Toulouse Biotechnology Institute
Bio & Chemical Engineering

Internship: Assessment of the effects of climate change on anaerobic digestion processes

Project description:
Methane production is a renewable energy production sector that aims to convert biomass (livestock manure, bio-waste, crop silage, etc.) into methane (injection into the natural gas network or combined heat and power production). This sector is experiencing strong growth, driven by climate change mitigation targets. However, all the sources that the anaerobic digestion sector aims to mobilise will be affected by climate change through its impact on yields, but also through the impact of agriculture adapting both in terms of crop production and animal production. Furthermore, climate change will have an impact on the sector itself, both from a technical point of view (emissions from digestate management, etc.) and in terms of aspects related to the bioeconomic system and its relationship with public policy and land use issues. Although the impacts of climate change currently being experienced in mainland France are already being felt by many farmers with biogas plants, there is currently no comprehensive mapping of the impacts of different climate change scenarios on all components of the sector. This has led to a lack of forward-looking strategies for adaptation and a lack of understanding of the challenges that climate change will present.
In this context, the objectives of the interdisciplinary MethAdapt exploratory project are:

- To construct the 'exposome' of the anaerobic digestion sector in relation to climate change: the objective here will be to map the certain or potential impacts that different climate change scenarios will have on the anaerobic digestion sector.
- To identify and test adaptation trajectories for the anaerobic digestion sector in order to identify research needs to enable the sector to adapt.

Aim of the internship:
We are currently looking for an intern whose main objective will be to assess the impact of climate and socio-economic trajectories on different anaerobic digestion sectors. The intern will be able to draw on the work carried out as part of Léa BOROS's thesis on anaerobic digestion scenarios in agricultural systems with or without livestock. For the entire project, the three levels of warming in the National Climate Change Adaptation Trajectory (TRACC: +2°C, +2.7°C and +4°C) will be considered within the framework of an RCP 8.5 emissions scenario. The four climate projections from Explore2 will be considered to take into account prediction uncertainties (https://entrepot.recherche.data.gouv.fr/dataverse/explore2).
The assessment of potential impacts will be based on a variety of performance indicators covering socio-economic and environmental aspects (food security, sustainable resource management, dependence on non-renewable resources, climate change mitigation and adaptation, economic competitiveness). For this assessment, the intern will be able to use a territorial bioeconomy assessment framework currently being developed by the supervisory team.
This internship offer is part of a national research consortium involving a variety of INRAE units. The candidate will therefore be required to interact with the entire research community.

Host Laboratory:
Toulouse Biotechnology Institute (TBI) is a multidisciplinary research laboratory located on the INSA campus, with 300 employees in multiple scientific disciplines and skills to develop varied

approaches ranging from ‘gene to process’. The mission of this unit is to generate knowledge to support the implementation of biotechnological processes for a sustainable bioeconomy and a fair and effective environmental transition. The candidate will join the ‘Sustainable Process Engineering’ division within the SOPHYE team. http://www.toulouse-biotechnology-institute.fr/fr/index.htm

Profile :
Education: M2 Engineer (any field), environmental sciences, agronomy, depending on the candidate's profile.
Skills: mass balance, knowledge of LCA and Python highly appreciate, Analytical and writing skills,
Interest: Environmental assessment and research

Internship conditions:
Duration: 6 months
Start date: February – March 2026
Supervision: Lorie Hamelin, Kevin Bertin

Are you interested?
Please send an application containing your CV, latest academic transcripts and a cover letter.
Application deadline: 30th of January 2026.
Contact:
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kbertin@insa-toulouse.fr

Applications will be considered as they are received, but all applications received before 30th of January 2026 are guaranteed full consideration.