivier.Damette@univ-lorraine.fr*** ***and*** ***Fabrice.Patisson@univ-lorraine.fr***

JOB LOCATION

Nancy, Lorraine, France
BETA (Bureau d'Economie Théorique et Appliqué) laboratory, Baron Louis Street (see below) in cooperation with IJL (Institut Jean Lamour) lab.

REQUIREMENTS

DOCUMENTS

- Curriculum Vitae - Your most recently updated C.V. including list of publications
- Cover Letter
- Statement of Research