Demande de Publicité Internationale
Recrutement prévu dans le cadre du contrat ANR PEMFC95

Job title	**Engineer or PostDoc Fuel Cell Systems**
Ref	
Date de mise en ligne souhaitée	**15/01/2025**
Job type (PhD, Post-doc, Engineer)	**Engineer or PostDoc**
Contract duration (months)	18 months
Salary	To be discussed considering the background
Qualifications (Master degree, PhD…)	Master degree or PhD
Job hours (full time/ part time)	Full time
Employer	Université Marie et Louis Pasteur
Host Laboratory	FEMTO-ST / ENERGY Department
URL Host Laboratory	https://www.femto-st.fr/en/Research-departments/ENERGY/Presentation
Address Host Laboratory	2 rue Edouard Belin 90000 Belfort, FRANCE
Job description	**Context** PEMFC-95 project is one of the project of the Priority Hydrogen Research Program and Equipment (PEPR H2 https://www.pepr-hydrogene.fr/). Its purpose is to meet the needs of heavy mobility (trains, trucks, buses), which require proton exchange membrane fuel cells (PEMFC) capable of delivering higher power than current systems, while being more durable and less expensive. The PEMFC95 project aims to meet these objectives by contributing to the development of PEMFC fuel cells that can operate at a stabilized temperature of 95°C (compared to 80°C in current systems). This temperature increase should also make it possible to supply PEMFCs with less pure hydrogen with equivalent efficiency. At the end of the project, developments will be necessary in order to move from the results obtained in PEMFC-95, 25cm² cells and around 100W short stack to real scale stacks of 100kW, i.e. three orders of magnitude. In order to prepare the potential industrial transfer of this work, it is essential to quantify the expected gains of this new technology under operating conditions such as "European automotive conditions" in terms of: - stack-scale efficiency

- system-scale efficiency
- potential gains on the hydrogen value chain linked to the reduction of hydrogen quality requirements,
- aging and durability
- life cycle analysis

The proposed study topic is a contribution to this assessment through the creation of a reference database on 80°C PEMFC technologies and the assessment of scale effects, the modeling of an 80°C PEM system and a 95°C PEM system, taking into account the simplifications of architecture and control. It will also involve proposing a life cycle analysis methodology on these two systems.
FEMTO-ST is a laboratory of the University of Marie et Louis Pasteur, the University of Technology of Belfort-Montbéliard, SupMicroTech, associated with the CNRS. It is organized in 7 scientific departments in engineering sciences. The Energy department, which hosts the project, is one of the leading groups at national and European level in Hydrogen systems for energy. With 25 years of experience in this field, it is located in Belfort. It has a world-class testing platform and has developed a large network of industrial partnerships. Its main areas of research are energy efficiency, sustainability and economic, social and environmental sustainability.

Job Description
WP 1: Reference database on PEMFC stacks of 80°C technology
Inventory of existing databases at the project partners and possibly available on "open source" portals, for stacks of different powers
Formatting of metadata on these databases and proposing a uniformed frame for future data labelling.
Identification of scale effects when increasing the power of a technology
Carrying out fuel cell stack tests to supply the database
These data will be analyzed to try to identify possible performance losses and difficulties related to increasing the power of the stacks (increase in the surface area of the cells, increase in the number of cells, evolution of the surface power)

WP 2: Macroscopic modeling of an 80°C PEM system
Modeling of a PEMFC system operated at 80°C, from the component models available at FEMTO-ST
Calculation of performance indices over a heavy mobility mission cycle

WP 3: Macroscopic modeling of a 95°C PEM system
Definition of the architecture of a PEM fuel cell system, operated at 95°C

	Macroscopic modeling of the PEMFC system operated at 95°C, from component models adapted to this temperature Calculation of performance indices over a heavy mobility mission cycle by extrapolating the data obtained on assembly and single cell. *WP 4: Life cycle analysis for both systems* Literature study on the life cycle analysis of PEM systems for heavy mobility and critical analysis of the results Identification of software tools to support a life cycle analysis in the field of hydrogen energy Comparative analysis of the LCA for a PEMFC95 stack and a PEM stack at 80°C according to the data available within the consortium Comparative analysis for both systems. Data accessibility is a critical point of this task. The expectations will therefore be reassessed based on this constraint. The recruited staff will participate in the biannual meetings of the PEMFC95 project, will present the progress of their work to the project partners. They will have to contribute to the written reports to be produced as part of this project. They will have the opportunity to present their results at national conferences (CNRS H2 Research Federation in particular https://frh2.cnrs.fr/) and at least one international conference. Dissemination in scientific journals with an international audience will also be expected.
Supervisor(s)	Prof. PERA Marie-Cécile (marie-cecile.pera@univ-fcomte.fr), Université Marie and Louis Pasteur Prof. Daniel Hissel (daniel.hissel@univ-fcomte.fr), Université of Marie and Louis Pasteur Prof. Yousfi Steiner Nadia (nadia.steiner@univ-fcomte.fr), Université of Marie and Louis Pasteur
Candidate profile	The candidate will hold a Master degree or an engineering degree or a PhD in Electrical Engineering or Automation. Skills in the field of hydrogen for energy are mandatory.
Keywords	PEM Fuel Cell, Heavy duty vehicles, modeling, control, LCA.
Application deadline	30 March 2025
Starting Job	To be defined

Application *Depending on the type of position*	Postdoc or Engineer Position Please send the following documents by e-mail to marie-cecile.pera@univ-fcomte.fr , nadia.steiner@univ-fcomte.fr and daniel.hissel@univ-fcomte.fr : 1) For EU candidates: Copy of your national ID card or of your passport page where your photo is printed. For non-EU candidates: Copy of your passport page where your photo is printed. 2) Curriculum Vitae 3) Letter of motivation relatively to the position (1 to 2 pages). 4) Copy of your Master degree or Engineer degree or PhD. 5) Copy of your final marks and ranks (M1 et M2). 6) Coordinates of reference persons (maximum 3): Title, Name, organization, e-mail.