

Environmental Protection Agency  
An Ghníomhaireacht um Chaomhnú Comhshaoil



# EPA Research Programme 2021-2030 EPA Research Call 2022 – Technical Description Document

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The EPA Research Programme is a Government of Ireland initiative funded by the Department of the Environment, Climate and Communications.

## Document Version History

Version No.	Changes Made
Version 2	The amount in the “Max Budget (€) per project” column in Table 1 for the Call topic entitled “Protecting and Restoring our Natural Environment 2022 Call Topic 11” has been corrected to €100,000

# EPA Research Call 2022

This document provides the Technical Description for the Environmental Protection Agency (EPA) Research Call 2022. Applicants should read the following carefully and consult the other documentation provided (e.g. 2021 - 2030 Guidelines and Terms & Conditions).

## Contents

Introduction .....	1
Thematic Research Approach.....	1
Addressing Climate Change Evidence Needs.....	1
Facilitating a Green and Circular Economy .....	1
Delivering a Healthy Environment.....	2
Protecting and Restoring our Natural Environment .....	2
Funding Structure.....	2
Co-funding and Partnerships.....	2
Application Process .....	4
List of Topics.....	4
Call Content.....	9
Addressing Climate Change Evidence Needs.....	9
The political economy of climate adaptation in Ireland .....	9
The impact of extreme climatic events on ecosystems - Scoping study.....	10
Operationalising climate resilience .....	11
National costings of impacts and adaptation to Climate Change .....	12
Scenario analysis for Ireland to support mitigation and adaptation policy and decision making..	13
Review of and projections for biomass burning events in Ireland from 1990 to 2050 (and beyond)	14
Review of greenhouse gas emissions on a consumption basis.....	16
Aerosol climate forcing: review from international networks.....	17
Understanding ozone levels in Ireland .....	19
Attribution approaches to identify climate-driven impacts on our water resources .....	20
Assessing administrative burdens as barriers to policy implementation.....	21
An environmental, social and economic comparison of forestry and agriculture.....	22
Development of N <sub>2</sub> O emissions verification system for Ireland .....	23
Improving the national inventory - wastewater treatment emissions .....	25
Improving the national inventory - F Gases.....	26
National non-methane volatile organic compounds (VOCs): emissions and mitigation options...	27

Facilitating a Green and Circular Economy.....	28
The role of Irish Small to Medium-Sized Enterprises (SMEs) in the transition to a more Circular Economy.....	28
Exploring ways to deliver more circular organic waste collection systems for large-scale apartment dwellings.....	29
Exploring Industry attitudes to the REACH Regulation in the transition to a more circular economy.....	31
An analysis of glass container reuse to facilitate the circular economy .....	32
Climate impact of household food waste.....	33
The role of incentives, standards and levies to reduce the use of virgin materials in the construction sector .....	34
Pathways to enable a more Circular Built Environment .....	35
The role of remanufacturing in the computer, electronic, optical and electrical equipment sectors in Ireland to facilitate the Circular Economy .....	37
Fuel derived from residual municipal wastes and other waste feedstocks to achieve more sustainable transport .....	38
A critical analysis of Ireland's Circular Material Use Rate .....	39
Delivering a Healthy Environment.....	40
An analysis of the effectiveness of EPA industrial emissions licensing on emissions in relevant industrial sectors .....	40
A critical analysis of environmental considerations of hydrogen production – implications for the IED licensing process .....	42
A review of population and human health effects assessment in SEA and development of a Practitioners Toolkit for Health in SEA.....	43
Gamma Radiation Dose Evaluation (Grade) - Outdoor and Indoor gamma dose evaluation for the Irish population .....	44
Assessment of emissions from a representative range of solid fuels on the residential market in Ireland .....	45
Implications of deep energy-efficient retrofits on indoor radon concentrations.....	47
Persistent, mobile & toxic (PMTs) and very persistent & very mobile (vPvM) chemicals in the aquatic environment .....	48
Feasibility study for a national human biomonitoring programme for Ireland .....	50
Chemicals in the environment – PFAS, a review and analysis of its uses, sources, exposure pathways, risks and challenges for industry, society and environmental protection in Ireland ....	52
Investigation of intervention levels and feasible options for remediation of environmental PFAS contamination .....	54
Open topic: Research on the environmental dimension of AMR .....	56
Protecting and Restoring our Natural Environment.....	57
Integration of DNA-based assessment tools into water quality and biodiversity monitoring .....	57
Establishing a representative long-term climate change observational network for rivers, lakes and groundwater in Ireland.....	59
Lake water level fluctuations, ecology and hydrology interactions.....	61

Development of hydromorphological metrics and standards that can be used in the assessment and regulation of activities on our rivers, lakes, transitional and coastal waters .....	62
Assessing flow-ecology interactions in ecological communities in upland high-status sites .....	63
Open topic: use of data - Copernicus for environmental monitoring and assessment .....	64
Characterising the relationship between soil geochemistry and biodiversity in Ireland .....	65
Integrated modelling and scenario development for future sustainable land use needs .....	67
Ammonia impact reduction on Natura 2000 sites.....	68
Potential environmental impact of antiparasitic drug use in Ireland .....	69
A state of knowledge of bogland research .....	70
Expected Outputs.....	72
Timeframe .....	72
Further Information .....	73

## Introduction

EPA Research 2030<sup>1</sup> is the ten-year high-level framework for the EPA's research programme (2021-2030), designed to be agile, responsive and flexible. EPA-funded research is essential to:

- Supporting the monitoring, assessment, reporting and regulatory activities of the EPA.
- Generating evidence crucial in assisting Ireland in meeting its commitments and requirements under the various international, EU and national policies and strategies.
- Generating the evidence base that supports decision making, behaviour change and policy development.
- Addressing knowledge gaps, providing the evidence-base and responding to priority challenges.
- Supporting multi-disciplinary, cross-sectoral and multi-stakeholder partnership projects.
- Developing environmental research capacity in Ireland, recognising the importance of not only sustaining the research-base but also of building and training the researchers in specific areas.

Environmental policies must be underpinned by an in-depth level of knowledge that needs to be delivered through a systematic programme of environmental research and assessment. Research can play an important role by generating evidence that will support the design and implementation of effective and robust policy, evaluate its outcomes, and demonstrate its value. EPA Research 2030 will further our understanding of our environmental and natural systems. It will enable the outcomes from research to be put in action to protect and improve our natural and built environment.

## Thematic Research Approach

EPA Research 2030 thematic structure comprises four interconnected hubs that bring an integrated and cross-sectoral approach, enabling holistic management and protection of our environment.

### Addressing Climate Change Evidence Needs

Climate change is already having an impact in Ireland, and strong mitigation and adaptation measures are needed. Research is essential in providing the evidence necessary to improve our knowledge systems and inform policy decisions that will advance our ambitions to be carbon neutral and resilient to climate disruption.

### Facilitating a Green and Circular Economy

Environmental and sustainability challenges are inextricably linked to economic activities and lifestyles. Research under this hub will contribute to the mainstreaming of sustainable management of natural resources and waste, unlocking the potential of the circular and bio-economies, and boosting competitiveness, through resource efficiency and deployment of innovative technologies and solutions.

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<sup>1</sup> <https://www.epa.ie/our-services/research/epa-research-2030/>

## Delivering a Healthy Environment

A clean, vibrant and safe environment is a prerequisite for good health and wellbeing. Environmental degradation, pollution, as well as known and emerging substances of concern threaten our health and that of our supporting ecosystems. Research under this hub will contribute to understanding the risks and benefits, and to identifying appropriate policy and behavioural responses.

## Protecting and Restoring our Natural Environment

Our natural environment provides us with clean air and water, food and the raw materials to sustain us and our economy. Research is required to inform and support a cross-sectoral approach to managing our natural environment and for the development of policies relating to the regulation of emissions and activities, and the protection of our water, land, and ecosystems.

## Funding Structure

Proposals can be Desk Studies, Medium Scale Projects, Large Scale Projects or Research Fellowships:

**Desk Studies** will typically last from 6 to 12 months with an indicative cost of up to €120,000

**Medium Scale Projects** will typically last from 24 to 48 months, with an indicative cost of up to €500,000

**Large Scale Projects** will typically last from 36-48 months, with an indicative cost of up to €1,000,000

**Research Fellowships** will typically last from 24-36 months, with an indicative cost of up to €300,000

## Co-funding and Partnerships

The EPA is pleased to announce that the EPA Research Call 2022 involves co-funding partnerships with the following organisations:



**An Roinn Talmhaíochta,  
Bia agus Mara**  
Department of Agriculture,  
Food and the Marine

The **Department of Agriculture, Food and the Marine (DAFM)** mission is to lead the sustainable development of a competitive, consumer focused agri-food-forest sectors and to contribute to a vibrant rural economy and society. The Department undertakes a variety of functions, including: to

promote and safeguard public, animal and plant health and animal welfare for the benefit of consumers, producers and wider society; provide income and market supports to underpin the rural economy; and to provide the optimum policy framework for the sustainable development of the agri-food-forest sectors in order to deliver a sustainable, growth-driven sector focused on competitiveness and innovation, driven by a skilled workforce delivering value added products in line with market demands maintain, and to develop the strategic, operational, regulatory and technical capacity of the sectors to achieve operational excellence .



**Geological Survey Ireland (GSI)** Founded in 1845, Geological Survey Ireland is Ireland's public earth science knowledge centre and is a division of the Department of the Environment, Climate and Communications. GSI is committed to providing free, open and accurate data and maps on Ireland's subsurface to

landowners, the public, industry, and all other stakeholders. GSI also acts as a project partner in leading international projects providing expertise, data and developing models and viewers in a diverse array of topics including geological mapping, geothermal energy, groundwater, seabed mapping, natural hazards, and public health risks.



**Met Éireann**, Ireland's National Meteorological Service, is a line division of the Department of Housing, Local Government and Heritage and is the leading provider of weather information and related services in the State. Its mission is to monitor, analyse and predict Ireland's weather and climate and to provide a range of high quality meteorological and related information to the public and to specific customers in, for

example, the aviation and agricultural sectors. As a scientific and technical organisation, it strives to utilise the latest technological and scientific advances in order to improve the efficiency, effectiveness and accuracy of its forecasts.



# Application Process

## Making an Application

Applications **must** be made online at <https://epa.smartsimple.ie>

For more information, please refer to the following documentation, which is available to download from the EPA's Online Grant Management and Application Portal or from the EPA website<sup>2</sup>:

1. EPA Research Programme 2021 - 2030 Guidelines and Terms & Conditions; and
2. EPA Online Grant Management and Application Portal System User Guides.

## List of Topics

The EPA invites research proposals under the topics listed in Table 1 for the EPA Research Call 2022.

Up to one award is expected for each of the topics included in the call.

**Table 1.** List of topics for the EPA Research Call 2022

Call Topic Reference	Research Hub and Call Topic Titles	Max Budget (€) Per Project	Co-funded by
<b>Addressing climate change evidence needs</b>			
Addressing Climate Change Evidence Needs 2022 Call Topic 1	<a href="#">The political economy of climate adaptation in Ireland</a>	€ 100,000	DAFM
Addressing Climate Change Evidence Needs 2022 Call Topic 2	<a href="#">The impact of extreme climatic events on ecosystems - Scoping study</a>	€ 100,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 3	<a href="#">Operationalising climate resilience</a>	€ 100,000	MÉ
Addressing Climate Change Evidence Needs 2022 Call Topic 4	<a href="#">National costings of impacts and adaptation to Climate Change</a>	€ 300,000	N/A

<sup>2</sup> <http://www.epa.ie/our-services/research/>

Call Topic Reference	Research Hub and Call Topic Titles	Max Budget (€) Per Project	Co-funded by
Addressing Climate Change Evidence Needs 2022 Call Topic 5	<a href="#">Scenario analysis for Ireland to support mitigation and adaptation policy and decision making</a>	€ 450,000	DAFM
Addressing Climate Change Evidence Needs 2022 Call Topic 6	<a href="#">Review of and projections for biomass burning events in Ireland from 1990 to 2050 (and beyond)</a>	€ 250,000	DAFM
Addressing Climate Change Evidence Needs 2022 Call Topic 7	<a href="#">Review of greenhouse gas emissions on a consumption basis</a>	€ 100,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 8	<a href="#">Aerosol climate forcing: review from international networks</a>	€ 100,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 9	<a href="#">Understanding ozone levels in Ireland</a>	€ 100,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 10	<a href="#">Attribution approaches to identify climate-driven impacts on our water resources</a>	€ 350,000	MÉ
Addressing Climate Change Evidence Needs 2022 Call Topic 11	<a href="#">Assessing administrative burdens as barriers to policy implementation</a>	€ 200,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 12	<a href="#">An environmental, social and economic comparison of forestry and agriculture</a>	€ 100,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 13	<a href="#">Development of N<sub>2</sub>O emissions verification system for Ireland</a>	€ 600,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 14	<a href="#">Improving the national inventory - wastewater treatment emissions</a>	€ 200,000	N/A
Addressing Climate Change Evidence Needs 2022 Call Topic 15	<a href="#">Improving the national inventory - F Gases</a>	€ 100,000	N/A

Call Topic Reference	Research Hub and Call Topic Titles	Max Budget (€) Per Project	Co-funded by
Addressing Climate Change Evidence Needs 2022 Call Topic 16	<a href="#">National non-methane volatile organic compounds (VOCs): emissions and mitigation options</a>	€ 200,000	N/A
<b>Facilitating a Green and Circular Economy</b>			
Facilitating a Green and Circular Economy 2022 Call Topic 1	<a href="#">The role of Irish Small to Medium-Sized Enterprises (SMEs) in the transition to a more circular economy</a>	€ 200,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 2	<a href="#">Exploring ways to deliver more circular organic waste collection systems for large-scale apartment dwellings</a>	€ 200,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 3	<a href="#">Exploring Industry attitudes to the REACH Regulation in the transition to a more circular economy</a>	€ 100,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 4	<a href="#">An analysis of glass container reuse to facilitate the circular economy</a>	€ 200,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 5	<a href="#">Climate impact of household food waste</a>	€ 200,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 6	<a href="#">The role of incentives, standards and levies to reduce the use of virgin materials in the construction sector</a>	€ 150,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 7	<a href="#">Pathways to enable a more Circular Built Environment</a>	€ 200,000	DAFM
Facilitating a Green and Circular Economy 2022 Call Topic 8	<a href="#">The role of remanufacturing in the computer, electronic, optical and electrical equipment sectors in Ireland to facilitate the Circular Economy</a>	€ 250,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 9	<a href="#">Fuel derived from residual municipal wastes and other waste feedstocks to achieve more sustainable transport</a>	€ 150,000	N/A
Facilitating a Green and Circular Economy 2022 Call Topic 10	<a href="#">A critical analysis of Ireland's Circular Material Use Rate</a>	€ 100,000	DAFM

Call Topic Reference	Research Hub and Call Topic Titles	Max Budget (€) Per Project	Co-funded by
<b>Delivering a Healthy Environment</b>			
Delivering a Healthy Environment 2022 Call Topic 1	<a href="#">An analysis of the effectiveness of EPA industrial emissions licensing on emissions in relevant industrial sectors</a>	€ 250,000	N/A
Delivering a Healthy Environment 2022 Call Topic 2	<a href="#">A critical analysis of environmental considerations of hydrogen production – implications for the IED licensing process</a>	€ 100,000	N/A
Delivering a Healthy Environment 2022 Call Topic 3	<a href="#">A review of population and human health effects assessment in SEA and development of a Practitioners Toolkit for Health in SEA</a>	€ 250,000	N/A
Delivering a Healthy Environment 2022 Call Topic 4	<a href="#">Gamma Radiation Dose Evaluation (Grade) - Outdoor and Indoor gamma dose evaluation for the Irish population</a>	€ 250,000	N/A
Delivering a Healthy Environment 2022 Call Topic 5	<a href="#">Assessment of emissions from a representative range of solid fuels on the residential market in Ireland</a>	€ 500,000	DAFM
Delivering a Healthy Environment 2022 Call Topic 6	<a href="#">Implications of deep energy-efficient retrofits on indoor radon concentrations</a>	€350,000	N/A
Delivering a Healthy Environment 2022 Call Topic 7	<a href="#">Persistent, mobile &amp; toxic (PMTs) and very persistent &amp; very mobile (vPvM) chemicals in the aquatic environment</a>	€ 450,000	N/A
Delivering a Healthy Environment 2022 Call Topic 8	<a href="#">Feasibility study for a national human biomonitoring programme for Ireland</a>	€ 100,000	N/A
Delivering a Healthy Environment 2022 Call Topic 9	<a href="#">Chemicals in the environment – PFAS, a review and analysis of its uses, sources, exposure pathways, risks and challenges for industry, society and environmental protection in Ireland</a>	€ 500,000	N/A
Delivering a Healthy Environment 2022 Call Topic 10	<a href="#">Investigation of intervention levels and feasible options for remediation of environmental PFAS contamination</a>	€ 100,000	N/A
Delivering a Healthy Environment 2022 Call Topic 11	<a href="#">Open topic: Research on the environmental dimension of AMR</a>	€ 500,000	DAFM

Call Topic Reference	Research Hub and Call Topic Titles	Max Budget (€) Per Project	Co-funded by
<b>Protecting and Restoring our Natural Environment</b>			
Protecting and Restoring our Natural Environment 2022 Call Topic 1	<a href="#">Integration of DNA-based assessment tools into water quality and biodiversity monitoring</a>	€ 500,000	DAFM
Protecting and Restoring our Natural Environment 2022 Call Topic 2	<a href="#">Establishing a representative long-term climate change observational network for rivers, lakes and groundwater in Ireland</a>	€ 150,000	N/A
Protecting and Restoring our Natural Environment 2022 Call Topic 3	<a href="#">Lake water level fluctuations, ecology and hydrology interactions</a>	€ 300,000	N/A
Protecting and Restoring our Natural Environment 2022 Call Topic 4	<a href="#">Development of hydromorphological metrics and standards that can be used in the assessment and regulation of activities on our rivers, lakes, transitional and coastal waters</a>	€ 200,000	N/A
Protecting and Restoring our Natural Environment 2022 Call Topic 5	<a href="#">Assessing flow-ecology interactions in ecological communities in upland high-status sites</a>	€ 300,000	N/A
Protecting and Restoring our Natural Environment 2022 Call Topic 6	<a href="#">Open topic: use of data - Copernicus for environmental monitoring and assessment</a>	€ 350,000	N/A
Protecting and Restoring our Natural Environment 2022 Call Topic 7	<a href="#">Characterising the relationship between soil geochemistry and biodiversity in Ireland</a>	€ 250,000	DAFM, GSI
Protecting and Restoring our Natural Environment 2022 Call Topic 8	<a href="#">Integrated modelling and scenario development for future sustainable land use needs</a>	€ 350,000	DAFM
Protecting and Restoring our Natural Environment 2022 Call Topic 9	<a href="#">Ammonia impact reduction on Natura 2000 Sites</a>	€ 350,000	N/A
Protecting and Restoring our Natural Environment 2022 Call Topic 10	<a href="#">Potential environmental impact of antiparasitic drug use in Ireland</a>	€ 350,000	DAFM
Protecting and Restoring our Natural Environment 2022 Call Topic 11	<a href="#">A state of knowledge of bogland research</a>	€ 100,000	DAFM

## Call Content

### Addressing Climate Change Evidence Needs

The political economy of climate adaptation in Ireland

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 1		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine			

#### Background

The Climate Change Advisory Council's 2021 annual review<sup>3</sup> found a significant time lag between Ireland's climate policy and action, including on climate adaptation. There is a need to better understand how national and sub-national adaptation processes connect with higher organisational scales of governance and interact across sectors of expertise. Political economy analysis can be a powerful tool for revealing underlying interests, incentives and institutions that enable or frustrate change and thereby help identify barriers to implementing adaptation options and opportunities for further effective adaptation policy development.

#### Scope

Innovative research proposals are invited to identify the political-economic barriers to climate adaptation in Ireland and identify what can be done to address them.

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3

[https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/publications/CCAC\\_AnnualReview\\_2021.pdf](https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/publications/CCAC_AnnualReview_2021.pdf)

## The impact of extreme climatic events on ecosystems - Scoping study

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 2		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

Extreme climatic events are projected to increase significantly in the future. Although their effects are likely to be wide ranging, there is little documented evidence on how they will impact on ecosystem/ecosystem services for any ecosystem. This includes effects on greenhouse gas emissions and carbon storage that might compromise attempts at achieving carbon neutrality or meeting emissions targets. In addition, they could have significant negative effects on the biodiversity of vulnerable ecosystems.

This research project is a scoping study exploring the potential impacts of extreme climate events on Special Areas of Conservation<sup>4</sup> and Special Protection Areas<sup>5</sup> in Ireland and should help identify how such research needs on this topic should be developed in the future.

This research project should consider how it can contribute directly to climate and biodiversity policy, including international agreements.

### Scope

Innovative research proposals are invited to, but not limited to:

- Explore the potential impacts of extreme climate events on Special Areas of Conservation and Special Protection Areas in Ireland.
- Consider how to advance the understanding of the impact of extreme climatic events on ecosystems in Ireland more broadly.

<sup>4</sup> <https://www.npws.ie/protected-sites/sac>

<sup>5</sup> <https://www.npws.ie/protected-sites/spa>

## Operationalising climate resilience

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 3		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months
<b>Co-funded by:</b> Met Éireann			

### Background

The National Adaptation Framework (Government of Ireland, 2018: 63)<sup>6</sup> proposes an overarching definition of climate resilience for sectoral and local plans and strategies, but in order to operationalise the concept, one needs to understand what climate resilience means for Irish people and how it informs decision making at sectoral and local authority level, particularly in the context of the National Climate Objective's aim of transitioning to climate resilience by 2050.

### Scope

Innovative research proposals are invited to explore what climate resilience means for Irish people and how it informs decision making at sectoral and local authority level, particularly in the context of the National Climate Objective's aim of transitioning to climate resilience by 2050. This includes exploring how climate resilience relate to climate neutrality, biodiversity richness and environmental sustainability and how we integrate our adaptation choices with mitigation choices given the inherent uncertainty in what pathway will be taken at a global level and the interconnection between adaptation and mitigation.

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<sup>6</sup> <https://www.gov.ie/en/publication/fbe331-national-adaptation-framework/>



## National costings of impacts and adaptation to Climate Change

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 4		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 300,000	<b>Maximum Duration:</b>	24 months

### Background

The National Adaptation Framework<sup>7</sup> identifies a need for a greater understanding of the potential costs of climate impacts (e.g. costs of extreme weather events on the economy), adaptation measures, and expected benefits. Actions 299 and 490 of Climate Action Plan 2021 (CAP21)<sup>8</sup> require analyses of the costs related to the transport and energy sectors and the inclusion of potential rises in future flood damages within the cost-benefit analysis (CBA) of flood relief schemes (Action 441 of CAP21/Action 462 of CAP21-Annex of Actions). However, there is a need to understand the costs of climate for all sectors of the impacts of climate change.

The effective and efficient implementation of adaptation actions requires further research on potential financing options, as well as costing studies and methodologies to provide key sectors identified in national adaptation policy and society in general with the information to transition to a climate resilient economy and society.

### Scope

Innovative research proposals are invited to, but not limited to:

- Undertake an analysis (including an estimate) of the potential costs of impacts and adaptation to climate change for all sectors of the economy. The research should consider a full cross-sectoral costing of the current projected impacts of climate change and future adaptation costs.
- Provide the evidence to support the EPA delivery of Action 490 of CAP21-Annex of Actions<sup>9</sup>.
- Develop guidelines for proportionate and transparent economic appraisal of adaptation options that can be applied to project- and sector-level actions.

This project must build on previous national and international research, including, but not limited to, [EPA Research Report 360](#): Methodologies for Financing and Costing of Climate Impacts and Future Adaptation Actions: Transport Networks in Ireland, and the Climate Change Advisory Council/ESRI work<sup>10</sup> on quantifying the initial climate change impacts and adaptation costs and benefits for Ireland.

<sup>7</sup> <https://www.gov.ie/en/publication/fbe331-national-adaptation-framework/>

<sup>8</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

<sup>9</sup> CAP-21 Annex of Actions

<sup>10</sup> See Page 16 of the CCAC Annual Review Report available at:

[https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/publications/CCAC\\_AnnualReview\\_2021.pdf](https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/publications/CCAC_AnnualReview_2021.pdf)

## Scenario analysis for Ireland to support mitigation and adaptation policy and decision making

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 5		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 450,000	<b>Maximum Duration:</b>	48 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine			

### Background

Climate policy is informed by analysis of emissions pathways that are consistent with international climate policy goals. The Working Group II contribution to the IPCC Sixth Assessment Report (published February 2022)<sup>11</sup> assesses the impacts of climate change, looking at ecosystems, biodiversity, and human communities at global and regional levels. It also reviews vulnerabilities and the capacities and limits of the natural world and human societies to adapt to climate change. Future projections are driven by emissions and/or concentrations from illustrative Representative Concentration Pathways (RCPs) and Shared Socioeconomic Pathways (SSPs) scenarios, respectively. Preferably, an integrative SSP-RCP framework where climate projections obtained under the RCP scenarios are analysed against the backdrop of various illustrative SSPs is used.

In order to support national mitigation and adaptation policy and decision making, research is required to identify Ireland-specific SSPs.

### Scope

Innovative research proposals are invited to, but not limited to:

- Explore plausible alternative GHG emissions scenarios for Ireland out to 2050 and 2100 and provide a set of shared socio-economic pathways (SSPs) downscaled for Ireland.
- Consider relationships with climate resilient development pathways.

The alternative scenarios should address uncertainty, widen policy framing towards deep emissions reductions and address ethical challenges inherent in reproducing a single path for climate action. The alternative scenarios should seek to maximise benefit and minimise trade-offs over the long term. The pathways should link behaviour, technologies, economics models to support the development of pathways for climate action.

This project should build on previous research, including the EPA-funded research project *Scenarios Quantifying land Use & Emissions Transitions towards Equilibrium with Removals* (2018-CCRP-MS.57).

<sup>11</sup> <https://www.ipcc.ch/report/ar6/wg2/>

## Review of and projections for biomass burning events in Ireland from 1990 to 2050 (and beyond)

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 6		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 250,000	<b>Maximum Duration:</b>	24 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine			

### Background

The annual National Inventory Report on Greenhouse Gas (GHG) emissions under the United Nations Framework Convention on Climate Change requires quantitative inputs on biomass burning, area statistics and emission profiles on fires (both controlled burning and wildfires) on forest, grassland and cropland, and other land uses.

Currently inputs on biomass burning, area statistics and emission profiles are estimated from low spatial resolution data sources, such as the European Forest Fire Information System (EFFIS)<sup>12</sup> and Fire Information for Resource Management System (FIRMS)<sup>13</sup>, which synthesise satellite imagery to provide as much near real time fire information as possible. However, the small nature of many of these events, as well as the challenge of persistent cloud cover precluding a view of the ground for up to several weeks at a time, can result in under-estimation of the extent of burned areas. There is also a lack of geographically explicit data on fires, which compromises the ability to attribute their location to different land cover/land use classes and vegetation habitats.

Improved annual estimates of areas burned from high resolution satellite imagery, with enhanced land cover/land use attribution will improve the accuracy of estimates of emission quantities arising from biomass burning.

Climate Action Plan 2021<sup>14</sup> advises that one of the potential impacts of climate change in Ireland is an increased frequency of wildfires damaging forest stands, owing to projected increases in the frequency of heatwaves and drought.

Research is needed to determine the extent to which this has happened, as well as the baseline from which to provide evidence of future changes.

### Scope

Innovative research proposals are invited to, but not limited to:

- Review how satellite remote sensing captures the spatial and temporal distribution of vegetation biomass burning events in Ireland over the last 30 years and update, as appropriate, estimates of emissions from biomass burning in the National Inventory Report for GHG emissions.
- Assess how this information combined with climate projections and land management policy can be used to determine how the distribution of these biomass burning events may evolve over the next 30 and more years.
- Assess the significance of the findings for land management, agriculture and forest, and other land cover/land use policies.

<sup>12</sup> <https://effis.jrc.ec.europa.eu/>

<sup>13</sup> <https://earthdata.nasa.gov/earth-observation-data/near-real-time/firms>

<sup>14</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

- As a follow-on case study, assess the vulnerability of peatland carbon sinks in Ireland to wildfire over the medium- and long-term.

Projects under this topic will need to work closely with the EPA's Emissions Statistics team who compiles the National Greenhouse Gas Emission Inventory.

## Review of greenhouse gas emissions on a consumption basis

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 7		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

In the Climate Action and Low Carbon Development (Amendment) Act 2021<sup>15</sup>, Ireland committed to limiting national emissions through the implementation of carbon budgets. In its deliberations on carbon budgets, and more generally in terms of assessment and review of national climate policy, the Climate Change Advisory Council (CCAC) and government are mandated to consider consistency with commitments under the Paris Agreement. This includes contributions to global drivers of climate change, which can include our supply of and demand for carbon intensive products within globalised markets. Action 2 of the Climate Action Plan 2021<sup>16</sup> is to “Conduct a review of greenhouse gas emissions on a consumption basis, with a goal of ensuring that Irish and EU action to reduce emissions supports emission reductions globally, as well as on our own territories”.

The current reporting structures adopt a production-based approach where responsibility is attributed at the point of emission, for example during manufacture of carbon intensive goods or the point of combustion of fossil fuels. A consumption-based approach to greenhouse gas emissions attributes responsibility for emissions embedded in goods and services to the end user. Technical issues regarding assigning boundaries and life cycle analysis associated with consumption-based approaches need consideration and can have a profound impact on the complexity and transparency arising from different assumptions. Specific questions regarding the insights each approach can offer to policy development in regard to equity, agency, economic and social responsibility also need to be considered. Indeed, alternative hybrid approaches, which may provide deeper insights in the context of open economies, have been considered in published research on this topic.

Research is required to consider the effectiveness and implications for just transition of consumer-focused policies aimed at modifying behaviours and consumption habits, and their impact on national and global emissions compared to production-based and hybrid approaches to policy development.

### Scope

Innovative research proposals are invited to, but not limited to:

- Review approaches to consumption-based reporting of greenhouse gases emissions.
- Review international experience of the use of consumption-based approaches to climate action and policy design.
- Explore alternative hybrid approaches to the attribution of greenhouse gas emissions to actors within an open economy.

The study should build an evidence base to consider issues such as embedded emissions, carbon leakage, equity, and the concept of common but differentiated responsibilities. The EPA has commissioned the Economic & Social Research Institute (ESRI)<sup>17</sup> to undertake a first estimate of consumption-based emissions for Ireland, and the data, expected to be published in May 2022, will be made available for this research.

<sup>15</sup> <https://assets.gov.ie/127957/ab70a65d-68c1-4947-983b-babf920cc4dc.pdf>

<sup>16</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

<sup>17</sup> <https://www.esri.ie/>

## Aerosol climate forcing: review from international networks

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 8		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

The Working Group I contribution to the Intergovernmental Panel on Climate Change (IPCC) 6<sup>th</sup> Assessment Report<sup>18</sup> provided an update of scientific understanding of the physical science basis for climate change. It identified the various atmospheric constituents which contribute to enhanced warming. These are mainly carbon dioxide and methane, as well as other well-mixed greenhouse gases. It also recognised that some short-lived climate forcers have a cooling impact which can “mask”, at least partially, the full warming potential of current atmospheric greenhouse gas (GHG) levels. The IPCC Working Group I report highlights this cooling effect due to implementation of air quality policies, particularly in Europe and North America. The 2016 Scientific Assessment Report, “Towards Cleaner Air”<sup>19</sup>, published by the United Nations Economic Commission for Europe identifies there has been a sharp decline in emissions of sulphur dioxide in Europe and North America since the introduction of abatement measures under the 1979 Convention on Long-Range Transboundary Air Pollution. This trend is also reflected in data from Irish observatories<sup>20</sup>.

In response, it was noted that rapid action to reduce methane emissions could in the relatively short-term reduce the impacts of the consequent warming. The analysis presented was largely based on emissions scenarios which tries to capture the complex range of aerosol formation, transport and removal, processes, which determine the overall climate impacts of these short-lived climate forcers, which has a high level of scientific uncertainty.

Ireland supports advanced Atlantic boundary aerosol and radiation measurements at Mace Head and Valentia European Monitoring and Evaluation Programme (EMEP<sup>21</sup>) Observatories. Both sites are also part of the World Meteorological Organisation’s Global Atmospheric Watch (GAW) network<sup>22</sup>.

Integrated analysis, of these data in combination with other remote or in-situ observations can assist in reducing the scientific uncertainty around the scale of aerosol cooling and how this has changed over recent decades. Such analysis can enhance understanding and quantification of the findings from the IPCC. The aim of this call is to support such a study. This should quantify any observed changes, link these to the advice provided by the IPCC and thereby inform effective policy responses.

The implementation of the Climate Action Plan 2021<sup>23</sup> needs to be based on the best available science. The focus is on addressing the impacts of GHGs. However, there is a need to better understand the impacts of short-lived climate forcers and how to manage these in the context of effective actions to address climate change. This should take account of the synergies and trade-off between these actions in the period to 2030. This analysis would provide a response to issues highlighted by the IPCC which warrant urgent consideration in the context of limiting warming in line with the Paris Agreement temperature goal.

<sup>18</sup> <https://www.ipcc.ch/report/ar6/wg1/>

<sup>19</sup> <https://unece.org/info/publications/pub/21553>

<sup>20</sup> [https://www.epa.ie/publications/research/climate-change/Research\\_Report\\_357.pdf](https://www.epa.ie/publications/research/climate-change/Research_Report_357.pdf)

<sup>21</sup> <https://emep.int/>

<sup>22</sup> <https://public.wmo.int/en/programmes/global-atmosphere-watch-programme>

<sup>23</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

## Scope

Innovative research proposals are invited to, but not limited to:

- Assess whether long-term changes in the chemical composition of aerosols measured at global monitoring stations (including those in Ireland) can be linked to observed changes in solar radiation levels measured at these sites, and therefore used to quantify associated changes in radiative forcing. If so what levels of responses in reduction of short-lived GHGs would be needed to balance these, and over what time period?
- Assess (a) how observed changes reflect policies, actions and measures that have been introduced to achieve national and European air quality objectives and (b) how linked actions in other regions, e.g., actions in North America or wider hemispheric actions, impact on the observations. This should include analysis of other pollutant species, including atmospheric mercury.

The study should consider analysis of observational data (in situ and space-based if available) for Ireland and its North Atlantic boundary as well as a global analysis.

## Understanding ozone levels in Ireland

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 9		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

Ground level ozone adversely affects human health and ecosystems and is regulated through the National Emission reduction Commitments (NEC) Directive, i.e. Directive (EU) 2016/2284<sup>24</sup> and Directive 2008/50/EC on ambient air quality and cleaner air for Europe (CAFÉ Directive)<sup>25</sup>. Additionally, it is a short-lived climate forcer, and the formation of ground level ozone is influenced by climate. Often, ozone is a ‘transboundary’ air pollutant in Ireland<sup>26</sup>, but it is also formed in the atmosphere through a series of photochemical reactions with NO<sub>x</sub> (NO and NO<sub>2</sub>), volatile organic compounds (VOCs) and methane among the principal precursors. The impact of methane emissions on ozone levels are not fully understood in Ireland, even though emissions of methane in Ireland are high by European standards<sup>27</sup>.

As ozone is formed in the atmosphere, it is controlled through the regulation of emissions of its precursors. In particular there are national emissions ceilings for NO<sub>x</sub> and VOCs included in the NEC Directive. Emissions of methane, another important ozone precursor, are regulated through climate (and not air quality) policies.

The 2016 Scientific Assessment Report, “Towards Cleaner Air”<sup>28</sup>, published by the United Nations Economic Commission for Europe (UNECE), advises that, while there is evidence that peak concentrations of ground level ozone in Europe have begun to decline over the last decade, due to large interannual variations the trend is not clear at many locations. Irish data does not show a conclusive downward trend for all locations<sup>29</sup>, although a downward trend at all locations except for Mace Head and Valentia had been indicated in previous decades<sup>30</sup>.

A greater understanding of the sources of ozone in Ireland is needed to develop coherent climate and air quality policies.

### Scope

Innovative research proposals are invited to, but not limited to:

- Improve the understanding of ozone levels and trends in Ireland, including the contribution of methane to the formation of ozone.
- Explore the implications of climate change for ozone levels in Ireland.

<sup>24</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L2284&from=EN>

<sup>25</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=en>

<sup>26</sup> <https://www.epa.ie/publications/monitoring--assessment/air/Air-Quality-in-Ireland-2020.pdf>

<sup>27</sup> <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>

<sup>28</sup> <https://unece.org/info/publications/pub/21553>

<sup>29</sup> <https://www.epa.ie/resources/charts--data/air/air-quality--ground-level-ozone.php>

<sup>30</sup> <https://www.epa.ie/publications/research/air/summary-of-findings-ozone-levels-changes-and-trends-over-ireland-an-integrated-analysis.php>



## Attribution approaches to identify climate-driven impacts on our water resources

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 10		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 350,000	<b>Maximum Duration:</b>	36 months
<b>Co-funded by:</b> Met Éireann			

### Background

Hydrometric data can be used to verify the impact of climate change. However, changes in hydrological data can also be influenced by other non-meteorological factors, including land use change, drainage or other engineering works, and changes in water demand. This project would aim to set out a detailed and robust methodology that would help answer the question: “Is climate change currently impacting on our water resources, and by how much, in terms of the magnitude and frequency of extreme events, and long-term trends?”. Similar work is starting in other countries, and it is an important component of water management planning. There are very few studies and metrics developed that allow the attribution of extreme flooding, droughts and long-term trends to climatic change. This is because long-term hydrological data is influenced by anthropogenic changes, such as changing demand for water or flood alleviation. If a detailed methodology could be established to identify and quantify the influence of anthropogenic changes in long-term hydrometric and groundwater level datasets, this could allow the changing impacts of climate change on our water resources to be quantified periodically in future. This, in turn, will support improved water management planning and decision making, when coupled with climate change projections.

Research is needed to develop standard, robust and consistent approaches and metrics on how to detect where long-term hydrological records have been or will be influenced by changes in land use, drainage, and/or water use.

### Scope

Innovative research proposals are invited to, but not limited to:

- Develop approaches and metrics on how to detect and isolate, from long-term hydrological records, the influence of changes caused by climate change and anthropogenic influences including, but not limited to, land use, drainage, and/or water use.
- Set out a clear approach that can be used on a long-term basis to attribute climate-driven changes in hydrometric and groundwater level observations to the standardised outputs from a national climate service, both in terms of observations and future predictions.

The project should build on existing work and data currently available for example, Geological Survey Ireland data<sup>31</sup> project GroundwaterClimate<sup>32</sup>.

<sup>31</sup> <https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx>

<sup>32</sup> <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/projects/gwclimate/Pages/default.aspx>

## Assessing administrative burdens as barriers to policy implementation

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 11		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	24 months

### Background

The implementation and enforcement of environmental policies is key to the EPA. The Climate Change Advisory Council's 2021 Annual Review<sup>33</sup> found a significant time lag between Ireland's climate policy and action, including on climate adaptation. Internationally, the effectiveness of many policies in a wide area of contexts is reduced by unnecessary complex administrative requirements. Increasing the efficiency of policy measures by funding process assessments that focus on the administrative steps that need to be taken is a way for the EPA to act in line with its monitoring and assessment regulatory roles.

Research is required to assess the administrative burdens to implementation of climate policy in Ireland and in particular the implementation of the measures outlined in Ireland's 2021 Climate Action Plan<sup>34</sup>.

### Scope

Innovative research proposals are invited to explore whether there are any unnecessary administrative burdens that reduce the efficiency of the policy measures described in the 2021 Climate Action Plan which includes critical measures to increase the proportion of renewable electricity to up to 80% by 2030, and if so, how can these burdens be reduced.

This project must build on previous research, including, but not limited to EPA Research report No. 362, *Evaluating Ireland's Climate Policy Performance*.

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<sup>33</sup>

[https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/publications/CCAC\\_AnnualReview\\_2021.pdf](https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/publications/CCAC_AnnualReview_2021.pdf)

<sup>34</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

## An environmental, social and economic comparison of forestry and agriculture

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 12		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

National climate policies, e.g., *Ag Climatise – A Roadmap towards Climate Neutrality* (Department of Agriculture, Food, and the Marine, 2020)<sup>35</sup> and Climate Action Plan 2021<sup>36</sup>, seek substantial expansion of the forestry sector for Ireland to meet its climate targets, for 2030 but particularly for the longer-term target of climate neutrality by 2050. Analysis produced to support the Carbon Budgets recommended by the Climate Change Advisory Council<sup>37</sup> studied a range of afforestation scenarios that could be consistent with the 2050 goal. These ranged from 13,000 ha per annum afforestation to 33,000 ha per annum which would see a substantial area of land (potentially 500,000 ha or more by 2050) converted to forest land over this period.

Research is needed to explore what are the net impacts on the Irish economy if afforestation targets consistent with carbon neutrality were reached, accounting for the loss of agricultural output on the converted land. As the land most likely to be used is currently grassland devoted to livestock farming (in particular, beef production), the research could feasibly focus on a comparison of the whole economy impact of forestry vs beef farming on the same land area.

### Scope

Innovative research proposals are invited to, but not limited to:

- Explore how forestry compares with other farming activities from economic, social and environmental perspectives.
- Compare on a consistent basis the wider projected impact of forestry versus other farming activities on the economy in 2050, including downstream processing and use of outputs (e.g., meat processing, timber processing and construction activity) if afforestation consistent with 2050 goals were achieved.

The project should build on existing work and data currently available for example, existing research on the economic and social impacts of livestock production, including work done by Teagasc and outputs from the National Farm Survey. The research should also consider and update, as necessary, previous work on the economic impact of Irish Forestry including research funded by the Council for Forest Research and Development (COFORD).

<sup>35</sup> <https://www.gov.ie/en/publication/07fbc-ag-climatise-a-roadmap-towards-climate-neutrality/>

<sup>36</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

<sup>37</sup>

<https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/Technical%20report%20on%20carbon%20budgets%2025.10.2021.pdf>

## Development of N<sub>2</sub>O emissions verification system for Ireland

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 13		
<b>Project Type:</b>	Large Scale Project		
<b>Maximum Budget:</b>	€ 600,000	<b>Maximum Duration:</b>	36 months

### Background

In Ireland, Nitrous oxide (N<sub>2</sub>O) is largely produced through fertilizer use and livestock management in agriculture. Its production cycle is complex and influenced by soils and meteorology. Consequently, there are large uncertainties in emissions estimates for N<sub>2</sub>O which come from diffuse sources and are influenced by applications and meteorology. Management and reduction of these emissions are challenging. Options include land management systems, livestock management, and fertiliser use.

N<sub>2</sub>O is recognised as the third most important greenhouse gas (GHG) with an atmospheric lifetime of over 100 years and is an important component of Ireland's GHG emissions profile<sup>38</sup>. Addressing N<sub>2</sub>O emissions poses a considerable immediate challenge due to its links with soil management and food production as well as for Ireland's ambition to be climate neutral by 2050.

The United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC) guidelines<sup>39</sup> recommend the development of inverse modelling as a means of emissions verification. The methodology has been applied in Ireland for methane and carbon dioxide emissions (through previous EPA-funded research<sup>40</sup>), but not yet for N<sub>2</sub>O. The methodology can be used in QA/QC (Quality Assurance/Quality Control) analysis of emissions inventories and inform actions to address emissions.

Research is needed to advance the development of a platform which integrates and communicates high resolution and near real-time data on Ireland's GHG emissions and removals from land including seasonal variations and where feasible land management interventions. Given the large degree of uncertainty that exist in estimate of emissions of this gas, further developments and work to enhance quantification of these is required.

### Scope

Innovative research proposals are invited to, but not limited to:

- Develop observation systems for N<sub>2</sub>O that complements existing atmospheric observation systems and links with similar analysis in the UK and Europe and enhances the use of national observational data, such as from Integrated Carbon Observation System -Ireland network.
- Develop analysis tools to support national emissions inventory collation and QA/QC with respect to terrestrial emissions and removals of N<sub>2</sub>O in line with European and global systems for use in reporting to the EU and the United Nations Framework Convention on Climate Change (UNFCCC).
- Develop enhanced systems models for Ireland including mapping of temporally and spatially disaggregated analysis.
- Advance analysis of Ireland's nitrogen cycle, including analysis of the contributions of land management and impacts of weather and climate.

<sup>38</sup> <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-provisional-greenhouse-gas-emissions-1990-2020.php>

<sup>39</sup> <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>

<sup>40</sup> <http://www.epa.ie/publications/research/climate-change/research-331-implicit-improving-inversion-model-capability-in-ireland.php>

The project will need to work closely with the EPA's Emissions Statistics team, who compiles the National Greenhouse Gas Inventory. It is also expected that this project will establish links with European and global networks, such as the Integrated Carbon Observation System Research Infrastructure<sup>41</sup>, the Global Carbon Project<sup>42</sup>, and Copernicus services<sup>43</sup>.

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<sup>41</sup> <https://www.icos-cp.eu/>

<sup>42</sup> <https://www.globalcarbonproject.org/>

<sup>43</sup> <https://www.copernicus.eu/en>

## Improving the national inventory - wastewater treatment emissions

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 14		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	24 months

### Background

The EPA's Emissions Statistics team has identified a need to improve the national inventory's assessment of greenhouse gas (GHG) emissions from wastewater treatment systems, from which there is also the potential for air pollutant emissions.

### Scope

Innovative research proposals are invited to, but not limited to:

- Identify gaps in the GHG Inventory reporting for wastewater treatment systems and possible overlaps with air pollutant requirements.
- Assess GHG emissions from wastewater in Ireland from all treatment systems; septic tanks, centralised treatment systems in accordance with the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- Explore how GHG and air pollutant emissions could be mitigated.

The project will need to work closely with the EPA's Emissions Statistics team, who compiles the national inventory.

## Improving the national inventory - F Gases

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 15		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

Sulphur hexafluoride (SF<sub>6</sub>) is a highly potent and long-lived greenhouse gas<sup>44, 45</sup>. SF<sub>6</sub> is a gas used in industrial applications, including in electrical insulation and as an arc suppressant. There has been a rapid development in Ireland of wind farms and data centres in recent years and these are potential sources of SF<sub>6</sub> emissions due to its use in electrical switch gear. Not all sites are licensed by the EPA and so its knowledge of the use of SF<sub>6</sub> at them is incomplete.

In addition, medium voltage substations, solar and hydro generators and high electricity demand customers may use SF<sub>6</sub> in equipment. Perfluorocarbons (PFC) and nitrogen trifluoride (NF<sub>3</sub>) are also used in the electronics industry, as substitutes for Ozone Depleting Substances (ODS) and for product manufacture<sup>46,47</sup>. Ireland's greenhouse gas (GHG) inventory and projections has potential data gaps in the use and emissions of PFCs and NF<sub>3</sub>.

Research is needed on the use of F gases in Ireland, to provide data for the GHG Inventory and Projections.

### Scope

Innovative research proposals are invited to, but not limited to:

- Investigate the use of SF<sub>6</sub> in electrical switch gear at data centres, wind farms, solar and hydro generators and high electricity demand customers and other sites not licensed by the EPA in order to update the national inventory for this highly potent GHG.
- Investigate the use of SF<sub>6</sub>, PFCs and NF<sub>3</sub> and HFCs<sup>48</sup> (other than in refrigeration or fire control equipment) in research institutes, semiconductor industry, thin film solar modules and flat screen production and printed circuit board manufacture to confirm that all use and emissions of these gases are recorded and reported in the GHG inventory and projections.
- Investigate the use of SF<sub>6</sub> in medical devices (in vitro diagnostic medical devices) in order to update the national inventory.
- Using economic analysis, assess the impact on projections of SF<sub>6</sub> emissions.

The project will need to work closely with the EPA's Emissions Statistics team, who compiles the national inventory.

<sup>44</sup> <https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>

<sup>45</sup> <https://unfccc.int/process/transparency-and-reporting/greenhouse-gas-data/greenhouse-gas-data-unfccc/global-warming-potentials>

<sup>46</sup> <https://www.ipcc-nggip.iges.or.jp/public/2006gl/>

<sup>47</sup> <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>

<sup>48</sup> HFCs: Hydrofluorocarbons

## National non-methane volatile organic compounds (VOCs): emissions and mitigation options

<b>Call Topic Reference:</b>	Addressing Climate Change Evidence Needs 2022 Call Topic 16		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	24 months

### Background

Ireland's Air Pollutant Emissions 1990-2030 report<sup>49</sup> identifies that the emission reduction commitments set for emissions of non-methane volatile organic compounds (NMVOCs) under Directive (EU) 2016/2284 are at risk of not being met. The key drivers of NMVOC emissions include solvents and other product use, and emissions from the food and beverage industry, in particular the increased spirit production in recent years.

Research is required to review emissions and mitigation options for NMVOCs in Ireland.

### Scope

Innovative research proposals are invited to, but not limited to:

- Review current emission inventory approaches in terms of activity data and identify new data sources where available. This work should be undertaken in the context of the emission inventory methodologies described in the 2019 EMEP/EEA Emission Inventory Guidebook<sup>50</sup>.
- Explore how can projected exceedances of Ireland's legally binding NMVOCs emission reduction commitments can be addressed. This should focus on the major sources of emissions of NMVOCs including spirit production in the food and beverage industry.

The project will need to work closely with the EPA's Emissions Statistics team, who compiles the National Inventory and the EPA's Licensing team who regulate industry<sup>51</sup>.

<sup>49</sup> [https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Irelands-Air-Pollutant-Emissions-report\\_2021Final.pdf](https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Irelands-Air-Pollutant-Emissions-report_2021Final.pdf)

<sup>50</sup> EMEP/EEA air pollutant emission inventory guidebook 2019 — European Environment Agency (europa.eu)

<sup>51</sup> <https://www.epa.ie/our-services/licensing/industrial/industrial-emissions-licensing-ied/who-needs-an-industrial-emissions-licence/>



## Facilitating a Green and Circular Economy

The role of Irish Small to Medium-Sized Enterprises (SMEs) in the transition to a more Circular Economy

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 1		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	36 months

### Background

Ireland faces some key challenges in delivering climate action and sustainability commitments, achieving 7% annual and 50% total reduction in GHG emissions by 2030 and Carbon Neutrality by 2050. As noted in the Climate Action Bill, all sectors of the economy and wider society will have to play their part<sup>52</sup>. The EPA State of the Environment Report 2020 highlights that the majority of Ireland's agreed environmental targets will not be met. Despite progress in some areas, the scale of improvements being made is insufficient to meet long-term objectives<sup>53</sup>.

Small to medium enterprises (SMEs) constitute 99.8% of Irish businesses and employ 69% of the workforce in Ireland<sup>54</sup>.

Research is needed to highlight the role of the SMEs sector in addressing the challenges and meeting Circular Economy targets Ireland faces in the coming years.

### Scope

Innovative research proposals are invited to, but not limited to:

- Conduct a review of current Irish SMEs engagement in Circular Economy practices.
- Identify barriers and opportunities to enhance engagement and uptake of more Circular Economy activity in the SMEs sector in Ireland.

<sup>52</sup> <https://assets.gov.ie/127957/ab70a65d-68c1-4947-983b-babf920cc4dc.pdf>

<sup>53</sup> <https://www.epa.ie/publications/monitoring--assessment/assessment/state-of-the-environment/irelands-environment-2020---an-assessment.php>

<sup>54</sup> <https://www.cso.ie/en/releasesandpublications/ep/p-bii/bii2015/sme/>

## Exploring ways to deliver more circular organic waste collection systems for large-scale apartment dwellings

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 2		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€200,000	<b>Maximum Duration:</b>	24 months

### Background

Apartments, which have increased in number by 85% since 2002, accounted for 12.0 % of all household types in 2016, compared with 11.1% in 2011<sup>55</sup>. Currently there are many apartment dwellings that do not have the facility to provide source-separated waste collection.

Organic waste is often also known as putrescible waste or bio-waste. Sources of household organic wastes include all types of uncooked and cooked food (meat, bones, fruit, vegetables) and garden material (such as grass and hedge cuttings). The organic fraction of household waste is generally heavier than other types of waste due to higher moisture content<sup>56</sup>.

Ireland has an obligation that biodegradable municipal waste going to landfill should be no more than 35% of amounts generated in 1995<sup>57</sup>. At the European level, separate collection of biowaste will become mandatory by 2023 under the new Circular Economy legislative package. Recent European Union (EU) circular economy and bioeconomy policies and the New European Green Deal promote the recycling of nutrients from organic wastes into products that can be used as soil improvers and fertilisers, thereby reducing the use of mineral fertilisers<sup>58</sup>.

In order to boost Ireland's recycling rates and foster Ireland's move to a circular economy, more biowaste from both commercial and household sources needs to be diverted to brown bins and composted<sup>59</sup>. Finding ways to address waste segregation is an objective of the EU Circular Economy Action Plan (2020)<sup>60</sup>, the Irish Government's Climate Action Plan 2019<sup>61</sup>, the Climate Action and Low Carbon Development Act 2021<sup>62</sup>, the Waste Action Plan for a Circular Economy (2020)<sup>63</sup>, the Whole of Government Circular Economy Strategy 2022-2023<sup>64</sup> and the Circular Economy Bill 2021<sup>65</sup>. It is also directly relevant to the EPA's Circular Economy Programme 2021-2027<sup>66</sup>.

Research is needed to identify opportunities for all relevant stakeholder to collaborate in co-designing solutions to address the challenge of food waste disposal from large-scale apartment dwellings in Ireland.

<sup>55</sup> <https://www.cso.ie/en/releasesandpublications/ep/p-cp1hii/cp1hii/od/>

<sup>56</sup> [https://apartmentownersnetwork.org/wp-content/uploads/2021/12/ertdi-no71\\_web-final-with-cover.pdf](https://apartmentownersnetwork.org/wp-content/uploads/2021/12/ertdi-no71_web-final-with-cover.pdf)

<sup>57</sup> <https://assets.gov.ie/86647/DCF554a4-0fb7-4d9c-9714-0b1fbe7dbc1a.pdf>

<sup>58</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

<sup>59</sup> <https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/composting--anaerobic/>

<sup>60</sup> [https://ec.europa.eu/environment/strategy/circular-economy-action-plan\\_en](https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en)

<sup>61</sup> <https://assets.gov.ie/25419/c97cdecdf8c49ab976e773d4e11e515.pdf>

<sup>62</sup> <https://www.irishstatutebook.ie/eli/2021/act/32/enacted/en/html>

<sup>63</sup> <https://assets.gov.ie/86647/DCF554a4-0fb7-4d9c-9714-0b1fbe7dbc1a.pdf>

<sup>64</sup> <https://assets.gov.ie/207622/bd90130d-494e-4d32-8757-46d36c77b912.pdf>

<sup>65</sup> <https://assets.gov.ie/137605/10140ef7-a8ef-41c2-b7e9-de375b9f4a18.pdf>

<sup>66</sup> [https://www.epa.ie/publications/circular-economy/resources/EPA\\_Circular\\_Economy\\_2021\\_Programme\\_Mar22\\_Web.pdf](https://www.epa.ie/publications/circular-economy/resources/EPA_Circular_Economy_2021_Programme_Mar22_Web.pdf)

## Scope

Innovative research proposals are invited to, but not limited to:

- Conduct a review of current EU and International 'Best Practice' for source-separated waste disposal from high-occupancy buildings.
- Develop a forum to co-design a 'communities of practice' model with all relevant stakeholders based on review conducted.
- Identify opportunities to replicate 'Best Practice' in Ireland.
- Identify a strong demonstrator element to evaluate and assess the solutions proposed for different types of dwellings (the collection of real data will be critical).

## Exploring Industry attitudes to the REACH Regulation in the transition to a more circular economy

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 3		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€100,000	<b>Maximum Duration:</b>	12 months

### Background

REACH (EC 1907/2006) aims to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. This is done by the four processes of REACH, namely the registration, evaluation, authorisation and restriction of chemicals. REACH also aims to enhance innovation and competitiveness of the EU chemicals industry<sup>67</sup>. REACH switches most responsibility of control and safety of chemicals from authorities, to chemical manufacturers, importers and users and places greater responsibility on industry to manage risks that chemicals may pose to human health and the environment. REACH also aims to promote alternative methods for the assessment of hazards of substances and eliminate unnecessary testing, especially on animals. REACH applies to all chemicals – not just those used in industrial processes, but also to household products and those used in articles (unless specifically exempted)<sup>68</sup>.

### Scope

Innovative research proposals are invited to, but not limited to:

- Conduct a review to identify if adherence to the REACH regulation results in innovation and increased competitiveness.
- Identify case studies of ‘Best Practice’ as guidance for relevant stakeholders.

<sup>67</sup> [https://ec.europa.eu/environment/chemicals/reach/reach\\_en.htm](https://ec.europa.eu/environment/chemicals/reach/reach_en.htm)

<sup>68</sup> <https://www.epa.ie/our-services/monitoring--assessment/waste/chemicals/reach/>

## An analysis of glass container reuse to facilitate the circular economy

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 4		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	36 months

### Background

Each EU member state is obliged to meet targets, set out in the EU Packaging and Waste Packaging Directive, for the recycling and recovery of waste packaging made from glass, plastic, paper and board, metals and wood<sup>69</sup>.

In Ireland 62% of packaging waste was recycled in 2019<sup>70</sup>. Ireland generated over 1.1 million tonnes of packaging waste in 2019, up 11% on 2018. This is the third year in a row that packaging waste in Ireland has exceeded one million tonnes. Most of this consisted of plastic and paper/cardboard, with smaller amounts of glass, wood and metal packaging. Almost all plastic and paper/cardboard, and most metal packaging waste, was sent abroad for recycling<sup>71</sup>.

Ireland's Waste Action Plan for a Circular Economy represents a roadmap for waste planning and management. Core to this plan is the need to embed climate action in all strands of public policy. The Plan shifts focus away from waste disposal and looks instead to how we can preserve resources by creating a circular economy<sup>72</sup>.

Ireland introduced a Deposit and Return Scheme (DRS) in 2020. DRS is a system used in other EU Member States and further afield to incentivise consumers to return their beverage containers for recycling or reuse. The DRS being introduced in Ireland is focused on plastic bottles and aluminium cans because too few of these are being captured for recycling by our current system (which could put Ireland in breach of EU legislation) and too many are being discarded as litter<sup>73</sup>.

### Scope

Innovative research proposals are invited to, but not limited to:

- Conduct an analysis of current practice in glass container reuse in Ireland.
- Conduct a review of EU and International current glass container reuse 'Best Practice'.
- Identify Circular Economy opportunities that could be replicated within Ireland.

Please note that this research must complement EPA involvement with CIRCULÉIRE which is a public-private partnership created by Irish Manufacturing Research and the Department of the Environment, Climate and Communications (DECC), the Environmental Protection Agency (EPA), and EU Climate Innovation Initiative- EIT Climate-KIC with 25 Founding Industry Members<sup>74</sup>.

<sup>69</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01994L0062-20150526>

<sup>70</sup> <https://www.epa.ie/publications/monitoring--assessment/waste/national-waste-statistics/Packaging-Waste-Ireland-2019.pdf>

<sup>71</sup> <https://www.epa.ie/news-releases/news-releases-2021/more-packaging-waste-falling-recycling-rates-for-plastic-and-a-heavy-reliance-on-export-mean-that-ireland-is-missing-opportunities-to-foster-a-circular-economy.php>

<sup>72</sup> <https://assets.epa.ie/86647/DCF554A4-0FB7-4D9C-9714-0B1FBE7DBC1A.pdf>

<sup>73</sup> <https://assets.epa.ie/89535/EB44CB1E-F5FB-4559-9105-1879149F310B.pdf>

<sup>74</sup> <https://circuleire.ie/>

## Climate impact of household food waste

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 5		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	36 months

### Background

In Ireland we waste about 1 million tonnes of food each year, according to current best estimates. Growing, processing and transporting food uses a huge amount of resources, such as land, water, energy and fertiliser. If food is wasted, these resources are wasted too. Reducing household food waste is an objective of the EU Circular Economy Action Plan (2020)<sup>75</sup>, the Irish Government's Climate Action Plan 2019<sup>76</sup>, the Climate Action and Low Carbon Development Act 2021<sup>77</sup>, the Waste Action Plan for a Circular Economy (2020)<sup>78</sup>, the Whole of Government Circular Economy Strategy 2022-2023<sup>79</sup> and the Circular Economy Bill 2021<sup>80</sup>. It is also directly relevant to the EPA's Circular Economy Programme 2021-2027<sup>81</sup>.

Research is needed to examine the climate impacts of food waste, in particular household food waste that occurs at the end of the food value chain.

### Scope

Innovative research proposals are invited to, but not limited to:

- Gather data to provide evidence to inform climate impacts associated with current food waste challenges.
- Assess how diet choices have evolved towards an increase in more plant-based diets and associated climate impacts.
- Conduct lifecycle assessments of wasted food and associated climate impacts.
- Identify potential economic cost savings and environmental protection opportunities.

<sup>75</sup> [https://ec.europa.eu/environment/strategy/circular-economy-action-plan\\_en](https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en)

<sup>76</sup> <https://assets.gov.ie/25419/c97cdecddf8c49ab976e773d4e11e515.pdf>

<sup>77</sup> <https://www.irishstatutebook.ie/eli/2021/act/32/enacted/en/html>

<sup>78</sup> <https://assets.gov.ie/86647/DCF554a4-0fb7-4d9c-9714-0b1fbc1a.pdf>

<sup>79</sup> <https://www.gov.ie/en/publication/b542d-whole-of-government-circular-economy-strategy-2022-2023-living-more-using-less/>

<sup>80</sup> <https://assets.gov.ie/137605/10140ef7-a8ef-41c2-b7e9-de375b9f4a18.pdf>

<sup>81</sup> [https://www.epa.ie/publications/circular-economy/resources/EPA\\_Circular\\_Economy\\_2021\\_Programme\\_Mar22\\_Web.pdf](https://www.epa.ie/publications/circular-economy/resources/EPA_Circular_Economy_2021_Programme_Mar22_Web.pdf)

## The role of incentives, standards and levies to reduce the use of virgin materials in the construction sector

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 6		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 150,000	<b>Maximum Duration:</b>	36 months

### Background

Ireland experienced a growth in the construction sector in recent years in line with the upturn in the economy, especially in the greater Dublin area. Project Ireland 2040<sup>82</sup> sets out the State's ambition and vision in terms of development over the next 20 years. The plan includes several major construction projects which present huge potential in terms of preventing and recycling construction waste; and a challenge in terms of ensuring we can manage the waste generated. If the State is to meet the targets as set out in the National Development Plan 2018- 2027, it is vital that there is sufficient capacity for the recovery and/or disposal of the envisaged increased construction and demolition waste.

From a broader Circular Economy perspective and to deliver on Ireland's Climate policy commitments, it is even more important that prevention and reuse are hardwired into construction activity<sup>83</sup>. Extracting 'virgin materials' in this context is defined as previously unused raw material, including previously unused copper, aluminium, lead, zinc, iron, other metal or metal ore<sup>84</sup>.

The United Nations Environment Programme (UNEP) International Resource Panel published a report in 2020 titled '*Resource Efficiency and Climate Change: Material Efficiency Strategies for a Low-Carbon Future*'. Commissioned by the G7 countries, it shows that natural resource extraction and processing account for more than 90 % of global biodiversity loss and water stress, and around half of global greenhouse gas emissions<sup>85</sup>. The use of recycled materials in the construction sector has potential to reduce greenhouse gas emissions in the material cycle of residential buildings.

Research is needed to address a knowledge gap to identify opportunities to minimise the use of virgin materials used in the growing construction sector in Ireland.

### Scope

Innovative research proposals are invited to, but not limited to:

- Conduct a feasibility study to assess the use, application and effectiveness of economic and regulatory instruments to reduce the use of virgin materials in the construction sector.
- Identify 'Best Practice' options that could be applied within the construction sector in Ireland.

<sup>82</sup> <https://www.gov.ie/en/campaigns/09022006-project-ireland-2040/?referrer=http://www.gov.ie/2040/#:~:text=Project%20Ireland%202040%20is%20the%20government%E2%80%99s%20long-term%20overarching,didn%E2%80%99t%20align%20with%20a%20well-thought-out%20and%20defined%20strategy.>

<sup>83</sup> <https://assets.gov.ie/86647/DCF554a4-0fb7-4d9c-9714-0b1fbc7dbc1a.pdf>

<sup>84</sup> [https://www.law.cornell.edu/definitions/index.php?height=800&def\\_id=ab8cc9ff2f9493dc51f3d4fe0af77c64](https://www.law.cornell.edu/definitions/index.php?height=800&def_id=ab8cc9ff2f9493dc51f3d4fe0af77c64)

<sup>85</sup> <https://wedocs.unep.org/bitstream/handle/20.500.11822/34351/RECCR.pdf?sequence=1&isAllowed=y>

## Pathways to enable a more Circular Built Environment

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 7		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	36 months
<b>Co-funded by:</b> Department of Food, Agriculture and the Marine			

### Background

The built environment plays a key role in how we, as a society live, work, and interact with our environment. Buildings are responsible for almost 40% of all energy-related global carbon emissions, 50% of global material use with 42 billion tonnes of materials consumed annually<sup>86</sup>. These excessive patterns of consumption have been facilitated by the traditional linear extract-produce-consume-dispose resource flow model of the modern economic system<sup>87</sup>. In 2020, 64% of Ireland's total population lived in urban areas and cities<sup>88</sup>. The EU Circular Economy Action Plan (2020)<sup>89</sup>, Ireland's Climate Action Plan 2019<sup>90</sup>, COFORD Forests and wood products, and their importance in climate change mitigation<sup>91</sup>, the Climate Action and Low Carbon Development Act 2021<sup>92</sup>, the Waste Action Plan for a Circular Economy (2020)<sup>93</sup>, the Whole of Government Circular Economy Strategy 2022-2023<sup>94</sup> and the Circular Economy Bill 2021<sup>95</sup> are underpinned by the need to transition towards a circular and low-carbon and biobased society. It is also important to consider for the National Policy Statement<sup>96</sup> and the EU Commissions communication on Sustainable Carbon Cycles<sup>97</sup>.

Further research is required to identify how the built environment sector can lead the transition to meet Ireland's circular economy objectives.

### Scope

Innovative research proposals are invited to, but not limited to:

- Develop a National Circular Built Environment Roadmap.
- Develop a Circular Built Environment Toolkit including guidance, demonstrator case studies, templates, and tools.
- Establish training- a resource hub for industry, policy makers and educational audiences.

<sup>86</sup> <https://worldgbc.org/news-media/WorldGBC-embodied-carbon-report-published>

<sup>87</sup> [https://mycourses.aalto.fi/pluginfile.php/1187882/mod\\_label/intro/Korhonen%20et%20al.2018.Circular%20economy%20-%20the%20concept%20and%20its%20limitations..pdf](https://mycourses.aalto.fi/pluginfile.php/1187882/mod_label/intro/Korhonen%20et%20al.2018.Circular%20economy%20-%20the%20concept%20and%20its%20limitations..pdf)

<sup>88</sup> <https://www.statista.com/statistics/455844/urbanization-in-ireland/#:~:text=This%20statistic%20shows%20the%20degree%20of%20urbanization%20in,total%20population%20lived%20in%20urban%20areas%20and%20cities.>

<sup>89</sup> [https://ec.europa.eu/environment/strategy/circular-economy-action-plan\\_en](https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en)

<sup>90</sup> <https://www.gov.ie/en/publication/ccb2e0-the-climate-action-plan-2019/>

<sup>91</sup> [Cofordstrategyfullfinalreportjan2022240122.Pdf](https://www.gov.ie/en/publication/b542d-whole-of-government-circular-economy-strategy-2022-2023-living-more-using-less/)

<sup>92</sup> <https://www.irishstatutebook.ie/eli/2021/act/32/enacted/en/html>

<sup>93</sup> <https://www.gov.ie/en/publication/4221c-waste-action-plan-for-a-circular-economy/>

<sup>94</sup> <https://www.gov.ie/en/publication/b542d-whole-of-government-circular-economy-strategy-2022-2023-living-more-using-less/>

<sup>95</sup> <https://www.gov.ie/en/publication/89838-circular-economy-bill-2021/#:~:text=The%20Circular%20Economy%20Bill%20is%20a%20key%20step,that%20goal.%20General%20Scheme%20Circular%20Economy%20Bill%202021>

<sup>96</sup> <https://assets.gov.ie/2244/241018115730-41d795e366bf4000a6bc0b69a136bda4.pdf>

<sup>97</sup> [com\\_2021\\_800\\_en\\_0.pdf \(europa.eu\)](https://assets.gov.ie/2244/241018115730-41d795e366bf4000a6bc0b69a136bda4.pdf)



The research must complement and not duplicate the EPA and DAFM-funded research project: 2021-GCE-1039: Opportunities for Green Public Procurement to improve implementation of circular practice, which started in March 2022.

## The role of remanufacturing in the computer, electronic, optical and electrical equipment sectors in Ireland to facilitate the Circular Economy

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 8		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 250,000	<b>Maximum Duration:</b>	36 months

### Background

Remanufacturing can be defined as “Returning a product to at least its original performance with a warranty that is equivalent or better than that of the newly manufactured product.” Remanufacturing technology is an effective way to reduce waste and environmental pollution. This area is a developing new research field, and a growing and developing advanced manufacturing technology, offering an extension to the whole life cycle of many manufacturing processes. Remanufacturing technology provides an important technical support to industrial sustainable development, bringing great benefits to the development of the national economy, and becoming a new point of economic growth<sup>98</sup>. Base case scenario of remanufacturing for Europe is that it could yield a production value of € 46 billion, employing some 300,000 people and averting 11 million tonnes of carbon dioxide equivalent. This is a little over a 50% increase in remanufacturing from today’s levels<sup>99</sup>.

A remanufacturing platform DigiPrime<sup>100</sup> was developed via Horizon 2020 funding and acknowledges the role that digital technology plays the transition to a circular economy, identifying ways to achieve optimum use of resources within industries. Ireland, Germany, France and the United Kingdom (UK) is identified as one of four key regions, estimated to account for some 70% of remanufacturing value in Europe<sup>101</sup>.

Research is required to examine remanufacturing opportunities in Ireland to facilitate more circular manufacturing practices.

### Scope:

Innovative research proposals are invited to, but not limited to:

- Conduct a review of remanufacturing activity in Ireland.
- Examine key enablers to promote remanufacturing such as possible sector targets, financial incentives, clarity around legal definitions of waste versus products to be remanufactured, strengthening take back obligations for products etc.
- Identify the sectors in Ireland most suited to remanufacturing based on work already undertaken.

<sup>98</sup> <https://www.sciencedirect.com/topics/engineering/remanufacturing>

<sup>99</sup> <https://link.springer.com/article/10.1007/s13243-017-0038-2>

<sup>100</sup> <https://www.digiprime.eu/>

<sup>101</sup> <https://www.remanufacturing.eu/assets/pdfs/remanufacturing-market-study.pdf>

## Fuel derived from residual municipal wastes and other waste feedstocks to achieve more sustainable transport

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 9		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 150,000	<b>Maximum Duration:</b>	24 months

### Background

Ireland is an energy importing economy, relying largely on gas and oil imports to meet its energy needs. At the same time, the effects of climate change are causing increasing disruption in our lives. The need to reduce our carbon emissions and our reliance on fossil fuels in all sectors of our society is becoming more urgent. It is the goal of the government<sup>102</sup> to enable Ireland, within EU and global frameworks to include *inter alia* the EU Green Deal<sup>103</sup>, the Irish Government's Climate Action Plan (2019)<sup>104</sup>, the Climate Action and Low Carbon Development Act (2021)<sup>105</sup>, the Waste Action Plan for a Circular Economy (2020)<sup>106</sup>, the EU Circular Economy Action Plan (2020)<sup>107</sup>, the Circular Economy Bill (2021)<sup>108</sup> and the Whole of Government Circular Economy Strategy 2022-2023<sup>109</sup> to achieve a transition to a low-carbon, climate-resilient and environmentally sustainable economy.

Research is required to assess the potential use of fuel derived from residual municipal wastes and other waste feedstocks, as a means to reduce fossil fuel use to deliver on climate change goals by decoupling economic activity from resource use. Such research is aligned also with the vision of the EPA's Circular Economy Programme 2021-2027, where the circular economy ensures that everyone uses less resources and prevents waste to achieve sustainable economic growth<sup>110</sup>.

### Scope

Innovative research proposals are invited to, but not limited to:

- Conduct a review of current international 'Best Practice' alternatives to fossil fuel use in transport (in particular shipping and aviation) to support the transition to more sustainable solutions.
- Identify the technical and regulatory gaps, barriers and opportunities to progress the use of alternative waste-based feedstocks in sustainable transport solutions.
- Critically evaluate the potential use of residual municipal wastes and other waste feedstocks to support the production of sustainable aviation and shipping fuels in Ireland.

<sup>102</sup> <https://www.gov.ie/en/policy/9cd812-energy/>

<sup>103</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

<sup>104</sup> <https://assets.gov.ie/25419/c97cdccdf8c49ab976e773d4e11e515.pdf>

<sup>105</sup> <https://www.gov.ie/en/publication/984d2-climate-action-and-low-carbon-development-amendment-bill-2020/>

<sup>106</sup> <https://www.gov.ie/en/publication/4221c-waste-action-plan-for-a-circular-economy/#:~:text=The%20Waste%20Action%20Plan%20for%20a%20Circular%20Economy,Demolition%2C%20Textiles%2C%20Green%20Public%20Procurement%20and%20Waste%20Enforcement.>

<sup>107</sup> [https://ec.europa.eu/environment/strategy/circular-economy-action-plan\\_en](https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en)

<sup>108</sup> <https://www.gov.ie/en/publication/89838-circular-economy-bill-2021/>

<sup>109</sup> <https://www.gov.ie/en/publication/b542d-whole-of-government-circular-economy-strategy-2022-2023-living-more-using-less/>

<sup>110</sup> <https://www.epa.ie/publications/circular-economy/resources/the-circular-economy-programme-2021-2027.php>

## A critical analysis of Ireland's Circular Material Use Rate

<b>Call Topic Reference:</b>	Facilitating a Green and Circular Economy 2022 Call Topic 10		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months
<b>Co-funded by:</b> Department of Food, Agriculture and the Marine			

### Background

By 2030 Ireland's ambition is to significantly improve its circular material use rate (CMUR) in both absolute terms and in comparison, with other EU Member States so that our national rate is above the EU average. Achieving this improvement in the circularity gap is a key objective of Ireland's Circular Economy Strategy<sup>111</sup>. In 2019, Ireland's Circular Material Use Rate, which measures the share of material recovered and fed back into the economy thus saving extraction of primary raw materials in overall material use, was the second worst in the EU according to Eurostat figures<sup>112</sup> and showing no signs of improvement. There are also opportunities to be explored in relation to cascading use of biological resources<sup>113</sup>.

Research is needed to understand Ireland's low rate and to identify opportunities to improve on the current rate in line with the Government's ambition. This research will also support the EPA's Circular Economy Programme<sup>114</sup> and its ambition to gather evidence to inform robust policy development. It is also important to consider for the National Policy Statement on the bioeconomy<sup>115</sup> and the EU Commissions communication on Sustainable Carbon Cycles<sup>116</sup>.

### Scope

Research proposals are invited to, but not limited to:

- Conduct a review of data from Member States with a high CMUR score, analysing and reporting on the activities driving that score.
- Critically evaluate the underlying data & protocols used to measure Ireland's CMUR.
- Identify potential areas for Ireland to improve its current CMUR, including for cascading use of resources.

<sup>111</sup> <https://www.gov.ie/en/publication/b542d-whole-of-government-circular-economy-strategy-2022-2023-living-more-using-less/>

<sup>112</sup> <https://ec.europa.eu/eurostat/documents/3217494/10164469/KS-EI-19-001-EN-N.pdf/33ab6c0c-a0c6-5294-3948-b1fb9973d096?t=1574262443000>

<sup>113</sup> [Cascading use | Knowledge for policy \(europa.eu\)](https://knowledge4policy.europa.eu/cascading-use/)

<sup>114</sup> <https://www.epa.ie/publications/circular-economy/resources/the-circular-economy-programme-2021-2027.php>

<sup>115</sup> <https://assets.gov.ie/2244/241018115730-41d795e366bf4000a6bc0b69a136bda4.pdf>

<sup>116</sup> [com\\_2021\\_800\\_en\\_0.pdf \(europa.eu\)](https://ec.europa.eu/eurostat/documents/3217494/10164469/KS-EI-19-001-EN-N.pdf/33ab6c0c-a0c6-5294-3948-b1fb9973d096?t=1574262443000)

## Delivering a Healthy Environment

An analysis of the effectiveness of EPA industrial emissions licensing on emissions in relevant industrial sectors

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 1		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€250,000	<b>Maximum Duration:</b>	36 months

### Background

Industrial activities play an important role in the economic well-being of Ireland contributing to sustainable growth but can also have a significant impact on the environment. Certain industrial activities produce emissions of various substances into the air, water and land. They also generate waste and use resources such as energy and water. The EPA has a wide remit and is responsible for a range of tasks relating to the authorisation of activities that could have an impact on the environment or on human health<sup>117</sup>.

Ireland has a relatively long history of integrated licensing dating back to 1994. Emissions data are submitted to the EPA and are presented in Annual Environmental Reports (AERs). A study conducted in 2010 devised an Environmental Emissions Index (EEI) model, based on life-cycle impact assessment characterisation, normalisation, and weighting methodologies, to compare and aggregate 20 key mass annual emissions reported in AERs. Six major environmental impact categories were considered. A sectoral pollution trend was derived for the pharmaceutical manufacturing sector from 1995 to 2007 and was used to estimate the change in pollution intensity of pharma production over this time<sup>118</sup>. The EU has also completed a review of the Industrial Emissions Directive (IED) in 2021 and plans to publish an amendment to this Directive in the very near future.

Research is needed now, 28 years after the issue by the EPA of the first Integrated Pollution Control (IPC) licence, to perform an analysis of the effectiveness of this and subsequent regimes for the regulation of industry. This research will need to examine the further impacts of the Industrial Emissions Licencing (IE) regime introduced in 2013 as well as IPC licencing to repeat and build on the 2010 research study in examining the impact of licencing regimes on emissions from relevant industrial sectors.

### Scope

Innovative research proposals are invited to, but not limited to:

- Review the effectiveness of IED licensing compared with baseline Integrated Pollution Control (IPC) and Integrated Pollution Prevention and Control (IPPC) licensing and other EU regulatory regimes. This review should consider the European Commission's review of the IED.
- Critically compare Irish chemical footprints (sector, substances) with those of other European countries.
- Assess and modify, if required, the previously developed indicator-based approach to the assessment of environmental emissions (air, water) related to economic performance for identified industrial sectors (e.g. power, cement, food, agriculture) based on acceptable rationale/justification.

<sup>117</sup> <https://www.epa.ie/our-services/licensing/>

<sup>118</sup> [https://www.epa.ie/publications/research/waste/ERC\\_16\\_Styles\\_IPPCemissions\\_web.pdf](https://www.epa.ie/publications/research/waste/ERC_16_Styles_IPPCemissions_web.pdf)

- Determine if IE Licensing has had a measurable effect on a reduction in emissions (air, water, waste generated) for sites in relevant industrial sectors (e.g. power, cement, food, agriculture).

## A critical analysis of environmental considerations of hydrogen production – implications for the IED licensing process

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 2		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

There is increasing interest in the role that hydrogen-based energy systems may play in the future, especially in the transport sector. They appear to be an attractive alternative to current fossil fuel-based energy systems, since these have been proven to affect climate due to greenhouse gases emissions<sup>119</sup>. Ireland has policy commitments to reduce fossil fuel use under Actions 169d, 169e, and 294b of the Climate Action Plan (Annex of Actions published in December 2021)<sup>120</sup>.

The majority of hydrogen used in the world today is sourced from fossil fuels (Grey Hydrogen), which can be decarbonised through the use of carbon capture and storage (Blue Hydrogen). While this does add cost to hydrogen production, it eliminates the greenhouse gas emissions and allows hydrogen use at large scale. Hydrogen produced from renewable electricity through electrolysis of water (Green Hydrogen) does not produce any greenhouse gases and it additionally allows for otherwise lost renewable energy resources to be captured and stored for future use<sup>121</sup>.

Research is required to gain more insight on the role of hydrogen-based-energy systems as a non-fossil fuel for use in the transport sector.

Research is needed to gain more insight into the role of hydrogen-based-energy systems as an alternative to fossil fuels within the transport sector.

### Scope

Innovative research proposals are invited to, but not limited to:

- Conduct a critical international review of the environmental and legislative implications of various hydrogen production routes (grey, blue, grey) which are relevant in an Irish Industrial Emissions Directive (IED) licencing context.
- Undertake a life-cycle assessment of the environmental sustainability/burden of hydrogen as a fuel.
- Provide international evidence with regard to hydrogen as a fuel to guide and inform the EPA's licensing procedures and to meet Climate Change commitments.

<sup>119</sup> [https://ec.europa.eu/environment/integration/research/newsalert/pdf/39na1\\_en.pdf](https://ec.europa.eu/environment/integration/research/newsalert/pdf/39na1_en.pdf)

<sup>120</sup> <https://assets.gov.ie/10207/c8f59b1734af460fa310ddbe20e01388.pdf>

<sup>121</sup> <https://energyinstitute.ucd.ie/wp-content/uploads/2020/06/UCD-Energy-Institute-The-need-for-a-Hydrogen-Strategy-for-Ireland.pdf>

## A review of population and human health effects assessment in SEA and development of a Practitioners Toolkit for Health in SEA

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 3		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 250,000	<b>Maximum Duration:</b>	36 months

### Background

SEA is defined in the SEA Protocol as the evaluation of the likely environmental impacts, including health effects<sup>122</sup>. The SEA Directive refers to human health as one of the environmental topics requiring consideration in SEA. The Directive also requires the relationship between environmental topics to be considered, e.g. human health and water quality, air quality etc.

Health was identified as an environmental topic which merited further consideration during the SEA process following the Strategic Environmental Assessment (SEA) Effectiveness Review published in 2020<sup>123</sup>. The importance of environmental considerations facilitated through the SEA process is also recognised and integrated within Ireland’s current National Development Framework: Project 2040<sup>124</sup>.

Recommendations from the 2020 review informed the National SEA Action Plan whereby a commitment was included to prepare Good Practice Guidance for addressing health in SEA. The timescale assigned to this deliver this guidance is 2023-2025<sup>125</sup>. It is envisaged that this proposed study would be a precursor to this Guidance.

### Scope

Innovative research proposals are invited to, but not limited to:

- Conduct a review of current practice with regard to the consideration of interrelationships between environmental topics in considering significant health effects of Plans and Programmes in SEA.
- Develop a bibliography of Good Practice Case Studies across a range of sectors, Member States and internationally.
- Develop a Manual and Toolkit to guide the consistent consideration of Population and Human Health in the SEA process.

<sup>122</sup> <https://europa.eu/capacity4dev/public-environment-climate/wiki/strategic-environmental-assessment#:~:text=A%20Strategic%20Environmental%20Assessment%20%28SEA%29%20is%20a%20systematic,of%20decision%20making%20alongside%20economic%20and%20social%20considerations.>

<sup>123</sup> [https://www.epa.ie/publications/research/environmental-technologies/Research\\_Report\\_306.pdf](https://www.epa.ie/publications/research/environmental-technologies/Research_Report_306.pdf)

<sup>124</sup> <https://www.gov.ie/pdf/?file=https://assets.gov.ie/166/310818095340-Project-Ireland-2040-NPF.pdf#page=1>

<sup>125</sup> <https://www.epa.ie/publications/monitoring--assessment/assessment/strategic-environmental-assessment/05565-EPA-Action-Plan-2021-2025.pdf>



## Gamma Radiation Dose Evaluation (Grade) - Outdoor and Indoor gamma dose evaluation for the Irish population

<b>Call Topic Reference:</b>	Delivering a Healthy Environment Call 2022 Topic 4		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 250,000	<b>Maximum Duration:</b>	36 months

### Background

Radioactive materials are all around us and can be naturally found in the earth. This type of radiation is called terrestrial radiation. The Ionising Radiation Regulation (IRR) 2019<sup>126</sup> for the protection of workers and members of the public from the harmful effects of ionising radiation were signed into law in 2019. The IRR states that the dose to members of the public be evaluated on a regular basis. Indoor exposure is as a result of radon exposure and gamma radiation that is mainly from natural radioactivity in building materials. The exposure arising from radon exposure has been thoroughly investigated and evaluated over the past number of years. However, the dose contribution from terrestrial gamma radiation both indoors and outdoors has not been evaluated since the early 1990's<sup>127</sup>. Indoor and outdoor gamma radiation can be determined using either passive or active measurement techniques.

Research is needed to inform a better understanding of the levels of gamma radiation in the environment and indoors (including geographical and temporal trends). This evidence will also fill knowledge gaps in building radiation monitoring, measurement and dose assessment capacity in relevant organisations.

### Scope

Innovative research proposals are invited to, but not limited to:

- Identify appropriate techniques needed to measure the gamma radiation outdoors and indoors.
- Comprehensively evaluate national gamma radiation.
- Conduct a dose assessment taking into consideration appropriate lifestyle habits of members of the Irish public.

<sup>126</sup> <https://www.irishstatutebook.ie/eli/2019/si/30/made/en/pdf>

<sup>127</sup> <https://www.epa.ie/publications/compliance--enforcement/radiation/radiation-doses-received-by-the-irish-population-2014.php>

## Assessment of emissions from a representative range of solid fuels on the residential market in Ireland

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 5		
<b>Project Type:</b>	Large Scale Project		
<b>Maximum Budget:</b>	€ 500,000	<b>Maximum Duration:</b>	48 months
<b>Co-funded by:</b>	Department of Food, Agriculture and the Marine		

### Background

Residential solid fuel heating is the largest single source of fine particulate matter (PM) emissions in Ireland<sup>128</sup>. The European Environment Agency (EEA) estimate that fine PM is responsible for 95% of all mortality attributable to air pollution in Ireland<sup>129</sup>. Ireland currently uses emissions factors from the European Monitoring and Evaluation Programme (EMEP)/European Environment Agency (EEA) Air Pollutant Emission Inventory Guidebook 2019<sup>130</sup> that may not be representative of the types of solid fuel and appliances used in Ireland. This research project seeks to address this lack of knowledge by developing emissions factors more representative of *'real world'* conditions in Ireland (e.g. fuel types and combustion devices).

Research is therefore needed to improve the robustness of current emission factor estimates for residential fuel burning to develop national specific emission factors to complement current guidance (as per the EMEP/EEA Guidebook). Nationally representative emission factors based on a range of fuel types representative of use in Ireland (including coals, turf, peat briquettes and wet/dry timber) and combustion installations (including open fires and stoves) are required.

In addition, research is needed to assess the level of persistent organic pollutants (POPs) including Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) in bottom ash and soot arising from the combustion of solid fuels to determine whether such PCDD/F concentrations are above certain 'Low POP Concentration Limits' (LPCL) as set out in Regulation (EU) 2019/1021. Assessment of laboratory generated fly-ash could be benchmarked against analysis of that generated in actual home fires, through the analysis of ash collected through chimney sweeps of house chimneys.

### Scope

Innovative research proposals are invited to, but not limited to:

- Calculate the amount of emissions to air (in g/Gj or comparable units) released by the burning of different types of solid fuels used for residential heating in Ireland.
- Determine the POPs content (including PCDD/PCDF) in bottom and fly ash and soot from burning fossil fuels used in residential heating.
- Design and apply methods to benchmark the results regarding fly ash against real world samples from households, for example, in collaboration with chimney sweep industry.

The research should address the full range of air pollutants list in the EMEP/EEA Guidebook, including total PM (hot filterable and condensable); and cover representative range of fuels used in Ireland (e.g. peat) and combustion devices (including open fires and stoves).

<sup>128</sup> [https://www.epa.ie/publications/research/air/Research\\_Report\\_318.pdf](https://www.epa.ie/publications/research/air/Research_Report_318.pdf)

<sup>129</sup> <https://www.eea.europa.eu/publications/air-quality-in-europe-2021/air-quality-status-briefing-2021>

<sup>130</sup> <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019>

An Interim Report on the concentration of PCDD/Fs content in ash and soot from residential heating is required by the end of 2024.

## Implications of deep energy-efficient retrofits on indoor radon concentrations

<b>Call Topic Reference:</b>	Delivering a Healthy Environment Call 2022 Topic 6		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€350,000	<b>Maximum Duration:</b>	36 months

### Background

Radon is a leading cause of lung cancer causing 350 cases per annum in Ireland with a survival rate of circa 15% after five years. Ireland has some of the highest indoor radon concentrations in the world. Increased radon concentrations could result from increased building airtightness. The EPA, in partnership with other government departments and agencies, is responsible for delivering on the government’s National Radon Control Strategy (NRCS)<sup>131</sup>.

The NRCS identified that the implications of deep energy-efficient retrofits on indoor radon concentrations in dwellings was a knowledge gap that warranted research and investigation. It is critical that the implementation of national Climate policy to implement deep retrofitting of dwellings does not increase the exposure of citizens to radon as this would increase risk of citizens developing lung cancer.

### Scope

Certain parts of the country have been identified as a more prone to radon than others. In these “High Radon Areas”, over 10% of dwellings are predicted to have elevated indoor radon concentrations. In this context, innovative research proposals are invited to, but not limited to:

- Collect and review the current international state of knowledge concerning radon concentrations in buildings, particularly those located in High Radon Areas, for pre- and post-energy-efficient retrofit scenarios, especially y deep retrofit, and analyze the national ventilation guidelines for the provision of ventilation following deep retrofit.
- Provide strategic information to inform national policy on protecting citizens from indoor radon in the implementation of deep retrofitting of dwellings especially dwellings in High Radon Areas.
- Taking into account the building’s location (if it is in a High Radon Area), develop a computational framework that incorporate the buildings’ location, air permeability and purpose-provided ventilation (PPV) scenarios. The framework should model key parameters such as pressure differential equations, simulating a dynamic radon entry rate, which captures the temporal and spatial variations in radon concentrations.

This research should build upon prior and ongoing relevant research, including research supported by SEAI, for example ALIVE, ARDEN, BENEFIT, HAVEN, VALIDate<sup>132</sup> addressing deep energy retrofit, ventilation types and indoor air quality in domestic and non-domestic buildings and incorporate assessment of radon levels before and after an intervention.

Outputs from this research will inform future development and revisions to guidance being developed to implement the retrofit targets in the Climate Action Plan 2021<sup>133</sup>. Research outputs will also inform the development of further research needs under Phase 3 of the NRCS, expected to be implemented from 2024.

<sup>131</sup> <https://www.epa.ie/our-services/monitoring--assessment/radiation/national-radon-control-strategy/>

<sup>132</sup> <https://www.seai.ie/data-and-insights/seai-research/research-database/>

<sup>133</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

## Persistent, mobile & toxic (PMTs) and very persistent & very mobile (vPvM) chemicals in the aquatic environment

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 7		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 450,000	<b>Maximum Duration:</b>	48 months

### Background

The levels of chemicals (both legacy and emerging) in the environment and how some of these chemicals are impacting on environmental quality and on human health is currently not fully understood. The EU Chemicals Strategy for Sustainability<sup>134</sup> sets out a roadmap for delivery of a non-toxic future with 'safe-by-design' chemicals contributing to a healthy and sustainable economy and society. It emphasises the importance of strengthening the chemicals science-policy interface including increased measurement of chemicals in the environment. Further research and assessment tools are urgently required to develop a clearer understanding of the effects of chemicals.

The EPA Water Framework Directive monitoring programmes<sup>135</sup> focus on compliance with Environmental Quality Standards for a specific list of Priority and Priority Hazardous Substances. This list of substances does not capture all the chemicals present in the environment which may have significant environmental and health issues.

Persistent mobile and toxic (PMT), as well as very persistent and very mobile (vPvM) chemicals (including but not limited to short-chain per- and polyfluoroalkyl substances (PFAS), such as Trifluoroacetic acid and Perfluorobutanesulfonic acid, 1,4-Dioxane and Melamine) represent a group of contaminants of emerging concern (CEC) that due to their persistency together with their hydrophilic nature represent a potentially significant threat to the aquatic environment and drinking water resources. These chemicals are not removed through sorption by natural barriers or during conventional water treatment processes and have therefore the potential to accumulate in water sources. Recent advances in the development of analytical methods for the determination of these highly polar (mobile) chemicals have led to increased detections and raised awareness of the presence of these PMT/vPvM chemicals in source and drinking water in Europe.

Research is needed to investigate the possible emission sources and assess presence of PMT/vPvM chemicals in Irish waters. This will inform the identification of substances of particular concern for Ireland so that they can be considered for restriction measures and substitution before they become a legacy issue.

### Scope

Innovative research proposals are invited to, but not limited to:

- Develop suitable analytical methods for determination of PMT/vPvM chemicals in Irish waters.
- Assess the presence and quantify PMT/vPvM chemicals in Irish waters, including surface water, groundwater, drinking water sources as well as treated drinking water.
- Examine the potential pathways of such PMT/vPvM chemicals in the Irish environment.
- Undertake an emissions review of PMT/vPvM chemicals with details on industries and sectors that use or produce these chemicals.

<sup>134</sup> [https://ec.europa.eu/environment/strategy/chemicals-strategy\\_en](https://ec.europa.eu/environment/strategy/chemicals-strategy_en)

<sup>135</sup> <http://www.epa.ie/water/watmg/wfd/>

- Provide recommendations to inform robust monitoring programmes to identify chemicals of interest, as well as areas of concern where monitoring efforts might need to be concentrated.

## Feasibility study for a national human biomonitoring programme for Ireland

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 8		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

A clean, vibrant and safe environment is a prerequisite for good health and wellbeing. Chemicals are an integral part of modern society and if developed and managed effectively can support a transition to a sustainable and circular society. At present there are significant environmental and health issues associated with both legacy and existing chemicals. Human Biomonitoring (HBM) will play a role in the future warning and/or action systems for chemicals, by, identifying human exposure to new and emerging chemicals of concern, informing temporal changes (e.g., legacy chemicals), gender-related risks and risks to vulnerable groups (e.g. children), in turn providing essential information to develop and strengthen regulation and policy in this area.

The European Green Deal<sup>136</sup> and the EU Chemicals Strategy for Sustainability<sup>137</sup>, aims for a ‘zero pollution ambition for a toxic-free environment’. Novel tools that provide a systematic assessment of the chemical exposure levels occurring from all routes of exposure (e.g., dietary, water intake, air) are needed. The European Human Biomonitoring Initiative (HBM4EU<sup>138</sup>), is coordinating and advancing human biomonitoring in Europe, to provide better evidence of the actual exposure of citizens to chemicals. It also provides information on the impact of chemical exposure on human health, using the most up to date scientific tools.

Research is needed to identify the requirements, prioritisation and feasibility of initiating a national human biomonitoring programme in Ireland to evaluate the links between chemicals in the environment and human health and wellbeing.

### Scope

Innovative research proposals are invited to, but not limited to:

- Undertake a comprehensive literature review of human biomonitoring datasets available in Ireland/Europe.
- Perform a systematic strengths, weaknesses, opportunities and threats (SWOT) analysis for initiating a national human biomonitoring programme, in Ireland.
- Develop a chemical prioritisation dataset that will also identify the most significant gaps in terms of chemicals that pose a risk to the environment and human health within an Irish context.
- Provide recommendations for the long-term goals of developing a national human biomonitoring programme in Ireland.

This project should consider available information from the European Chemicals Agency, European Information Platform for Chemical Monitoring<sup>139</sup> and the EEA European Environmental Health Atlas which is currently under development. The research should also investigate relevant

<sup>136</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

<sup>137</sup> [https://ec.europa.eu/environment/strategy/chemicals-strategy\\_en](https://ec.europa.eu/environment/strategy/chemicals-strategy_en)

<sup>138</sup> <https://www.hbm4eu.eu/>

<sup>139</sup> <https://ipchem.jrc.ec.europa.eu/>

synergies/learnings from the ongoing EU research project HBM4EU<sup>140</sup>, as well as the developing Horizon Europe Partnership for the Assessment of Risk from Chemicals (PARC) project<sup>141</sup>.

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<sup>140</sup> [About HBM4EU – HBM4EU – science and policy for a healthy future](#)

<sup>141</sup> [ec\\_rtd\\_he-partnerships-chemical-risk-assessment.pdf \(europa.eu\)](#)



## Chemicals in the environment – PFAS, a review and analysis of its uses, sources, exposure pathways, risks and challenges for industry, society and environmental protection in Ireland

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 9		
<b>Project Type:</b>	Large Scale Project		
<b>Maximum Budget:</b>	€ 500,000	<b>Maximum Duration:</b>	48 months

### Background

The EU Chemicals Strategy for Sustainability<sup>142</sup> sets out a roadmap for delivery of a non-toxic future with ‘safe-by-design’ chemicals contributing to a healthy and sustainable economy and society. There are still significant data gaps in relation to the effects of chemicals and chemical mixtures on both ecosystems and on human health. The EPA’s role is the primary competent authority under the EU Persistent Organic Pollutants (POPs) Regulations<sup>143</sup>. This regulation addresses areas such as the environmental monitoring for POPs (currently these include perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA)) and reporting to the European Commission on POPs, such as the identification and management of POPs contaminated sites and the provision of information and support on POPs related issues to relevant stakeholders.

PFAS (per- and polyfluoroalkyl substances) have been detected in the Irish environment through monitoring and investigative programmes carried out by the EPA and other organisations.

PFAS are a very large group of man-made chemicals that have multiple fluorine atoms attached to a carbon chain. Approximately 4,700 PFAS have been identified to date. They have been used in industrial and consumer products since the 1950’s due to their physical and chemical properties. They can be found in many everyday products – outdoor clothing and equipment, textiles, paints, food packaging, photographic coatings, non-stick coatings on cookware, as well as fire-fighting foam. PFAS can have harmful effects on human and animal health and stay in the environment and in our bodies for long periods of time where they can increase in concentration. They are often referred to as “forever chemicals”. Some PFAS have been linked to an increased risk of cancer, high cholesterol, reproductive disorders, hormonal disruption (also known as endocrine disruption) and weakening of the immune system. Human and environmental exposure to PFAS can arise from contaminated water and food, PFAS-containing consumer products, household dust and air, as well as the reuse of PFAS contaminated sewage sludge as fertiliser resulting in PFAS pollution in soil and crops.

Research is needed to review and analyse the PFAS uses, sources, exposure pathways, risks and challenges for industry, society and environmental protection in Ireland.

### Scope

Innovative research proposals are invited to, but not limited to:

- Identify sources of PFAS, as per recent Organisation for Economic Co-operation and Development (OECD) definition<sup>144</sup>, and rank them based on their uses, their management in waste in Ireland and associated risk to the environment.
- Examine the potential pathways of PFAS in the Irish environment.
- Identify uses and users of these substances associated with a potentially high risk of environmental contamination in Ireland.

<sup>142</sup> [https://ec.europa.eu/environment/strategy/chemicals-strategy\\_en](https://ec.europa.eu/environment/strategy/chemicals-strategy_en)

<sup>143</sup> [Regulation \(EU\) 2019/1021 and Irish law by S.I. No. 146 of 2020](#)

<sup>144</sup> [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/CBC/MONO\(2021\)25&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/CBC/MONO(2021)25&docLanguage=En)

- Undertake a determination of the current extent of PFAS in products associated with high-risk of environmental contamination e.g., relevant recyclable materials, waste, compost, sewage sludge and industrial sludges.
- Provide recommendations to inform the development of a national strategy on PFAS, in Ireland.

The research, where appropriate, should be a combination of the determination of these substances in relevant materials and environments. The research must build on past and current research in this area and utilise existing data and align with findings from completed and on-going research, such as, but not limited to, the ELEVATE<sup>145</sup> and FUEL<sup>146</sup> projects.

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<sup>145</sup> <https://www.epa.ie/publications/research/environment--health/research-343-elucidating-levels-and-pathways-of-human-exposure-in-ireland-to-brominated-flame-retardants-and-perfluoroalkyl-substances.php>

<sup>146</sup> <https://www.epa.ie/publications/research/environment--health/research-345-furthering-understanding-of-emissions-from-landfilled-waste-containing-pobfrs-and-pfass-fuel.php>

## Investigation of intervention levels and feasible options for remediation of environmental PFAS contamination

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 10		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months

### Background

The EU Chemicals Strategy for Sustainability<sup>147</sup> sets out a roadmap for delivery of a non-toxic future with ‘safe-by-design’ chemicals contributing to a healthy and sustainable economy and society. There are still significant data gaps in relation to the effects of chemicals and chemical mixtures on both ecosystems and on human health. The EPA’s role is the primary competent authority under the EU Persistent Organic Pollutants (POPs) Regulations<sup>148</sup>. This regulation addresses areas such as the environmental monitoring for POPs (currently these include perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA)) and reporting to the European Commission on POPs, such as the identification and management of POPs contaminated sites and the provision of information and support on POPs related issues to relevant stakeholders.

PFAS (per- and polyfluoroalkyl substances) have been detected in the Irish environment through monitoring and investigative programmes carried out by the EPA and other organisations.

PFAS are a very large group of man-made chemicals that have multiple fluorine atoms attached to a carbon chain. Approximately 4,700 PFAS have been identified to date. They have been used in industrial and consumer products since the 1950’s due to their physical and chemical properties. They can be found in many everyday products – outdoor clothing and equipment, textiles, paints, food packaging, photographic coatings, non-stick coatings on cookware, as well as fire-fighting foam. PFAS can have harmful effects on human and animal health and stay in the environment and in our bodies for long periods of time where they can increase in concentration. They are often referred to as “forever chemicals”. Some PFAS have been linked to an increased risk of cancer, high cholesterol, reproductive disorders, hormonal disruption (also known as endocrine disruption) and weakening of the immune system. Human and environmental exposure to PFAS can arise from contaminated water and food, PFAS-containing consumer products, household dust and air, as well as the reuse of PFAS contaminated sewage sludge as fertiliser resulting in PFAS pollution in soil and crops.

The risks and remediation of sites with PFAS contamination have not been extensively studied to-date in Ireland. Research is required to provide an overview of feasible environmental remediation and clean-up options/interventions/remediation, which could be applied by the relevant authorities within an Irish context.

### Scope

Innovative research proposals are invited to, but not limited to:

- Review international practices and guidance on intervention levels and clean-up for PFAS from contaminated sites, including land, water and air aspects.
- Examine the applicability of remediation and treatment options for PFAS-contaminated sites including land, water and air aspects in Ireland.

<sup>147</sup> [https://ec.europa.eu/environment/strategy/chemicals-strategy\\_en](https://ec.europa.eu/environment/strategy/chemicals-strategy_en)

<sup>148</sup> [Regulation \(EU\) 2019/1021 and Irish law by S.I. No. 146 of 2020](#)

- Provide recommendations to inform the development of monitoring programmes, assessment studies and clean-up/ remediation options for PFAS-contaminated sites, including land, water and air aspects.

The research must build on past and current research in this area and utilise existing data and align with findings from completed and on-going research, such as, but not limited to, the ELEVATE<sup>149</sup> and FUEL<sup>150</sup> projects.

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<sup>149</sup> <https://www.epa.ie/publications/research/environment--health/research-343-elucidating-levels-and-pathways-of-human-exposure-in-ireland-to-brominated-flame-retardants-and-perfluoroalkyl-substances.php>

<sup>150</sup> <https://www.epa.ie/publications/research/environment--health/research-345-furthering-understanding-of-emissions-from-landfilled-waste-containing-pobfrs-and-pfass-fuel.php>

## Open topic: Research on the environmental dimension of AMR

<b>Call Topic Reference:</b>	Delivering a Healthy Environment 2022 Call Topic 11		
<b>Project Type:</b>	Open Topic		
<b>Maximum Budget:</b>	€ 500,000	<b>Maximum Duration:</b>	48 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine			

### Background

Global attention to antimicrobial resistance (AMR) has been dominated by a focus on the health and agriculture sectors. However, the environment is also key to the development, transmission and spread of AMR to humans, animals and plants (UNEP, 2021<sup>151</sup>). The environmental dimensions of AMR are characterised by cyclic interrelationships, their complexities, and multiple causalities and dynamics.

Development of appropriate policies, risk management strategies and mitigation measures rely on the generation of appropriate evidence. In 2021, the EPA published the 'Gap analysis of research needs to understand the environmental dimension of antimicrobial resistance in preparation for Ireland's second One Health Action Plan on Antimicrobial Resistance (AMR) 2021-2025 (iNAP2)<sup>152</sup>'. The analysis identifies a number of national research priorities (graded high, medium and low). iNAP2 was launched in November 2021 and will run for a period of five years.

### Scope

Innovative research proposals are invited to address key knowledge gap(s) identified in the gap analysis, with an emphasis on addressing those listed as high priority.

All research proposals must build on findings and recommendations from past and ongoing research projects<sup>153</sup> (where relevant) and should consider linkages and synergies with projects to be funded under this current call - clearly demonstrating that there will be no duplication.

These proposals can be for Desk-Studies, Medium-Scale or Large-Scale. Applicants must clearly demonstrate the value for money of their proposal and that the amount requested for the project budget as well as the scale of project selected will allow the proposed research to be addressed appropriately.

It is expected that one or more projects will be funded in 2022 under this Open topic and a reserve list may be established.

<sup>151</sup> [https://wedocs.unep.org/bitstream/handle/20.500.11822/38373/antimicrobial\\_R.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/38373/antimicrobial_R.pdf)

<sup>152</sup> [EPA 2021 AMR Gap analysis](#)

<sup>153</sup> Such as, but not limited to, the AREST @ <https://www.nuigalway.ie/medicine-nursing-and-health-sciences/medicine/disciplines/bacteriology/research/arest/> and PIER @ <https://www.nuigalway.ie/pier/> projects.

# Protecting and Restoring our Natural Environment

## Integration of DNA-based assessment tools into water quality and biodiversity monitoring

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 1		
<b>Project Type:</b>	Large Scale Project		
<b>Maximum Budget:</b>	€ 500,000	<b>Maximum Duration:</b>	48 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine			

### Background

Clean, healthy water is essential for our aquatic wildlife, our economy, and for our health and wellbeing. However, the quality of Ireland's water is under mounting pressures with the situation described as 'urgent' in the draft Third-Cycle River Basin Management Plan (RBMP)<sup>154</sup>. The EPA State of the Environment Report 2020<sup>155</sup> highlighted that the overall assessment for Ireland's water quality was 'poor'. 47.2% of surface waters are failing to meet their environmental objectives under both national water policy regulations<sup>156</sup> and the EU Water Framework Directive (WFD)<sup>157</sup> obligations of good ecological health. This was also highlighted in the EPA Water Quality Report 2020<sup>158</sup>. Whilst there have been some improvements in biological quality over the recent years, the rate of decline remains too high and is offsetting any improvements made.

Under the WFD, the EPA is tasked with providing biological status for river water quality. At present the methods involve time- and resource-intensive morphological-based assessments. The use of DNA-based methods could supplement traditional methods, potentially reducing sampling effort and costs, and/or allowing the expansion of the monitoring programme. Such assessment could also particularly useful when disentangling the effects of multiple stressors in freshwaters to inform mitigation measures. DNA-based methods are now being considered in many countries across Europe.

Research is needed to assess the use of DNA-based methods / tools to supplement and support their integration into water quality monitoring in Ireland. Addressing the significant knowledge gaps of 'what species occur where' would also support efforts to meet regulatory targets and address biodiversity decline and protection of key waterbodies.

### Scope

Innovative research proposals are invited to, but not limited to:

- Assess the use and applicability of new technologies such as DNA-based methods / tools that can be used to supplement traditional monitoring methods.
- Produce new guidance and procedures on sampling and analysis for DNA-based assessments and interpretation of associated results.
- Provide recommendations on how best to integrate these assessments into water quality monitoring in Ireland.

<sup>154</sup> <https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/>

<sup>155</sup> <https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/state-of-environment-report/>

<sup>156</sup> <https://www.irishstatutebook.ie/eli/2003/si/722/made/en/print>

<sup>157</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32000L0060&from=EN>

<sup>158</sup> [https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/EPA\\_Water\\_Quality\\_2020\\_indicators-report.pdf](https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/EPA_Water_Quality_2020_indicators-report.pdf)

- Examine how such techniques can also assist in biodiversity assessments and address other challenges such as barriers, river connectivity, pollutants and climate change.

The research must build on past and current research in this area and utilise existing data from databases and repository of DNA sequences for freshwater species, such as <https://freshbase.myspecies.info> , which currently has Irish species/communities as a subset of United Kingdom species/communities dataset.

## Establishing a representative long-term climate change observational network for rivers, lakes and groundwater in Ireland

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 2		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 150,000	<b>Maximum Duration:</b>	24 months

### Background

As the effects of climate change are felt in every part of society, it is now more than ever important to ensure Ireland's national Water Framework Directive (WFD)<sup>159</sup> monitoring programme is 'fit for purpose' by including consideration of how the programme can assess and evaluate the impacts of climate change on Ireland's aquatic environment. Hydrometric and groundwater level data provides an evidence base to determine the impact of climate change on water resources. Previously, many years of hydrological records were needed for this assessment and sites with shorter records were excluded.

Research is needed to identify and prioritise nationally representative sites to provide the data to assess the primary impacts of climate change on the hydrological regime of our catchment systems as well as our water resources. Identification of monitoring sites located in climate vulnerable sites and sites where secondary impacts on hydrology and hydrogeology from societal reaction/adaptation to climate impacts, are also required. Emphasis will also be identifying sites suitable for examining changes in climate driven extremes including flood and drought events. Hindcasting may be appropriate to validate proposed approaches in catchments where hydrological and hydrogeological variables were recorded or can be reliably constructed.

### Scope

Innovative research proposals are invited to, but not limited to:

- Produce a detailed literature review of relevant approaches for the attribution of long-term trends and extreme events in surface and groundwater quantity to climate change.
- Develop criteria and identify existing sites or propose new sites where required in the national hydrometric and groundwater monitoring programme that are (or could be) used to gauge the impacts of climate change in rivers, lakes and groundwater throughout Ireland. Such criteria should give due attention to the spatiotemporal coverage of the network as well as the diversity of catchment types represented.
- Provide recommendations on how the national WFD monitoring programme can assess and evaluate the impacts of climate change in an integrated way and how WFD monitoring can support climate adaptation planning and water resource management in Ireland.

This research must build on findings from existing research projects, included but not limited to EPA-funded research projects, such as Hydropredict<sup>160</sup>, HydroDetect<sup>161</sup> projects etc. The project should build on existing work and data<sup>162</sup> currently available, for example, Geological Survey Ireland projects

<sup>159</sup> [https://ec.europa.eu/environment/water/water-framework/index\\_en.html](https://ec.europa.eu/environment/water/water-framework/index_en.html)

<sup>160</sup> <https://www.maynoothuniversity.ie/icarus/active-research-grants/hydropredict-ensemble-riverflow-scenarios-climate-change-adaptation>

<sup>161</sup> [https://www.epa.ie/publications/research/climate-change/CCRP\\_27\\_HydroDetect.pdf](https://www.epa.ie/publications/research/climate-change/CCRP_27_HydroDetect.pdf)

<sup>162</sup> <https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx>



called GoundwaterFlood<sup>163</sup> and GroundwaterClimate<sup>164</sup>. It should also build on the work of the Office of Public Works (OPW) including from studies such as the Flood Studies Update<sup>165</sup> as well as the National Catchment-based Flood Risk Assessment and Management (CFRAM) Programme<sup>166</sup>.

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<sup>163</sup> <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/groundwater-flooding/gwflood-project-2016-2019/Pages/default.aspx>

<sup>164</sup> <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/projects/gwclimate/Pages/default.aspx>

<sup>165</sup> <https://opw.hydronet.com/>

<sup>166</sup> <https://www.floodinfo.ie/>

## Lake water level fluctuations, ecology and hydrology interactions

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 3		
<b>Project Type:</b>	Research Fellowship		
<b>Maximum Budget:</b>	€ 300,000	<b>Maximum Duration:</b>	36 months

### Background

The quality of Ireland's water is under significant pressure, with 44% of Irish lakes in an unsatisfactory biological quality status, as highlighted in the EPA Water Quality Report 2020<sup>167</sup>. These waterbodies are failing to meet good ecological status and hydromorphology is identified by the EPA as the second biggest pressure on freshwaters<sup>168</sup>. In Ireland, there is a lack of a regulatory regime for hydromorphology with the proposed Abstraction Bill<sup>169</sup> still pending. Nonetheless, measures are needed to improve the resilience of, protect and restore our lake water quality.

Research is needed to improve our understanding of the impact of hydrological-related anthropogenic activities (e.g., abstraction) on lake hydromorphology and ecology. This research will contribute towards addressing a gap in the Water Framework Directive (WFD)<sup>170</sup> implementation by supporting the selection of appropriate ecological supporting standards and conditions for lakes, in turn informing appropriate measures needed to improve and protect impacted lakes.

### Scope

Innovative research proposals are invited to, but not limited to:

- Undertake a literature review and identify the hydrological factors/limits and ranges relevant to supporting lake ecology in Ireland.
- Identify the components of lake ecology (e.g., indicator species, sensitive species or habitats) most impacted by modifications to lake levels and changes in the flow regime to and from lakes.
- Provide recommendations to inform the development of regulatory standards/conditions.

This research will be required to align with tools and models being developed and used in EPA and in collaboration with national partners on the National Hydromorphology Working Group (a subgroup of the WFD National Technical Implementation Group<sup>171</sup>).

<sup>167</sup> <https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/water-quality-in-2020.php>

<sup>168</sup> [https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/EPA\\_WFD\\_MonitoringProgramme\\_2019\\_2021-\(1\).pdf](https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/EPA_WFD_MonitoringProgramme_2019_2021-(1).pdf)

<sup>169</sup> <https://www.oireachtas.ie/en/press-centre/press-releases/20210129-joint-committee-on-housing-local-government-and-heritage-launches-report-on-pre-legislative-scrutiny-of-the-general-scheme-of-the-water-environment-abstractions-bill/>

<sup>170</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32000L0060&from=EN>

<sup>171</sup> <https://www.gov.ie/en/publication/f7c76-water-framework-directive/#the-national-technical-implementation-group-ntig>

## Development of hydromorphological metrics and standards that can be used in the assessment and regulation of activities on our rivers, lakes, transitional and coastal waters

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 4		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 200,000	<b>Maximum Duration:</b>	36 months

### Background

The EPA State of the Environment Report 2020<sup>172</sup> highlighted that the overall assessment for Ireland's water quality was 'poor'. Hydromorphology has been identified by the EPA as the second biggest pressure on freshwaters in Ireland<sup>173</sup>. The draft River Basin Management Plan (RBMP) 2022-27<sup>174</sup> noted that policy and associated planning guidance are being developed in relation to the regulation of activities that may have a hydromorphological impact on the function and health of our surface waters.

Research is needed to develop methods, metrics and standards that will provide the scientific basis to support the implementation of such regulatory regimes.

### Scope

Innovative research proposals are invited to, but not limited to:

- Develop methods and tools to assess how changes in the hydrological regime (e.g. caused by an impoundment) or morphological changes (e.g., from river drainage) impact on surface water ecology.
- Develop assessment approaches and metrics (hydrological, morphological and ecological) that allow for further assessment of hydromorphological pressures.
- Provide recommendations to inform the development of regulatory standards that establish resilient mitigation measures against these hydromorphological pressures.

This research will be required to build on tools and models developed by the EPA, such as the morphological index (MQI)<sup>175</sup>.

<sup>172</sup> <https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/state-of-environment-report/>

<sup>173</sup> [https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/EPA\\_WFD\\_MonitoringProgramme\\_2019\\_2021-\(1\).pdf](https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/EPA_WFD_MonitoringProgramme_2019_2021-(1).pdf)

<sup>174</sup> <https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/>

<sup>175</sup> <https://www.catchments.ie/significant-pressures-hydromorphology/>

## Assessing flow-ecology interactions in ecological communities in upland high-status sites

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 5		
<b>Project Type:</b>	Research Fellowship		
<b>Maximum Budget:</b>	€ 300,000	<b>Maximum Duration:</b>	36 months

### Background

The quality of Ireland's water is under significant pressure with the situation described as 'urgent' in the draft Third-Cycle River Basin Management Plan (RBMP)<sup>176</sup>. The EPA State of the Environment Report 2020<sup>177</sup> states that "Rescue plans are now needed for our remaining high-status water bodies to halt their decline", reporting a dramatic decline of high-status waterbodies from 573 sites in 1980's to 20 in most recent times. These high-status freshwater habitats hold some of the most diverse ecological communities and are therefore some of the most vulnerable habitats. These water bodies are failing to meet good ecological status with "hydromorphology" being identified by the EPA as the second biggest pressure on freshwaters in Ireland. Hydromorphology is a "supporting element" which means that it only has an influence on ecological status at high-status sites. These sites are typically more natural in character and are less impacted by human interference, therefore providing optimal conditions for investigating flow.

Research is needed to advance our understanding of the complexities of river processes in particular flow and ecology interactions of upland high-status flashy streams. Such research will inform the development of a robust programme of measures (POMs) that will protect vulnerable habitats in upland flashy streams and prevent further decline of high-status sites.

### Scope

Innovative research proposals are invited to, but not limited to:

- Examine the complex relationship between flow and ecology with particular reference to high-status upland streams.
- Undertake a scoping exercise to identify new sites that would fit the criteria of high status and where flow measurements would be possible.
- Carry out sampling of the most appropriate Biological Quality Elements (BQEs) from groups such as fish, macroinvertebrates, macrophytes, diatoms etc; at key sites fitting the criteria.
- Provide recommendations to inform the development of a POMs for such sites.

The research should build on past and current research in this area and utilise existing data and current flow models from the EPA Water Programme and other relevant monitoring agencies. Any successful project will be required to liaise directly with the recently commenced national projects such as the Life-IP Water of Life project<sup>178</sup> and the Blue Dot programme<sup>179</sup> that aim to support the implementation of measures to protect high-status waters, and any other relevant programme.

<sup>176</sup> <https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/>

<sup>177</sup> <https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/state-of-environment-report/>

<sup>178</sup> [https://webgate.ec.europa.eu/life/publicWebsite/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=7403](https://webgate.ec.europa.eu/life/publicWebsite/index.cfm?fuseaction=search.dspPage&n_proj_id=7403)

<sup>179</sup> <https://www.catchments.ie/blue-dot-catchments-working-to-let-life-thrive-in-some-of-our-wildest-waters/>

## Open topic: use of data - Copernicus for environmental monitoring and assessment

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 6		
<b>Project Type:</b>	Open Topic		
<b>Maximum Budget:</b>	€ 350,000	<b>Maximum Duration:</b>	36 months

### Background

Development of appropriate policies, risk management strategies and mitigation measures rely on the generation of appropriate evidence. Copernicus<sup>180</sup> is a European Union earth observation programme for monitoring the earth and its environment. It combines satellite observation data with data from sensor networks across the globe to build a comprehensive picture of our planet and its environment.

Copernicus delivers vast amounts of global real-time data which can be used at different scales (local, regional, national, international) to assist us in understanding environmental processes and in turn inform us on how to sustainably manage and protect our ecosystems.

### Scope

Innovative research proposals are invited to explore how Copernicus data could be used to support environmental monitoring and assessment in Ireland.

All proposals submitted under this topic must build on findings and recommendations from past and ongoing research<sup>181</sup> projects (where relevant). Other public sector agencies are also using Copernicus data to monitor and assess the environment; therefore, proposals must ensure alignment with existing ongoing work and/or other relevant projects.

Proposals can be for Desk-Studies or Medium-Scale projects. Applicants must clearly demonstrate the value for money of their proposal and that the amount requested for the project budget, as well as the scale of the project selected, will allow the proposed research to be addressed appropriately.

The project should use existing infrastructure and/or provide it as a service. It is expected that one or more projects will be funded in 2022 under this Open topic and a reserve list may be established.

<sup>180</sup> <https://www.copernicus.eu/en>

<sup>181</sup> Such as, but not limited to, the SoMoSAT <https://somosat.com/>, INFER <https://infer.ichec.ie/>, RePEAT Project @ [https://twitter.com/RePEAT\\_IRE](https://twitter.com/RePEAT_IRE) and Terrain-AI @ <https://terrainai.com/> projects.

## Characterising the relationship between soil geochemistry and biodiversity in Ireland

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 7		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€250,000	<b>Maximum Duration:</b>	36 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine (DAFM) and Geological Survey Ireland (GSI)			

### Background

Ireland faces persistent problems in relation to biodiversity loss and human-induced degradation of natural ecosystems, with land use demands and practices being at the heart of these national challenges. The EPA State of the Environment Report 2020<sup>182</sup> states that Ireland needs to intensify its efforts to protect nature. Biodiversity is a good indicator of the health of the environment, both locally and more widespread. Healthy soils are essential in achieving climate neutrality, reversing biodiversity loss, providing healthy food and safeguarding human health.

The European Green Deal<sup>183</sup> states that all EU policies should contribute to preserving and restoring Europe's biodiversity. As part of the European Green Deal, the EU Soil Strategy for 2030<sup>184</sup>, adopted in November 2021, sets a vision and objectives to achieve healthy soils by 2050, with concrete actions by 2030. The EU Commission is currently preparing a Soil Health Law due to be in place in 2023 to ensure a high level of environmental and health protection. At national level, there is also a commitment in the Programme for Government 2020 to develop a National Soils Strategy leading to a comprehensive legislative framework for soil in Ireland.

Research is needed to advance our knowledge and understanding of the geochemical characteristics of soils in areas of high and low biodiversity. Geochemical characteristics, including metals, nutrients and trace/major elements are important to understand in relation to natural abundances/deficiencies and anthropogenic contamination. These can impact on the health of the soil by affecting biodiversity, as well as agricultural productivity and the suitability of land for amenity uses in urban and rural areas.

### Scope

Innovative research proposals are invited to, but not limited to:

- Assess if there are there any geochemical indicators in Irish soils that characterise areas of high and low biodiversity.
- Identify key soil indicators that can inform measures to mitigate against biodiversity loss and support healthy soils.
- Examine what techniques could be used to monitor these indicators.
- Identify priority management options to assist in planning targeted mitigation measures to deal with biodiversity loss due to environmental degradation, climate change and land use practices.

<sup>182</sup> <https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/state-of-environment-report/>

<sup>183</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

<sup>184</sup> [https://ec.europa.eu/environment/strategy/soil-strategy\\_en#:~:text=Soil%20strategy%20for%202030&text=It%20sets%20a%20vision%20and,of%20environmental%20and%20health%20protection](https://ec.europa.eu/environment/strategy/soil-strategy_en#:~:text=Soil%20strategy%20for%202030&text=It%20sets%20a%20vision%20and,of%20environmental%20and%20health%20protection)

The research must use the regional baseline geochemistry data from the Tellus Project available from <https://www.gsi.ie/en-ie/programmes-and-projects/tellus/activities/ground-survey/Pages/default.aspx>

It is expected that the research will deliver useable outputs in the form of mapped data showing potential correlations between soil geochemistry and areas of high and low biodiversity.

## Integrated modelling and scenario development for future sustainable land use needs

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 8		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 350,000	<b>Maximum Duration:</b>	36 months
<b>Co-funded by:</b>	Department of Agriculture, Food and the Marine		

### Background

The Programme for Government 2020<sup>185</sup> committed to creating a national land use plan for Ireland. Aligned to this commitment is the production of the Climate Action Plan 2021<sup>186</sup> that provides a detailed plan to take action in achieving a 51% reduction in greenhouse gas (GHG) emissions by 2030 and setting Ireland on a path to reach net-zero emissions by 2050. To support this ambition, the EPA is currently leading Phase 1 of the Land Use Evidential Review<sup>187</sup> that will establish an evidence base for land use. This work will catalogue existing suitability criteria used in land use planning or decisions and develop a set of indicators that will assist in assessing and measuring land use impacts on the environment and society.

Very early signposts coming out of the review highlights the need for timely future national scenario modelling to inform land use management and policy in the context of climate change. Research is needed to develop landscape- and national-scale scenarios relating to the timing, scale and type of land use management needed to result in impactful climate change adaptation and mitigation.

### Scope

Innovative research proposals are invited to, but not limited to:

- Provide an Ireland-specific open-source integrated modelling framework for land use scenario development with IPCC Representative Concentration Pathways ([https://ar5-syr.ipcc.ch/topic\\_futurechanges.php](https://ar5-syr.ipcc.ch/topic_futurechanges.php).)
- Assess the use and applicability of the modelling framework across various land use sectors.
- Incorporate existing or produce new national scale input datasets required for the integrated modelling framework, such as future temperature and rainfall projections, GHG emissions, biodiversity, tree growth rates, woodland amenity use, etc.
- Provide recommendations on how best to integrate these assessments in national land use policy.

The project must build on and align with pre-existing national data sets used for reporting and findings from completed and on-going research, such as, but not limited to, the recently published EPA Research report 371 (Climate Change and Land Use in Ireland)<sup>188</sup> and the EPA-funded SEQUESTER project<sup>189</sup>. The modelling framework must align with IPCC good practice reporting guidance<sup>190</sup>.

<sup>185</sup> <https://www.gov.ie/en/publication/7e05d-programme-for-government-our-shared-future/#>

<sup>186</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

<sup>187</sup> <https://www.epa.ie/our-services/monitoring--assessment/assessment/land/>

<sup>188</sup> [https://www.epa.ie/publications/research/climate-change/Research\\_Report\\_371.pdf](https://www.epa.ie/publications/research/climate-change/Research_Report_371.pdf)

<sup>189</sup> <https://www.plantagbiosciences.org/project/sequester/homepage/>

<sup>190</sup> <https://www.ipcc-nggip.iges.or.jp/public/gp/english/>



## Ammonia impact reduction on Natura 2000 sites

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 9		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 350,000	<b>Maximum Duration:</b>	36 months

### Background

The latest EPA report on Ireland's Air Pollutant Emissions 1990-2030<sup>191</sup> published in 2021 shows that, despite decreasing in 2019, ammonia emissions are still non-compliant with the EU National Emissions Ceiling Directive<sup>192</sup> and have now been non-compliant for seven out of the last nine years. Agriculture dominates emissions of ammonia (99%), which arise from animal manures and nitrogen fertiliser. The EPA regulates the intensive agriculture (pig and poultry) sector, which combined accounts for approximately 10% of these emissions. The Natura 2000 Network consists of Special Protection Areas (SPAs) protected under the Birds Directive and Special Areas of Conservation (SACs) protected under the Habitats Directive<sup>193</sup>. Ireland needs to comply with both the Habitats Directive and the National Emissions Ceilings Directive. Part of the EPA's National Ecosystem Monitoring Network (NEMN)<sup>194</sup> objective is to monitor air pollution impacts of ammonia across sensitive habitats.

Research is needed to support this work, in particular, in identifying contributing sources of ammonia to Natura 2000 sites<sup>195</sup> in Ireland. Broader research is required to identify what policies to target to reduce national emissions. It should also inform source apportionment and modelling of emissions within a national context, ultimately ensuring Ireland's compliance with EU directives and improving the quality of Irish ecosystems.

### Scope

Innovative research proposals are invited to, but not limited to:

- Assess previously unassessed sources of ammonia, local level modelling to identify the proportion of emission decreases required to meet conservation objectives of Ireland's Natura 2000 sites.
- Provide recommendations and solutions to achieve such emission reductions.
- Provide recommendations for monitoring atmospheric ammonia and impacts on Natura 2000 sites.

The research must build on past and current research in this area and utilise existing data from the EPA NEMN and other relevant agencies.

<sup>191</sup> <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-air-pollutant-emissions-2019-1990-2030.php>

<sup>192</sup> <https://www.irishstatutebook.ie/eli/2018/si/232/made/en/print>

<sup>193</sup> [https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index\\_en.htm](https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm)

<sup>194</sup> <https://www.epa.ie/who-we-are/roles--responsibilities/organisational-structure/the-office-of-radiation-protection-and-environmental-monitoring/>

<sup>195</sup> <https://www.npws.ie/protected-sites>

## Potential environmental impact of antiparasitic drug use in Ireland

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 10		
<b>Project Type:</b>	Medium Scale Project		
<b>Maximum Budget:</b>	€ 350,000	<b>Maximum Duration:</b>	36 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine			

### Background

The recently published 'Gap analysis of research needs to understand the environmental dimension of antimicrobial resistance in preparation for Ireland's second One Health Action Plan on Antimicrobial Resistance 2021-2025 (iNAP2)<sup>196</sup>' outlines the limited research on antiparasitic agents in our aquatic environment to date. Recent studies by Mooney *et al.* (2021)<sup>197</sup> and (2020)<sup>198</sup> have highlighted anthelmintics and their transformation products as contaminants of emerging concern. In addition, recent research has identified anticoccidial veterinary drugs as an emerging issue in groundwater, with, in particular, poultry activity identified as a significant driver of occurrence.

Under the National Antiparasitic Action Plan<sup>199</sup>, coordinated by the Department of Agriculture, Food and the Marine, the EPA has been assigned a project to deliver on research needs to assess the environmental impact of antiparasitic use, with the ultimate aim of identifying pressures and informing policy and developing solutions.

Research is needed to understand the potential environmental impacts posed by antiparasitic drug use in Ireland.

### Scope

Innovative research proposals are invited to, but not limited to:

- Assess the risk and impact to water, soil and biodiversity posed by antiparasitic veterinary medicine use and their loss to the environment.
- Identify the sources and occurrence of antiparasitic agents\*, including key environmental hotspots and the relative contribution of different agricultural and aquaculture sectors.
- Provide recommendations to inform the development of environmental controls and monitoring of antiparasitic veterinary medicine in intensive animal production facilities, aquaculture and the environment in Ireland.
- Provide recommendations for further research or investigations needed to monitor and assess the impact of antiparasitic agents.

\* In particular the following specific indicator substances abamectin, cypermethrin, deltamethrin, diazinon (aka dimpylate), dicyclanil, fipronil, flumethrin, ivermectin and Emamectin benzoate.

<sup>196</sup> [EPA 2021 AMR Gap Analysis](#)

<sup>197</sup> Mooney, D., *et al.* (2021), *Science of the Total Environment*, 769, p. 144804.

<https://doi.org/10.1016/j.scitotenv.2020.144804>.

<sup>198</sup> Mooney, D., *et al.* (2020) *Science of the Total Environment*, 746, p. 141116.

<https://www.sciencedirect.com/science/article/pii/S0048969720346453>

<sup>199</sup> [gov.ie - Antiparasitic Resistance \(www.gov.ie\)](http://www.gov.ie)

## A state of knowledge of bogland research

<b>Call Topic Reference:</b>	Protecting and Restoring Our Natural Environment 2022 Call Topic 11		
<b>Project Type:</b>	Desk Study		
<b>Maximum Budget:</b>	€ 100,000	<b>Maximum Duration:</b>	12 months
<b>Co-funded by:</b> Department of Agriculture, Food and the Marine			

### Background

Peatlands are a major component in Ireland's terrestrial greenhouse gas (GHG) balance, with considerable research been funded into the impact of these ecosystems and their management have on Ireland's climate and water quality goals. The Climate Action Plan 2021(CAP)<sup>200</sup> has specific actions<sup>201</sup> linked to peatlands restoration and protection. The draft Third Cycle River Basin Management Plan (RBMP)<sup>202</sup> specifically calls out for action on peatland restoration. Peat extraction and degradation is identified as a pressure on 106 waterbodies across Ireland and identified as a significant pressure on 28 waterbodies that are impacted by peat activities alone. Considerable ambition for national peatlands is also detailed in the National Peatlands Strategy<sup>203</sup> which is intended to guide the Government's approach to peatlands management and conservation into the future. The mid-term review of the National Peatlands Strategy is ongoing and aims to refine outstanding actions and prioritising measurable, achievable objectives for the next five years.

Over the last two decades, the EPA has funded many peatlands projects. Some of this work has supported the development of the Site-Specific Conservation Objectives<sup>204</sup> and Technical Restoration Plans guidance<sup>205</sup> for the Special Areas of Conservation (SACs) raised bogs as well as restoration plans for the cut-away bogs. The State has invested € 126m in restoration and rehabilitation of (minimum) 80,000ha of national raised bog areas, inclusive of the planned restoration of industrial cutover bogs, and National Parks and Wildlife Services' (NPWS) restoration of high bogs. Additional State intervention and expenditure is also proposed for the blanket bog areas.

It is now timely to have a synthesis of all the research work carried out to date to summarise key learnings and insights, identify knowledge gaps as well as risks, trends and opportunities, etc., with a view to informing future evidence needs, as well as supporting the long-term sustainable management of Ireland's peatlands. This research will support the ongoing and planned national restoration and rehabilitation programmes for peatlands including the tasks to be delivered under the EU LIFE funded Peatlands & People project <https://peatlandsandpeople.ie/>.

<sup>200</sup> <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

<sup>201</sup> CAP 2021 Actions: 21, 22, 33, 80, 81, 362; 368; 373; 378; 379; 385; 443

<sup>202</sup> <https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/>

<sup>203</sup> <https://www.npws.ie/peatlands-and-turf-cutting/peatlands-council/national-peatlands-strategy>

<sup>204</sup> <https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives>

<sup>205</sup> [https://www.npws.ie/sites/default/files/publications/pdf/IWM99\\_RB\\_Restoration\\_Best%20Practice%20Guidance.pdf](https://www.npws.ie/sites/default/files/publications/pdf/IWM99_RB_Restoration_Best%20Practice%20Guidance.pdf)

## Scope

Innovative research proposals are invited to, but not limited to:

- Undertake a comprehensive analysis of peatland research past and present in Ireland (covering raised and blanket bog domains).
- Review emerging knowledge from international peatland experiences and research.
- Identify knowledge gaps and evidence needs to inform priority research areas and supporting policy development and implementation in Ireland (including risks and opportunities).

This research project should be cognisant of the current EPA portfolio of active peatlands and peatlands related - research activity (e.g., Climate 5 Year Assessment; Peatlands & People emissions profiling projects).

## Expected Outputs

Please consult the **2021-2030 Guidelines and Terms & Conditions** for the full list of expected outputs and interim/final reporting requirements.

**Outputs from ALL projects must build on recently completed and existing research and other relevant information.**

**Where project outputs include data and/or technical solutions** (websites, developed software, database solutions etc.) then the format of same must be agreed with the EPA to ensure that they can be installed on EPA infrastructure and maintained by EPA staff after the completion of the project. The EPA can supply a current list of approved data formats and technology on request and the exact format of all outputs must be agreed with the EPA before development of same commences. All data outputs must have a comprehensive set of metadata and all technical solutions must be fully documented according to EPA requirements.

It is essential that, in their proposal, applicants clearly demonstrate the policy-relevance of the outputs of their proposed research; the applicability of their findings; and how these outputs address a knowledge -gap and can be efficiently transferred/applied to the implementation of policies and the protection of the environment. Applicants **must** clearly demonstrate how their proposed research will provide the evidence to support environmental policy in Ireland, in terms of identifying pressures, informing policy and developing solutions.

## Timeframe

Thursday 14 <sup>th</sup> April 2022 at 11:00 GMT	Call opening
Wednesday 25 <sup>th</sup> May 2022 at 17:00 GMT	Deadline for queries relating to the technical contents of this call
Wednesday 1 <sup>st</sup> June 2022 at 17:00 GMT	Submission deadline
Wednesday 8 <sup>th</sup> June 2022 at 17:00 GMT	Approval deadline
July/September 2022	Evaluation process
October/November 2022	Negotiation <sup>206</sup>
November/December 2022	Grant award of successful projects
By 31 <sup>st</sup> March 2023	Start of successful projects

<sup>206</sup> The EPA may consider calling the shortlisted applicants for interview at this stage.

## Further Information

Information on current research projects being supported by the programme is available in the Research section of the EPA website: <http://www.epa.ie/our-services/research/>.

The following additional documents are available from the EPA website:  
<http://www.epa.ie/publications/research/current-call-documents/>

- EPA Research Programme 2021 - 2030 Guidelines and Terms & Conditions.
- EPA Research Programme 2021 – 2030 –Communicating Research.

Other relevant EPA Research Programme Strategies and Policies are also available from the EPA website: <http://www.epa.ie/our-services/research/epa-research-2030/strategies-and-policies/>.

### For updates on the EPA Research Call 2022:

1. Subscribe to [EPA Research Newsletters](#)
2. Follow us on Twitter [@EPAResearchNews](#)
3. Visit the [EPA Funding web pages](#)
4. Check the [Research Call Frequently Asked Questions web page](#)

Any queries that are not covered in the call documentation or on the FAQs web page must be submitted to [research@epa.ie](mailto:research@epa.ie).