



### Project Call for 2022 ERBE Cohort

MaREI Supervisor	Dr. Hannah Daly
Institution	MaREI/UCC
Co-Supervisor & Institution (if known – please note this is not a requirement at application stage):	Not currently known
PhD Proposal Title:	Achieving universal access to clean fuels and technologies within households: synergies and trade-offs with climate action goals
Alignment with ERBE Themes: (200 words max – please specify if the project aligns with 1 or more of the ERBE Themes)	The project very closely aligns with the Comfort, Health and Wellbeing Project Area. The research will address a significant gap within energy and climate mitigation modelling tools, where clean energy access and energy poverty is not considered explicitly. This could lead to policies and climate plans which are not well aligned to meeting targets for clean air and warm, healthy homes.

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PhD Proposal Abstract: (500 words max)

Sustainable Development Goal number 7 (SDG7) targets the achievement of universal access to affordable, reliable, sustainable and modern energy by 2030. This goal is far off track: three billion people in developing countries still rely on polluting fuels for cooking and heating, including wood, peat, coal and animal waste, leading to severe and negative consequences for health, gender equality and development.

Developed countries also face negative consequences: In Ireland, inadequate thermal insulation and ventilation and the use of solid fuels for heating, as well as the high cost of energy, leaves up to a third of households in energy poverty, with poor air quality, both indoors and outdoors, damaging health. Particulate matter (PM) arising from solid fuel use for heating causes an estimated 1300 premature deaths annually, and rates of childhood asthma are among the highest in the world. Climate action – through improving the thermal comfort of buildings and decarbonising heating and cooking – can bring very substantial cobenefits for health if policy is well targeted. However, climate mitigation policies may exacerbate energy poverty if the cost of clean energy increases without adequate planning to protect vulnerable households.

In addition to the human cost of the lack of clean energy access, the environmental impact can be significant as unsustainable consumption of wood fuel can be a source of greenhouse gases, particularly methane and black carbon when combustion is inefficient, and a driver of deforestation.

This research project will investigate climate mitigation pathways in the residential sector, in both developed and developing countries, through the lens of SDG7, asking how decarbonisation can be achieved in a way to help bring about access to cleaner, modern fuels and technologies in homes. In particular, the research will focus on climate mitigation planning tools – energy systems optimisation models (ESOMs) and Integrated Assessment Models (IAMs) – which to date typically do not explicitly represent clean energy access, and will develop methodologies to include SDG7 within the models.

The following are indicative research areas which this project will examine:

- Quantifying the number of people living in developed countries relying on unhealthy fuels for cooking and heating (i.e., not achieving the SDG7 target), and comparing this to the landscape in developing countries, which is qualified by the World Bank;



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- Investigating how the representation of energy access can be improved in energy systems and integrated assessment models;
- Examining the interplay between domestic solid fuel use and land-use and LULUCF emissions.
- Understanding the role of providing universal electricity access in developing countries in achieving clean cooking access goals, particularly with off-grid and mini-grid solutions.



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### PhD Proposal Summary for inclusion in Student Call Document:

(300 words max – please note the student will be indicating their order of preference for all submitted proposals; please ensure this summary includes a project overview & introduction to the supervisor & institution)

Sustainable Development Goal number 7 (SDG7) targets universal access to affordable, reliable, sustainable and modern energy by 2030. This goal is far off track: three billion people in developing countries still rely on polluting fuels for cooking and heating, including wood, peat, coal and animal waste, leading to severe and negative consequences for health, gender equality and development.

Developed countries also face negative consequences: In Ireland, inadequate thermal insulation and ventilation and the use of solid fuels for heating, as well as the high cost of energy, leaves up to a third of households in energy poverty, with negative health consequences as a result of poor air quality, both indoors and outdoors. Particulate matter (PM) as a result of solid fuel use causes an estimated 1300 premature deaths annually. Climate action – through improving the thermal comfort of buildings and decarbonising heating and cooking – can bring very substantial cobenefits for health if policy is well designed.

This research project proposes to investigate climate mitigation pathways in the residential sector, in both developed and developing countries, through the lens of SDG7, asking how decarbonisation can be achieved in a way to help bring about access to cleaner, modern fuels and technologies in homes.

The PhD researcher will work with a dynamic, diverse and solutions-focused research group led by **Dr Hannah Daly**, who is a lecturer in energy systems modelling in UCC. As a member of the Climate Change Advisory Council's Carbon Budgets Committee, and media commentator, Daly regularly communicates climate action research insights to policy and society. Based at **the Environmental Research Institute (ERI) and MaREI**, these centres have national and international recognition for climate action-oriented research and expertise, combining the expertise of a wide range of research groups and industry partners and with the shared mission of solving the main scientific, technical and socio-economic challenges across the climate, energy and marine spaces.