Role: SEFS summer student collaborator

Job: Review of Ireland's historical greenhouse gas emissions and temperature impact (undergraduate or Master's level)

Department: Energy Policy and Modelling Group, Sustainability Institute, School of Engineering & Architecture, College of Science, Engineering & Food Science, University College Cork.

Project supervisor: Dr Róisín Moriarty

Role: Historical greenhouse gas (GHG) emissions datasets, that are used to calculate Ireland's contribution to global temperature increase, are often constructed ad hoc. While there is some documentation of these historical datasets for Ireland, the approach to their construction and origins of data used is not always clear, to the extent is not possible to reconstruct an identical historical dataset to those that have been used for temperature impact analysis in Ireland. Accurate reconstruction of historical GHG emissions, a transparent record of their construction and publication of these datasets are essential elements for understanding country level contributions to global temperature increase and reproducibility of analysis.

Key responsibilities:

1. Dataset and temperature impact review: (a) gather and review existing historical GHGs emissions datasets for Ireland including relevant details of their construction and (b) review associated temperature impact analysis.

2. Data synthesis: (a) following best practice build a cohesive and internally consistent historical GHG emissions dataset (1750/1850 to 1989) and incorporating EPA national GHG emissions inventory data (1990 to 2024), (b) document the data synthesis and (c) compare temperature outcomes to previous studies.

3. Data review and synthesis of land use, land-use change and forestry (LULUCF) GHG emissions: compare LULUCF emissions from Ireland's national GHG emissions inventory (bottom up) to those calculated from global ecosystem models (top down) and other global approaches and document the discrepancies.

This role is important to establish a robust and transparent approach to the construction of historical GHG emissions dataset for use in temperature impact analysis. It will also make a valuable contribution to making this data available to the wider research community.

Additional Information

Publication: If time permits and the data synthesis is completed to a high standard, the student will be encouraged to lead a data paper (e.g. for Earth System Science Data journal) documenting the construction and characteristics of this dataset. There may also be potential to publish a short scientific review of this work.

Future Research: For a dedicated and motivated candidate, there is strong potential to extend this collaboration into an MSc or PhD project with a focus on reconciling land fluxes between global

models (top down global ecosystem models) and national GHG inventories (bottom up) from a country-level perspective.

Essential Criteria:

- Currently enrolled in an undergraduate or postgraduate programme in Engineering (Energy, Mechanical, Environmental or related) or Climate Science, Environmental Science or related discipline
- Strong analytical and problem-solving skills
- Basic experience with data analysis (e.g. Excel, Python/R desirable)
- Good written and verbal communication skills
- Ability to work independently and as part of a team

Desirable Criteria:

- Familiarity with GHG emissions, reductions and removals or climate policy
- Experience with modelling tools
- Knowledge of climate change mitigation pathways or sustainability frameworks
- Experience in report writing or academic research

Application Process

Applicants should submit

- A CV (max. 2 pages)
- A short cover letter outlining interest in the project and relevant experience

to Dr Róisín Moriarty rmoriarty@ucc.ie

Stipend: €1500

Deadline: Thursday 28 May 2026

Equality, Diversity & Inclusion

We are committed to fostering an inclusive and diverse research environment and welcome applications from all backgrounds.
