Postdoctoral position in construction of a parametrized Life Cycle Assessment model of offshore wind projects

N/Ref: *FEM-SAS-2021-009*

France Energies Marines Institute

France Energies Marines is the French Institute for Energy Transition dedicated to offshore renewable energies. Its mission: to define, set-up and apply a scientific and technical framework necessary to remove the obstacles faced by this rapidly developing sector. With a multidisciplinary team of 50 employees and a model of public-private collaboration, the Institute has a guiding purpose: R&D, whether collaborative or carried out as part of a service activity. France Energies Marines provides support for the various offshore renewable energy technologies by relying on four cross-disciplinary and complementary R&D programmes: site characterisation, design and monitoring of systems, environmental integration and farm optimization.

Context

FEM's activities are mainly oriented towards collaborative R&D, including the carrying out of research work and the development, coordination and leading of scientific projects. Under the roadmap of the research program "Environmental Integration", FEM is working to identify, quantify, measure and analyze in an integrative approach, ecological and socio-economic effects that could emerge from the installation, functioning and decommissioning of marine renewable energies projects.

In accordance to this roadmap, France Energies Marines and the Center "Observation, Impacts, Energy" (O.I.E.) of ARMINES/MINES ParisTech coordinate the LIF-OWI project: **Environmental, Socio-economic and Technological challenges for LIFe cycle assessment (LCA) of Offshore WInd farms (OWF).**

The Center "Observation, Impacts, Energy" is a joint Research Laboratory MINES ParisTech/ARMINES that focuses on energy. It addresses the temporal and spatial issues linked to renewable energy resources as well as to the environmental impacts of energy pathways. In this context, O.I.E. has developed a large expertise in building parameterized models to better describe the variable and uncertain character of life cycle inventories for renewable energy technologies.

Launched in 2020, LIF-OWI is a three-year collaborative project which aims at:

- developing a comprehensive methodological framework for environmental and social life cycle assessment and validating it through application to a selection of offshore wind farms (pilot and commercial, floating and bottom-fixed);
- identifying ways to improve the environmental and societal sustainability of offshore wind farms using the results of their life cycle assessments.

In the context of LIF-OWI, FEM and O.I.E. are looking for a motivated postdoc to carry out some of the foreseen research activities.

Job description

The postdoc will work on the environmental assessment of offshore wind farm (OWF) projects based on a life cycle perspective, by tackling two main challenges faced by applied research and practitioners when conducting LCA of OWF projects: (1) the lack of guidance when assessing the environmental impacts of OWF projects, and (2) the uncertain and variable character of installation-specific information.

Precisely, the postdoc will conduct the following tasks under the supervision of the OIE center and FEM:

- Provide a synthesis of the knowledge of LCA for Offshore Renewable Energy (ORE) projects. This review will aim at gathering a comprehensive overview of current practices in this field, from published studies on LCA and thorough comparison of available international standards for the LCA of other renewable energy technologies;
- Build a parameterized LCA model of the offshore wind power fleet by means of mathematical relationships in order to estimate the inventory flows necessary to conduct LCA for specific installations. This parameterized LCA model will be built in Python programming language using complementary tools and libraries such as *Brightway* and *lca_algebraic*. It will improve the representativity of conducted LCAs of OWF projects and help face potential data gaps;
- Contribute to the development of a methodological framework for the environmental assessment of fixed and floating OWF projects to guide project developers conducting LCAs and ensure a better comparability between LCA results of different projects.

The postdoc will produce the three deliverables listed below and is expected to use some of the findings in at least one scientific contribution (*e.g.* paper or scientific conference):

- A report summarizing the review of current knowledge on LCA for ORE projects;
- The parameterized LCA model in Python describing the environmental impacts of OWF projects and specifications associated with the model;
- A proposal of methodological guidelines for the environmental LCA analysis of OWF projects.

Profile and skills

Initial training

PhD degree in environmental science or in environmental/ecological engineering.

Specific knowledge

Required knowledge

Qualified knowledge on environmental impact assessment of energy power systems
Excellent programming skills (preferably Python, knowledge of *Brigthway2* is a plus)
Strong knowledge of LCA techniques
Multidisciplinary and adaptability to new challenges
Ability to write reports and publications in scientific journals in English

Desirable knowledge

Knowledge in Offshore Renewable Energy systems
Knowledge in marine ecological engineering
Knowledge in statistics

Work experience

Previous experience in the domain of onshore and/or offshore projects will be an asset, as well as experience with eco-design and environmental assessment methods and tools for ORE.

Professional Qualities

Scientific rigor and critical analysis
Be curious, autonomous, organized and pro-active
Appreciate working in groups in a multidisciplinary approach
Good communication/redaction skills in English and French

Practical information

- **Type of contract:** Fixed-term contract
- **Duration of the contract:** 12 months
- **Status:** Postdoctoral fellow
- **Workplace:** Armines/O.I.E. at Nice Sophia Antipolis, with working time to schedule at the FEM head office (Plouzané).
- **Starting date:** 22nd February 2021
- **Deadline for application:** 12nd February 2021

This position is open to people with disabilities.

How to apply

- Applications must consist of a **CV** and a **cover letter**.
- In the case of a candidate being seconded by a member of France Energies Marines, the application must mention the agreement of the current employer.
- To apply, please go to the France Energies Marines **website** under the **Join Us** section: Jobs – France Energies Marines (france-energies-marines.org)