PhD Position

PhD - Environmental assessment of territorial strategies for low-carbon industry

The French National Research Institute for Agriculture, Food, and Environment (INRAE) is a major player in research and innovation. It is a community of 12,000 people with 272 research, experimental research, and support units located in 18 regional centres throughout France. Internationally, INRAE is among the top research organisations in the agricultural and food sciences, plant and animal sciences, as well as in ecology and environmental science. It is the world's leading research organisation specialising in agriculture, food and the environment. INRAE's goal is to be a key player in the transitions necessary to address major global challenges. Faced with a growing world population, climate change, resource scarcity, and declining biodiversity, the Institute has a major role to play in building solutions and supporting the necessary acceleration of agricultural, food and environmental transitions.

MISSION & ACTIVITIES

Are you looking to contribute to addressing the challenges raised by achieving carbon neutrality by 2050 and the ecological transition? Do you have a strong taste for science, the production of knowledge, the search for sustainable alternatives to our lifestyles, and the prospect of deriving meaning from it in order to support sound decision-making? Then this is the offer for you!

The French low-carbon national strategy aims to reduce greenhouse gas (GHG) emissions from industry by 35% by 2030 and 81% by 2050, compared with 2015 values. To meet these targets, solutions for decarbonising industrial activities are being advocated at various levels, from processes to territories. These solutions are based both on optimising existing systems and on seeking more disruptive changes (e.g. technologies for capturing and using CO_2, renewable energy mixes, industrial symbioses).

To support the development of these new industrial trajectories, it is necessary to provide stakeholders with metrics that quantify their environmental performance, while identifying potential pollution transfers. Life Cycle Assessment (LCA) offers a recognised and standardised evaluation framework for quantifying the environmental impacts of a product or service from a life cycle perspective (from the extraction of raw materials to waste management) and using a multi-criteria approach. Initially designed to assess systems on a 'micro' scale, the LCA methodological framework has been adapted to quantify the eco-efficiency of land development scenarios, each of which is associated with a set of services provided by the area (e.g. jobs, added value) and a range of environmental impacts (e.g. climate change, toxicity, eutrophication), paving the way for the eco-design of human activities in an area. However, the approach remains static and does not consider the effects of socio-economic dynamics on the environmental performance of the trajectories studied (doi.org/10.1016/j.jclepro.2017.12.169).

Within this PhD thesis, your objectives will be to propose methodological developments to consider socio-economic dynamics in the environmental assessment of territorial trajectories for decarbonising industry. In particular, the aim will be to identify potential synergies or competitions between the low-carbon solutions proposed for a given area, taking into account the rationale and behaviour of the various stakeholders.
The core of the method will be based on an innovative coupling between territorial LCA and agent-based simulation. The proposed developments will be implemented in a case study in order to assess their applicability and their interest in terms of decision support.

TRAINING and SKILLS

- Recommended training: Master or Engineering degree in environmental science or process engineering
- Knowledge required in several of the following areas: environmental assessment methods, LCA, circular/industrial economy, programming tools (R, Python), Geographical Information System (GIS)
- Skills sought: organising, autonomy, interest in interdisciplinary work
- Excellent written and spoken English required (French not a prerequisite)

WORK ENVIRONMENT

You will be based in the ITAP research unit (joint INRAE - Institut Agro, Montpellier unit), on the offices of the Institut Agro de Montpellier (10 minutes by bike from the city centre and railway station), with the possibility of remote working up to 3 days a week.
The PhD will be supervised by Arnaud Hélias and Eléonore Loiseau (UMR ITAP). This PhD is part of the LCA-SPLEEN project under the PEPR SPLEEN[1] programme (Supporting innovation to develop new, largely carbon-free industrial processes), which brings together various academic partners (INRAE, IFP Energies nouvelles, ENSAM, INP Grenoble, CEA, CNRS, INP Bordeaux).

INRAE 's LIFE QUALITY

By joining our teams, you benefit from (depending on the type of contract and its duration):

- up to 30 days of annual leave + 15 days "Reduction of Working Time" (for a full time);
- parenting support: CESU childcare, leisure services;
- skills development systems: training, career advise;
- social support: advice and listening, social assistance and loans;
- holiday and leisure services: holiday vouchers, accommodation at preferential rates;
- sports and cultural activities;
- collective catering.

↘ Terms and conditions

- Research unit: UMR ITAP
- Location: Montpellier
- Contract: PhD position
- Duration: 36 months
- Beginning: Autumn 2024
- Remuneration: 2,100€ gross monthly

↘ How to apply

Send a CV and motivation letter to:
Eléonore Loiseau & Arnaud Hélias

By e-mail : eleonore.loiseau@inrae.fr & arnaud.helias@inrae.fr

Application deadline: **21/06/2024**

[1] https://www.pepr-spleen.fr/en/accueil-english/