



Rialtas na hÉireann
Government of Ireland

Climate Research Coordination Group Third Report on Activities

January 2020–December 2020



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on behalf of the Climate Research Coordination Group: June 2021

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Disclaimer

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Abbreviations

5YAR	5-Year Assessment of Research
CAP	Climate Action Plan
CAP19	2019 Climate Action Plan
CARO	Climate Action Regional Office
CCAC	Climate Change Advisory Council
CRCG	Climate Research Coordination Group
CSO	Central Statistics Office
DAFM	Department of Agriculture, Food and the Marine
DBEI	Department of Business, Enterprise and Innovation
DECC	Department of the Environment, Climate and Communications
DETE	Department of Enterprise, Trade and Employment
DFA	Department of Foreign Affairs
DFHERIS	Department of Further and Higher Education, Research, Innovation and Science
DHLGH	Department of Housing, Local Government and Heritage
DoT	Department of the Taoiseach
DT	Department of Transport
DTIF	Disruptive Technologies Innovation Fund
EI	Enterprise Ireland
EPA	Environmental Protection Agency
ERA-Nets	European Research Area Networks
EU	European Union
GCOS	Global Climate Observing System
GHG	Greenhouse gas
GSI	Geological Survey Ireland
HSE	Health Service Executive
iCAP21	Interim Climate Action Plan 2021
IPCC	Intergovernmental Panel on Climate Change
IRC	Irish Research Council

JPI	Joint Programming Initiative
MÉ	Met Éireann
MI	Marine Institute
NAF	National Adaptation Framework
NESC	National Economic and Social Council
NMP	National Mitigation Plan
NPWS	National Parks & Wildlife Service
NUIG	National University of Ireland, Galway
OPR	Office of the Planning Regulator
OPW	Office of Public Works
RD&D	Research Development and Demonstration
RFO	Research Funding Organisation
SEAI	Sustainable Energy Authority of Ireland
SFI	Science Foundation Ireland
SOER	State of the Environment Report
UCC	University College Cork
UNFCCC	United Nations Framework Convention on Climate Change
NPWS	National Parks & Wildlife Service
NIEA	Northern Ireland Environment Agency
NTA	National Transport Authority
NTMA	National Treasury Management Agency
NUIG	National University of Ireland, Galway
OPR	Office of the Planning Regulator
OPW	Office of Public Works
P2P	Public-to-Public Partnership
RD&D	Research, Development & Demonstration
RPO	Research Performing Organisation
SDG	Sustainable Development Goal
SEAI	Sustainable Energy Authority of Ireland
SFI	Science Foundation Ireland
UNFCCC	United Nations Framework Convention on Climate Change

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Executive Summary



Executive Summary

The Climate Research Coordination Group (CRCG) was established under the Environmental Protection Agency’s (EPA’s) 2014–2020 Research Strategy. The CRCG acts to coordinate climate change-related research in Ireland. It does so by supporting and promoting collaboration between relevant research funding organisations and by providing a forum for the exchange of information on activities and plans.

A key objective is to advance shared strategic objectives for climate change research and ensure coherence in climate change research investments in Ireland as well as effective linking of these to European Union (EU) funding streams. CRCG meetings are facilitated by the EPA. Its membership is made up of departmental officials, local authority representatives, state agencies and bodies, and stakeholders, who either fund or use outputs from climate change research.

This document contributes to achieving Action 14(i) of the Interim Climate Action Plan 2021 (iCAP21). Action 14(i) requires that the CRCG provides an annual report on its activities. In addition, Action 14(j) of iCAP21 requires that an assessment is carried out and a synthesis is created of key findings from the research programmes, and wider research activities is to be carried out every 5 years. The first 5-year assessment of climate research activities in Ireland has been initiated and is due to be completed in the period 2021–2022¹.

This report on the 2020 research presents a summary of investments, progress on strategic goals and related developments during 2020, as well as CRCG’s activities over that period. It builds on and updates the material from the first report (June 2017–December 2018)², published in May 2019, and the second report (January 2019–December 2019)³, published in June 2020. This (third) report covers competitive research funding committed by members of the CRCG, leveraged funding from EU schemes and core research activities carried out by CRCG members themselves over the period 1 January 2020–31 December 2020. This report is based on the information provided by the members of the group. This report provides neither an assessment nor a synthesis of the funded research, which is the aim of the 5-year assessment report.

In summary, in 2020:
The most significant highlight for 2020 was initiating the first 5-year assessment and synthesis of research (which shall contribute to Action 14 of the 2019 CAP) with the award of six lead author and one support fellowship projects. The work is scheduled to be completed in 2022.
Based on the information provided, 84 new climate-related research competitive awards were made during the reporting period, with a total budget commitment of €21 million . In these 84 projects, collaboration between the CRCG members was evident through the co-funding of 14 research projects, with a committed budget of €2.07 million . Of the €21 million, €6.9 million awarded from competitive national calls was not specific to climate but related to it.
A total of 73% of the budget for competitive new awards in 2020 went to three institutions: Trinity College Dublin, National University of Ireland, Galway and University College Dublin (when assigning funding for successful projects solely to the lead partner), based on the data provided on national competitive awards. Project awards ranged in size from €7000 to €2,989,001, with an average size of €249,790.
In excess of €4.2 million was also reported to be allocated to <i>core activities</i> in 2020, i.e. research activities that are funded by the organisation and performed in-house.
The Irish research community achieved a drawdown of €18.8 million under Horizon 2020 (46 projects), €6.9 million from INTERREG (one project) ⁴ and €10.5 million under the LIFE Programme, with climate-related research projects. No new climate-related COST Actions involving Irish partners were approved in 2020.
One new member joined the CRCG, namely the Department of the Taoiseach.
The CRCG held four meetings, one of which specifically related to carrying out the 5-year assessment and synthesis of research report.
In addition, 42 climate research communication events and workshops took place in 2020 involving the CRCG members.

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1 www.epa.ie/our-services/research/epa--research-funding/call-resultsawards/2020-epa-research-awards/#d.en.84693
2 www.epa.ie/publications/research/climate-change/climate-research-coordination-group-report.php
3 www.epa.ie/publications/research/climate-change/climate-research-coordination-group-second-report-on-activities.php
4 Includes projects approved, contracted and started in 2020.

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Section 1

Purpose of the Report



1. Purpose of the Report

The 2019 Climate Action Plan (CAP19) notes that the Environmental Protection Agency (EPA) convenes a national Climate Research Coordination Group (CRCG). CAP19 has subsequently been replaced by the Interim Climate Action Plan 2021 (iCAP21). The Climate Action Plans (CAPs) require the CRCG to report annually on its activities (see Action 14(i) of iCAP21).

This is the third report by the CRCG on its activities and covers the period January–December 2020. It builds on and updates the first report on the CRCG’s activities for the period June 2017–December 2018⁵ and the second report for the period January–December 2019⁶. These annual reports contribute to achieving Action 14 of iCAP21: “Strengthen our delivery of public funding for basic and applied research to underpin government policy, meet our decarbonisation objectives and open up new economic opportunities.”

The membership of the CRCG encompasses the main national bodies that fund climate change research, as well as key relevant stakeholders. A key objective of the group is to coordinate climate change research investments in Ireland. This is achieved through a coherent and well-structured programme that enhances synergies, avoids duplication and enables stakeholder participation.

This report provides an inventory of climate change research-related activities and funding from the CRCG members. This report provides neither an assessment nor a synthesis of the funded research, which is the aim of the 5-year assessment of research (5YAR) (also part of Action 14(i) of iCAP21). It therefore primarily provides the following:

► An overview of the climate change research that has been funded by CRCG members over the period January–December 2020. It covers competitive research funding committed by members of the CRCG for research and development performed elsewhere, as well as leveraged funding from European Union (EU) schemes and core research activities carried out by CRCG members.

► An outline of the wider funding landscape, which includes European sources. A summary of relevant international climate change research in which members of Ireland’s research community are active is also included.

This report is based on the information provided by the members of the group. The scientific and policy context for climate change research was outlined in the first report and updated in the second report.

1.1 The Climate Research Coordination Group

Under the Environmental Protection Agency Act 1992, the EPA is responsible for coordinating environmental research in Ireland. The CAPs and the National Adaptation Framework (NAF) enhance the roles of the EPA in coordinating climate research across state-funded bodies. As part of this function, under the EPA 2014–2020 Research Strategy⁷, three national Research Coordination Groups were established, focusing on sustainability, water and climate research. The CRCG is facilitated by the EPA and includes members across several government departments, local authorities and state agencies, and other stakeholders whose functional areas are relevant to furthering Irish research into climate change-related topics. The list of CRCG members, as of January 2021, is provided in **Table 1**. The terms of reference for the group are provided in **Appendix 1**. Descriptions of the other members were included in the first report⁸ and the second report⁹.

One new member joined the CRCG in 2020, namely the Department of the Taoiseach (DoT) (see Appendix 2).

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5 <https://www.epa.ie/publications/research/climate-change/climate-research-coordination-group-report.php>
6 <https://www.epa.ie/publications/research/climate-change/climate-research-coordination-group-second-report-on-activities.php>
7 <https://www.epa.ie/our-services/research/epa-research-2030/past-epa-research-strategies/epa-research-2014-2020/>
8 <https://www.epa.ie/publications/research/climate-change/climate-research-coordination-group-report.php>
9 <https://www.epa.ie/publications/research/climate-change/climate-research-coordination-group-second-report-on-activities.php>

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Table 1: CRCG membership (as of January 2021)

Organisation ¹⁰	Acronym	Website
Central Statistics Office	CSO	www.cso.ie
Climate Action Regional Offices established at four geographical regions: ▶ Atlantic Seaboard North ▶ Atlantic Seaboard South ▶ Dublin Metropolitan ▶ Eastern & Midlands	CAROs	http://caro.ie/
Climate Change Advisory Council	CCAC	www.climatecouncil.ie
County and City Management Association	CCMA	www.lgma.ie
Department of Agriculture, Food and the Marine	DAFM	www.gov.ie/en/organisation/department-of-agriculture-food-and-the-marine/
Department of Enterprise, Trade and Employment	DETE	www.gov.ie/en/organisation/department-of-enterprise-trade-and-employment/
Department of Further and Higher Education, Research, Innovation and Science	DFHERIS	www.gov.ie/en/organisation/department-of-higher-education-innovation-and-science/
Department of Housing, Local Government and Heritage (Met Éireann)	DHLGH (MÉ)	www.met.ie
Department of Housing, Local Government and Heritage (National Parks & Wildlife Service)	DHLGH (NPWS)	www.npws.ie
Department of the Environment, Climate and Communications	DECC	www.gov.ie/en/organisation/department-of-the-environment-climate-and-communications/
Department of the Environment, Climate and Communications (Geological Survey Ireland)	DECC (GSI)	www.gsi.ie
Department of the Taoiseach	DoT	www.gov.ie/en/organisation/department-of-the-taoiseach/

10 Where relevant, the specific division or business unit within the department is indicated in brackets.



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Organisation ¹⁰	Acronym	Website
Department of Tourism, Culture Arts, Gaeltacht, Sport and Media	DTCAGSM	www.gov.ie/en/organisation/department-of-tourism-culture-arts-gaeltacht-sport-and-media/
Department of Transport	DT	www.gov.ie/en/organisation/department-of-transport/
Enterprise Ireland	EI	www.enterprise-ireland.com
Environmental Protection Agency	EPA	www.epa.ie
Health Service Executive	HSE	www.hse.ie
Irish Environmental Network	IEN	https://ien.ie
Irish Research Council	IRC	http://research.ie
Irish Water	IW	www.water.ie
Marine Institute	MI	www.marine.ie
National Economic and Social Council	NESC	www.nesc.ie
National Transport Authority	NTA	www.nationaltransport.ie
National Treasury Management Agency	NTMA	www.ntma.ie
Northern Ireland Environment Agency	NIEA	www.daera-ni.gov.uk/northern-ireland-environment-agency
Office of Public Works	OPW	www.opw.ie
Office of the Planning Regulator	OPR	www.opr.ie
Science Foundation Ireland	SFI	www.sfi.ie
Sustainable Energy Authority of Ireland	SEAI	www.seai.ie
Sustainable Northern Ireland	SNI	www.sustainableni.org
Teagasc	–	www.teagasc.ie

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Section 2

2020 Science Policy Framework and Developments



2. 2020 Science Policy Framework and Developments

This section provides the details of the developments at national and EU/international levels in the science policy interface that took place in 2020. A key aim of climate change research is to respond to the evolving policy context¹¹.

A more detailed overview of the policy context (updated summary provided in **Figure 1**) was included in the first report¹². International and EU policy and actions on climate change are uniquely informed by research, principally through the work of bodies such as the Intergovernmental Panel on Climate Change (IPCC).

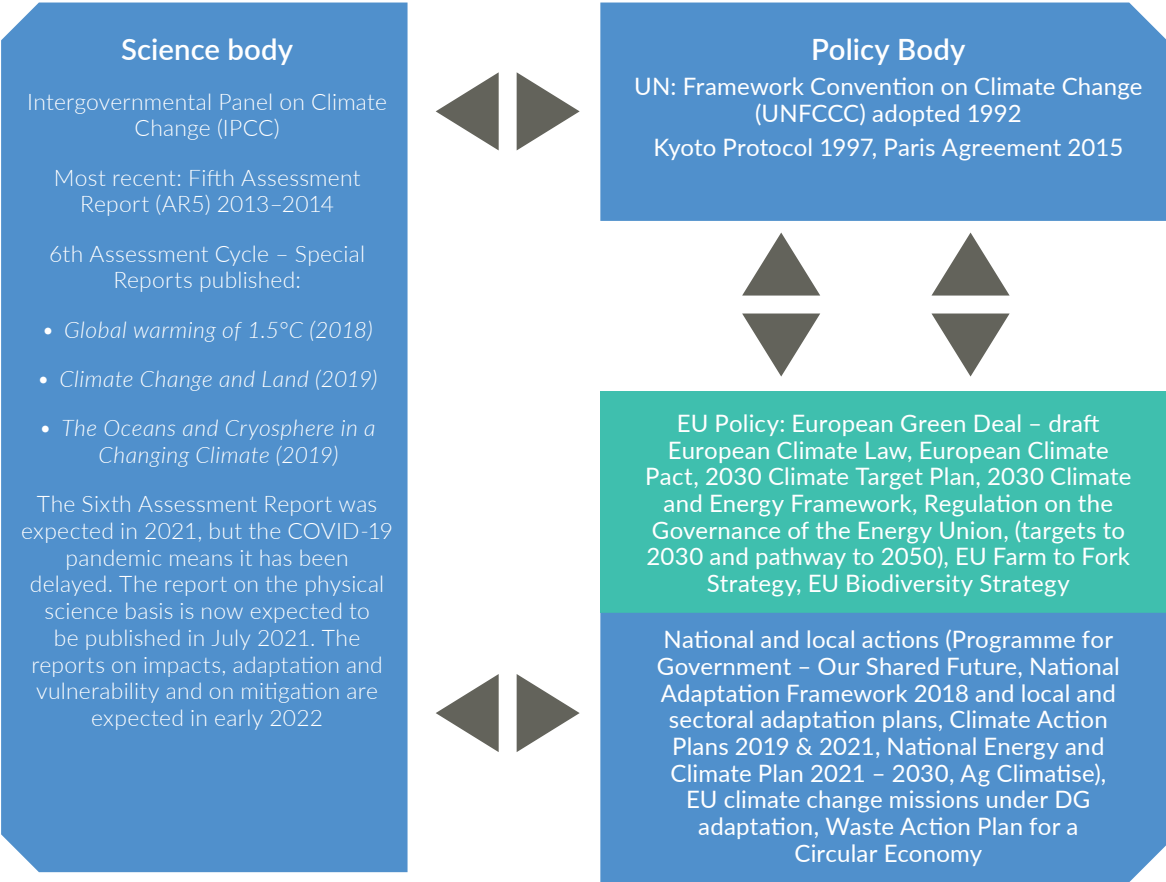


Figure 1: Schematic showing the science-policy interface from national to global levels¹³. DG, Directorate-General; UN, United Nations.

2.1 National Level

At the national level, the main policy development in 2020 was the new programme for government, *Our Shared Future*¹⁴. It introduced strengthened targets and measures related to climate action, notably:

- ▶ a 7% per year reduction in greenhouse gas (GHG) emissions from 2021 to 2030 (a 51% reduction in GHG

11 In addition to policy developments that occurred in 2020, the report also captures key policy developments up to the time of publication, as this benefits understanding the evolving context for the report.
12 www.epa.ie/publications/research/climate-change/climate-research-coordination-group-report.php
13 The IPCC special report on climate change and land (2019) was supported by an EPA Fellowship, which resulted in Ireland having one lead author on this report.
14 www.gov.ie/en/publication/7e05d-programme-for-government-our-shared-future/

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emissions over the decade), as well as a target of net zero emissions by 2050;

- ▶ a land use review that will include consideration of emissions to air and water, carbon sequestration and climate adaptation challenges;
- ▶ a commitment to a just transition;
- ▶ the Climate Action and Low Carbon Development (Amendment) Bill 2021.

The Climate Action and Low Carbon Development (Amendment) Bill 2021 was approved by government and published on 23 March 2021¹⁵. Key elements of this new strengthened statutory framework include:

- ▶ establishing a commitment of a climate-neutral economy by no later than 2050;
- ▶ five-year, economy-wide carbon budgets, setting maximum emissions by sector;
- ▶ strengthening the role of the Climate Change Advisory Council (CCAC), enabling it to propose appropriate carbon budgets to the Minister for the Department of the Environment, Climate and Communications;
- ▶ a requirement that the first two 5-year carbon budgets proposed by the CCAC should equate to a total reduction of 51% over the period to 2030, relative to a baseline of 2018;
- ▶ an annual update of CAP and a national long-term climate action strategy at least every 5 years;
- ▶ improving accountability arrangements, with a greater role for the Oireachtas;
- ▶ a review of GHG emissions on a consumption basis, with a goal of ensuring that Irish and EU actions to reduce emissions support emission reductions globally and on our own territories;
- ▶ a requirement for all local authorities to prepare individual local authority CAPs, which will include both mitigation and adaptation measures;
- ▶ the requirement for a just transition to a climate neutral economy.

The DoT publishes quarterly progress reports on the implementation of the CAPs¹⁶. The Department of the Environment, Climate and Communications (DECC) launched a public consultation on a new CAP¹⁷, which includes a call for expert evidence¹⁸. DECC has published iCAP21¹⁹, which will be used to drive continued delivery of climate action across all government departments and bodies while a new CAP is being prepared. It formally replaces the Annex of Actions published as part of CAP19.

Sectoral adaptation plans were published by government departments in 2020²⁰. These plans will guide implementation of government climate policy.

The National Energy and Climate Plan (NECP) 2021–2030²¹ outlines Ireland’s energy and climate policies in detail for the period 2021–2030 and looks onwards to 2050. This is currently being revised in the context of increased EU-wide mitigation ambition to 2030 (EU Climate Law) and increased Government of Ireland ambition, expressed in national legislation. Under the revised CAP, Ireland is currently developing policies and measures to reflect the increased national ambition and intends to integrate these in a revised NECP that will identify Ireland’s contribution to the overall EU contribution under the Paris Agreement as expressed under its collective Nationally Determined Contribution (NDC).

In September 2020, DECC published the Waste Action Plan for a Circular Economy²². The plan outlines the contribution of the sector to the achievement of a number of other national plans and policies, including the CAP.

In December 2020, the Department of Agriculture, Food and the Marine (DAFM) published Ag Climatise, its national climate and air roadmap for the agriculture sector²³.

The 2017 National Mitigation Plan (NMP) was quashed on 31 July 2020 by the Supreme Court because it did not satisfy the requirements of the Climate Action and Low Carbon Development Act

15 www.gov.ie/en/publication/984d2-climate-action-and-low-carbon-development-amendment-bill-2020/
16 www.gov.ie/en/publication/55fde-climate-action-important-publications/
17 www.gov.ie/en/consultation/5bd95-climate-conversation-climate-action-plan-2021/
18 www.gov.ie/en/consultation/5d554-call-for-expert-evidence-climate-action-plan-2021/
19 www.gov.ie/en/publication/ccb2e0-the-climate-action-plan-2019/
20 www.gov.ie/en/collection/51df3-sectoral-adaptation-planning/
21 www.gov.ie/en/publication/0015c-irelands-national-energy-climate-plan-2021-2030/
22 www.gov.ie/en/publication/4221c-waste-action-plan-for-a-circular-economy/
23 www.gov.ie/en/press-release/a8823-publication-of-ag-climatise-national-climate-air-roadmap-for-the-agriculture-sector/

2015, under which it was made²⁴. Accordingly, the government must make a new NMP that takes account of what the Supreme Court said about the degree of specificity required by law as regards the measures set out in the NMP to deliver the 2050 objective of the Climate Action and Low Carbon Development Act 2015.

The EPA published the 2020 State of the Environment Report (SOER 2020)²⁵. It summarises changes to Irelands climate, progress made in regard to climate change mitigation and adaptation, and the scale of the challenge to transform the country into a climate-neutral and climate-resilient society and economy by 2050.

The CCAC published its annual review of climate policy, progress on the achievement of the national transition objective and progress towards international targets in September 2020²⁶. In addition to progress made in the low-carbon transition, both at the national level and across different sectors, the report considers progress towards climate resilience (with a focus on adaptation issues for Ireland's five main cities), provides perspectives and a narrative related to mitigation in the agriculture and land use sectors, and includes a special focus on the transport sector.

2.2 EU/International Levels

In 2020, the EU published its proposal for an 8th Environment Action Programme in 2020, which “aims to accelerate the transition to a climate-neutral, resource-efficient and regenerative economy, which gives back to the planet more than it takes”²⁷. A large quantity of climate-related EU legislation is anticipated during the period 2020–2025.

The EU published the draft EU Climate Law, which would legislate for an EU goal of net zero GHG emissions by 2050²⁸. It launched the European Climate Pact, an EU-wide initiative inviting people,

communities and organisations to participate in climate action and build a greener Europe²⁹. The EU also announced its 2030 Climate Target Plan to further reduce GHG emissions by at least 55% by 2030³⁰. The changes came as part of the European Green Deal and would necessitate changes to climate legislation, notably the EU Emissions Trading System, the Effort Sharing Regulation and the Land Use, Land Use Change and Forestry Regulation³¹.

The EU Farm to Fork Strategy³² and the EU Biodiversity Strategy³³, which both have important implications for climate change, were also published in 2020.

In 2020, the IPCC, as part of its 6th assessment cycle³⁴, published second order draft reports (for expert and government review) for working groups I (The Physical Science Basis) and II (Impacts, Adaptation and Vulnerability). The second order draft for working group III (Mitigation of Climate Change) was due on 18 January 2021. The final version of these three reports are due to be published as follows: August 2021 for working group I, February 2022 for working group II and March 2022 for working group III. The synthesis report is due to be published September 2022.

These reports provide the current authoritative scientific understanding of the issues and are central to informing policy responses and actions to address climate change from the United Nations level to the local level. They also identify areas for further research.

As a party to the United Nations Framework Convention on Climate Change (UNFCCC), Ireland is committed to the development and provision of support for climate change research and systematic observations (through the Global Climate Observing System, GCOS) of the climate system. Progress in these areas is reported by parties in National Communications to the UNFCCC every 4 years.

24 www.courts.ie/acc/alfresco/681b8633-3f57-41b5-9362-8cbc8e7d9215/2020_IESC_49.pdf/pdf#view=fitH
25 <https://www.epa.ie/publications/monitoring--assessment/assessment/state-of-the-environment/irelands-environment-2020---an-assessment---report.php>
26 www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/publications/CCAC_AnnualReview2020FINAL.pdf
27 <https://ec.europa.eu/environment/pdf/8EAP/2020/10/8EAP-draft.pdf>
28 https://ec.europa.eu/clima/policies/eu-climate-action/law_en
29 https://europa.eu/climate-pact/index_en
30 https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en
31 https://ec.europa.eu/clima/policies/strategies/2030_en
32 https://ec.europa.eu/food/farm2fork_en
33 https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en
34 www.ipcc.ch/

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Section 3

2020 Developments in National and EU/International Research Funding Strategies



3. 2020 Developments in National and EU/International Research Funding Strategies

It is important for Ireland to have an active research community that is focused on Ireland-specific issues related to climate change and is engaged with European and global research activities. A coherent, well-structured research programme that is designed to address Ireland-specific issues and is linked to EU funding streams is key to enabling this.

It is also essential to ensure that publicly funded research is accessible, broadly disseminated and policy relevant. It should take account of the national climate policy and the objectives and actions contained in the CAPs and the NAF.

3.1 National Context

At the national level, as the climate change challenge is a cross-sectoral issue, Government of Ireland funding support for climate-related research, development and innovation is provided by a variety of different departments and agencies and specific programmes. Collaboration between national, EU and international research programmes and funders also offers the potential to engage in research on transitioning to a low-carbon economy. The main climate-related competitive research funding available in Ireland is listed in **Table 2**. Not all funders provide specific climate-related research funding.

Table 2: National funding landscape

National organisations	Funding programmes	Funding received from
CCAC	Research fellowships	Government Exchequer – DECC and Climate Action Fund
EI	Disruptive Technologies Innovation Fund (DTIF)	Government Exchequer – DETE
DECC (GSI)	Funding for small- to medium-scale research studies, including post-doctoral fellowships. Provides funding and co-funding with the EPA, MI, SEAI, SFI, IRC, Fulbright Commission of Ireland and OPW. Provides funding through Geothermica and ERA-Min ERA-Nets ³⁵	Government Exchequer – DECC
DHLGH (Met Éireann)	Climate services research; post-doctoral fellowships. Multi-annual competitive research call programme TRANSLATE in area of climate services	Government Exchequer – DHLGH
DHLGH (NPWS)	Funding of small-scale research projects investigating the impact of climate change on biodiversity and ongoing research into the carbon exchange of selected peatland communities. NPWS also provides co-funding with the EPA	Government Exchequer – DHLGH

35 European Research Area Networks (ERA-Nets) are networks of public research organisations that coordinate joint research activities in research areas which are of significant strategic value and relevance to the EU.

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National organisations	Funding programmes	Funding received from
DAFM	Competitive research funding programme, restructured approach in 2020, seeking projects across key thematic areas, including climate and biodiversity; sustainable animal and plant health and production; agri-digitalisation and the bioeconomy; and safe, healthy food production and processing. DAFM committed to a number of ERA-Nets; DAFM, in collaboration with DAERA-NI and the US National Institute of Food and Agriculture, launched the 2020 US-Ireland Research and Development Partnership Call for Proposals in Agriculture	Government Exchequer – DAFM
DT	Funds and co-funds projects that look at directly applicable solutions to climate mitigation and adaptation, as well as air quality issues	Government Exchequer – DT
EPA	EPA Research Programme 2014–2020 Under the 5-year Assessment of Research required by the CRCG, EPA opened a call for lead authors and support fellowship. Awards made under its strategic partnerships with SFI, DAFM, IRC and Fulbright Commission Ireland	DECC
IRC	Funds numerous bottom-up research projects (doctoral, post doctoral and PI led) that may include climate change topics Selected examples of relevant schemes are the Irish Research Council Postgraduate Scholarship Scheme 2020 – EPA Co-funded Scholarships Scheme and the COALESCE (Collaborative Alliances for Societal Challenges) research call in 2020	DFHERIS
MI	Funding awarded under the MI Marine Research Programme in 2020 for Post-graduate Scholarships; Post-doctoral Fellowships; Ship-time Programme (access to national research vessels Celtic Explorer and Celtic Voyager); and co-funded actions for marine-related research projects and awards	DAFM
OPW	Carries out research on flood risk and rivers in relation to fluvial and coastal flood risk management. External research is generally procured by a competitive tender process. OPW does not currently have a dedicated research call, but instead procures research through a competitive tender process	DPER
SFI	SFI has numerous funding programmes available to support individual-led and challenge-based research, partnerships with enterprise, international partnerships and education and public engagement. All may support research related to climate. These include SFI Research Centres, Frontiers for the Future; Research Professorship, Future Research Leaders, Strategic Partnerships and Future Innovator Prize, among others	DETE (DFHERIS from 2021)
SEAI	The SEAI National Energy RD&D Funding Programme supports innovative energy RD&D projects that contribute to Ireland’s transition to a clean and secure energy future	DECC
Teagasc	Carries out and administers research and knowledge transfer programmes on animals, crops and grassland management, food and rural development	DAFM

DAERA-NI, Department of Agriculture, Environmental and Rural Affairs – Northern Ireland; DAFM, Department of Agriculture, Forestry and the Marine; DECC, Department of the Environment, Climate and Communications; DETE, Department of Enterprise, Trade and Employment; DFHERIS, Department of Further and Higher Education, Research, Innovation and Science; DHLGH, Department of Housing, Local Government and Heritage; DPER, Department of Public Expenditure and Reform; DT, Department of Transport; EI, Enterprise Ireland; GSI, Geological Survey Ireland; IRC, Irish Research Council; MI, Marine Institute; NPWS, National Parks & Wildlife Service; OPW, Office of Public Works; RD&D, Research, Development & Demonstration; SEAI, Sustainable Energy Authority of Ireland; SFI, Science Foundation Ireland.

A number of CRCG members progressed reviews of and/or revisions to their research strategies in 2020. Here follow some examples.

1. The EPA carried out extensive consultation to prepare *EPA Research 2030: A Framework for EPA Research 2021–2030*. The framework provides for 3-yearly thematically based research areas assessments. The process of preparing the EPA Research 2030 Framework included an online survey, direct consultation with national stakeholders, a workshop targeted at the research community and national stakeholders on research priorities, and a public consultation³⁶. The final version was launched in March 2021.
2. The Irish Research Council (IRC) Strategic Plan 2020–2024 focuses on how research will be supported, rather than on what research should be supported. It addresses developing partnerships across the research ecosystem and supporting interdisciplinary research³⁷.
3. Following extensive consultation with the wider research stakeholder community, the new strategy of Science Foundation Ireland (SFI) to 2025, *Shaping Our Future*³⁸, was developed in alignment with the government’s ambition for Ireland to become a global leader in research and innovation. The strategy, which was launched in March 2021, sees research in Ireland meeting current challenges and seizing future opportunities to benefit Ireland’s economy and society.
4. The preparation of the new national research and innovation strategy by the Department of Business, Enterprise and Innovation (DBEI) was paused in 2020 with the restructuring of government departments and is to re-start in 2021 under the new Department of Further and Higher Education, Research, Innovation and Science (DFHERIS). Funding agencies and government departments were consulted by DBEI at the organisational level during the initial consultation process, under the aegis of the Innovation 2020 Implementation Group.

The development of the new national research and innovation strategy offers an opportunity to reinforce climate as a key tenet.

3.2 EU/International Context

National research investment is the main funding source for climate change research in Ireland. However, researchers from Ireland have been successful in attracting international funding at the European level. As well as being an important funding source, this enables researchers from Ireland to work with and lead on projects that involve leading international research groups.

At the European/international level, 2020 saw the last call in the EU’s Horizon 2020 programme with the launch of the Green Deal research call³⁹. It provided a bridge to Horizon Europe⁴⁰, the European Commission’s research and innovation framework programme running from 2021 to 2027. CRCG members provided feedback during the development of Horizon Europe, notably Cluster 5 (Climate, Energy and Mobility) and Cluster 6 (Food, Bioeconomy, Natural Resources, Agriculture and Environment) of Pillar 2 (Global Challenges and European Industrial Competitiveness). Horizon Europe will incorporate five research and innovation missions to increase the effectiveness of funding by pursuing clearly defined targets. These missions include *Adaptation to climate change including societal transformation* and *Climate-neutral and smart cities*. Political agreement on Horizon Europe was reached on 11 December 2020 and was launched by the EU on 2 February 2021.

Joint Programming Initiative (JPI) Climate held its Second Scoping Forum Symposium⁴¹ online in December 2020, which was hosted by Germany as an EU Presidency event. This symposium included contributions from State Secretary Wolf-Dieter Lukas (German Ministry for Education and Research), Commissioner Mairead McGuinness (Financial Services, Financial Stability and Capital Markets Union) and John Bell (Director of “Healthy Planet” at the Directorate-General for Research and Innovation

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36 <https://www.epa.ie/our-services/research/epa-research-2030/>
37 <https://research.ie/assets/uploads/2020/01/Irish-Research-Council-Strategic-Plan-2020-2024.pdf>
38 <https://www.sfi.ie/strategy/>
39 <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/h2020>
40 https://ec.europa.eu/info/horizon-europe_en
41 www.jpi-climate.eu/media/default.aspx/emma/org/10901902/7dec2020_draft_agenda%20scoping_forum_09122020.pdf

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of the European Commission)⁴². It explored key areas for development under the future strategic research agenda. JPI Climate had a leading role in the European Forum on Science and Education for Sustainability meeting hosted by the German EU Presidency in September 2020, which had a focus on climate neutrality⁴³.

JPI Climate completed a major joint transnational research funding call covering human dimensions of climate change in which Ireland participated through the EPA. JPI Climate and JPI Oceans jointly agreed to establish a knowledge hub⁴⁴ on sea level rise in 2020, which Ireland is supporting through the Marine Institute (MI). It also progressed the establishment of a knowledge hub on climate neutrality, which Ireland is supporting through DAFM and the EPA. JPI Climate’s links to Horizon Europe and the Climate Mission were enhanced in 2020, including working with the European Commission in the context of preparing the European Climate Change Adaptation Conference to be held in June 2021.

The JPI on Agriculture, Food Security and Climate Change (FACCE-JPI) launched its Strategic Research Agenda (2020–2027) on 27 November 2020⁴⁵. Research activities and resources will concentrate on agricultural production systems, but with a strong consideration of interactions with (i) the food system,

(ii) the climate system and (iii) the ecosystem and possible system shocks. FACCE-JPI had established the Modelling Agriculture with Climate Change for Food Security Science-Policy Knowledge Hub⁴⁶ (MACSUR SciPol) to investigate the impacts of climate change on European agriculture and improve scenario studies to inform policymaking. In 2020, Teagasc undertook work with MACSUR SciPol on biogeochemical modelling for developing tools for the prioritisation of policies.

The Water JPI launched its Strategic Research and Innovation Agenda 2025 (SRIA 2025)⁴⁷ in April 2020 and has identified climate change as a clear driver of global change, and climate-neutral circular economy and bioeconomy as a cross-cutting issue. The EPA was responsible for the preparation of the Water JPI Vision 2030 and SRIA 2025.

The European Joint Programme on Agricultural Soil Management (EJP Soil), for which Teagasc is a consortium partner (and DAFM a key stakeholder), kicked off in 2020 with an internal research call⁴⁸. This is a 5-year, €80 million programme and has as overall objective to provide sustainable agricultural soil management solutions that contribute to key societal challenges, including climate change and future food supply⁴⁹.

42 <http://www.jpi-climate.eu/news-events/news/10901808/2nd-JPI-Climate-Scoping-Forum-Symposium>

43 www.bmbf.de/en/together-for-an-innovative-and-sustainable-europe-12861.html

44 Knowledge hubs are networks consisting of selected research groups and their scientists from JPI member countries within a defined area of research. This instrument is developed to contribute to optimising research outcomes by facilitating the exchange of information among the actors, creating critical mass and avoiding duplications (see www.jpi-oceans.eu/knowledge-hubs-0). They accelerate the transfer of knowledge and innovation from science to policy and practice. They are focused on key challenges, for example climate neutrality, sea level rise and climate resilience.

45 <https://faccejpi.net/en/FACCEJPI/Strategy/Strategic-Research-Agenda.htm>

46 <https://www.macsur.eu/>

47 www.waterjpi.eu/mapping-agenda/strategic-research-and-innovation-agenda-sria/waterjpi_sria2025_web.pdf

48 <https://ejpsoil.eu/research-projects/first-internal-call-closed/>

49 <https://ejpsoil.eu/>



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Section 4

2020 Activities of the Climate Research Coordination Group



4. 2020 Activities of the Climate Research Coordination Group

The CRCG acts to coordinate climate change-related research in Ireland. It does so by supporting and promoting collaboration between relevant research funding organisations (RFOs) and providing a forum for exchange of information on activities and plans. A key objective is to advance shared strategic objectives for climate change research and ensure coherence in climate change research investments in Ireland and effective linking of these to EU funding streams.

The CRCG is focused on the development of research that informs policy and enables actions to address the various challenges that arise from climate change. **Table 3** gives a high-level overview of the progress made in 2020 with meeting the aims and objectives of the terms of reference of the CRCG (see **Appendix 1**).

The activities of the group in the period January–December 2020 are outlined in this section, including new funding commitments, meetings, events and research collaborations. The information provided here is based on the inputs provided by the CRCG members (see **Appendix 3**).

Table 3: Progress made in 2020 with the aims and objectives of the CRCG

Aims and objectives of the CRCG	Progress made in 2020
Facilitate, support and promote coordination, synergies and liaison between relevant cross-sectoral funding organisations – public and private – to reduce the fragmentation and/or duplication of climate research in Ireland	<p>The CRCG initiated the first 5-year assessment of climate research (5YAR) through agreeing its approach and structure and through the completion of a specific 5YAR call to carry out the work. It will be key to link the 5YAR process to the process for annual reporting of CRCG activities</p> <p>Synergies and liaison among national stakeholders were developed through the addition of DoT to the CRCG and engaging with DoT on its audit of climate research and modelling activities</p> <p>DBEI continued work on the development of the next national research and innovation strategy (successor to Innovation 2020), and provided an opportunity for CRCG members to input into this process. This work was paused as a result of the Covid-19 pandemic and the restructuring of government departments</p> <p>The preparation of EPA Research 2030, a 10-year high-level framework for the EPA's research programming (2021–2030) entailed significant liaison with CRCG members</p>
Facilitate an exchange forum between research funders and key stakeholders, providing an interface for funding organisations of climate research to facilitate the dissemination, sharing and uptake of relevant scientific outputs to policymakers and decision-makers and the uptake of research outputs for commercialisation	<p>Four CRCG meetings were held in 2020, which facilitated the sharing of information related to (i) climate research activities for each CRCG member, (ii) planned workshops on the outputs of climate research, (iii) climate research funding opportunities and (iv) policy developments. It also provided a forum to hear collectively from national experts</p>
Identify key research needs and emerging policy needs with the aim of informing the research strategy of Irish funding organisations of climate research	<p>The stakeholder consultation used to prepare EPA Research 2030 identified EPA research needs with particular regard to informing policy. The identification of research needs at the national level will be progressed through the 5YAR</p> <ul style="list-style-type: none">▶ The first CRCG meeting held in February 2020 identified policy needs▶ The second CRCG meeting held in June 2020 discussed the DoT's audit on climate research and modelling activities▶ The third CRCG meeting held in August 2020 focused on progressing the 5YAR▶ The fourth CRCG meeting held in November 2020 provided a state of play of various strategies of RFOs and preparations for developing a successor to Innovation 2020

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Aims and objectives of the CRCG	Progress made in 2020
Provide a platform for cross-sectoral RFOs to liaise and/or collaborate with European and international activities related to climate research, such as JPIs, technology platforms and LIFE	At CRCG meetings, members were provided with updates on European and international activities related to climate research, including: <ul style="list-style-type: none">▶ JPIs on (i) climate⁵⁰, (ii) oceans⁵¹, (iii) water⁵², (iv) agriculture, food security and climate change⁵³ and (v) biodiversity⁵⁴▶ Horizon Europe⁵⁵▶ EU LIFE programme (EU funding instrument for the environment and climate action)⁵⁶

DT, Department of Transport.

The most significant highlight for 2020 was initiating the first 5-year assessment and synthesis of research (which shall contribute to Action 14(j) of the iCAP21).

4.1 Five-year Assessment of Research

The first 5-year assessment of climate research activities⁵⁷ in Ireland was initiated in 2020 and is due to be completed in the period 2021–2022. The work will update national understanding of climate change, its impacts and response options, and inform policy options in climate mitigation and adaptation. It will also identify, inter alia, evidence gaps and research priorities. Accordingly, the report of this assessment will be a critical source of evidence for the national research prioritisation and planning processes. The EPA launched a specific call for experts to carry out the work and granted six lead authors awards and one support fellowship award. SFI and SEAI have indicated that they aim to provide support for the 5YAR writing process in 2021. Additionally, three online workshops on (i) sea level rise, (ii) energy, transport and heating and (iii) agriculture and land use were organised for national stakeholders to present and discuss the findings of recent IPCC reports and relevant national research.

The key objective of the 5-year assessment of research (5YAR) process is to deliver an assessment of our understanding of climate change based on scientific research and systematic observations in Ireland, and linked EU and global analysis, in a timely manner that can inform decision-making on actions to address climate change. In addition, the process serves to:

- ▶ identify research gaps to inform future research investment needs and priority research issues;
- ▶ utilise and enhance existing and emerging structures that are designed to address climate change;
- ▶ develop national assessment and analysis capacity;
- ▶ enhance engagement with similar developments at European and international levels;
- ▶ establish a structure and process to develop future reports.

The 5YAR follows the approach of the IPCC by providing a report in a series of thematic volumes with an overarching synthesis report. The volumes broadly reflect the IPCC structure⁵⁸ and the thematic structure currently used for the annual reporting of CRCG activities, but include an additional volume on realising the benefits and opportunities of the required transition and transformation. Accordingly, the 5YAR will report under the following four volumes:

50 www.jpi-climate.eu/home
51 www.jpi-oceans.eu/
52 www.waterjpi.eu/
53 www.faccejpi.net/en/faccejpi.htm
54 www.biodiversa.org/
55 https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en
56 https://cinea.ec.europa.eu/life_en
57 <https://www.epa.ie/our-services/research/epa--research-funding/call-resultsawards/2020-epa-research-awards/#d.en.84693>
58 www.ipcc.ch/about/

- ▶ science: Ireland in a changing world;
- ▶ achieving climate neutrality by 2050;
- ▶ being prepared for Ireland's future climate;
- ▶ realising the benefits of transition and transformation.

The reports will build on material provided by the IPCC during its assessment cycles (6th Cycle in 5YAR currently under way) by merging its findings with Ireland-specific research and analysis. The work will also use data from observations systems in Ireland, as identified under GCOS, as well as information from the Copernicus⁵⁹ and similar programmes.

Through a specific 5YAR research call in 2020, leading academics have been awarded grants to prepare the reports. Steering groups from membership of the CRCG have been established for each volume to coordinate the work, including agreeing on the scope. Experts based in state agencies and bodies, and departmental officials will oversee the writing and review process. The EPA provides management and secretariat support for the process.

The 5YAR provides a vehicle to further develop national understanding of climate change and to develop required analysis capacity and communication structures. It provides an opportunity to integrate and assess a range of climate-related activities in Ireland and link these to EU and international activities. In aiming to provide a shared understanding, based on the best available science, the 5YAR can inform the future processes for developing mitigation and adaptation policies, and be pivotal to informing actions by key bodies in Ireland and activities such as the National Dialogue on Climate Action⁶⁰.

The annual CRCG reports will link to and be informed by the 5YAR in a number of ways; for example:

- ▶ It will provide updates on the response of CRCG members, and in particular RFOs, to address the research gaps and needs identified in the 5YAR process;
- ▶ It will report on research activities and projects under the (revised) classifications developed under the 5YAR process, including any apparent trends. However, there will be inevitable interannual variability in research funding, both in total and under each classification, because the different RFOs have different funding cycles (e.g. some are not annual) and focus their funding programmes in different areas.

Further collaboration in the 5YAR process, such as co-funding of the process and finalising participation in Steering Groups for the different volumes, is being examined in 2021.

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59 Copernicus is the EU's Earth observation programme, which looks at our planet and its environment to benefit all European citizens. It offers information services that draw from satellite Earth observation and in-situ (non-space) data. (www.copernicus.eu/en)

60 www.gov.ie/en/publication/4bf2c-national-dialogue-on-climate-action-ndca/

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4.2 New 2020 Climate Change Research Projects and Activities⁶¹

A thematic approach has been used to develop climate change research in Ireland since 2007, when it was adopted at a cross-agency level. This report uses the standard thematic structure, which was described in the first report⁶², but recognises that this may evolve to encompass other areas. The CRCG is also aware of and recognises the importance of research on broader climate change issues, including on fundamental science and processes.

There are the following climate change research thematic areas:

- theme 1: carbon stocks, GHG emissions, sinks and management options;
- theme 2: Ireland’s future climate, its impacts, and adaptation options;
- theme 3: socio-economic and technological solutions and transition management and opportunities;
- theme 4: air science (air pollution and short-lived climate forcers).

New 2020 competitive awards (i.e. externally commissioned research)

This section covers competitive research funding for research and development performed elsewhere (i.e. outside the organisation providing the funding).

Based on the information provided, 84 new climate-related research competitive awards were created during the reporting period, with a total budget commitment of €21 million. However, €6.9 million out of this €21 million (i.e. 33%) awarded from competitive national calls were not specific to climate but related to the topic.

Figure 2 illustrates the breakdown of these new competitive awards under the four thematic areas and other projects of relevance to climate, in terms of budget committed, and Figure 3 illustrates the breakdown by CRCG members of the budget committed for new competitive awards during the reporting period.

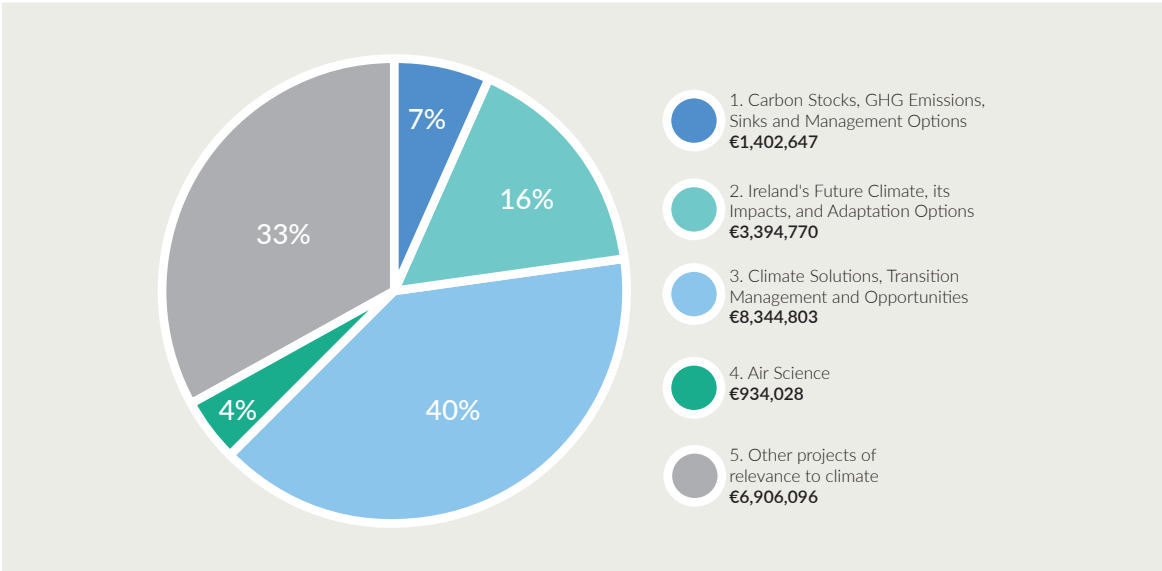


Figure 2: Breakdown of new competitive research awards in terms of budget committed (total budget committed €21 million) by thematic area by the CRCG members during 2020.

61 Funded by CRCG members and performed elsewhere.
62 <https://www.epa.ie/publications/research/climate-change/climate-research-coordination-group-report.php>

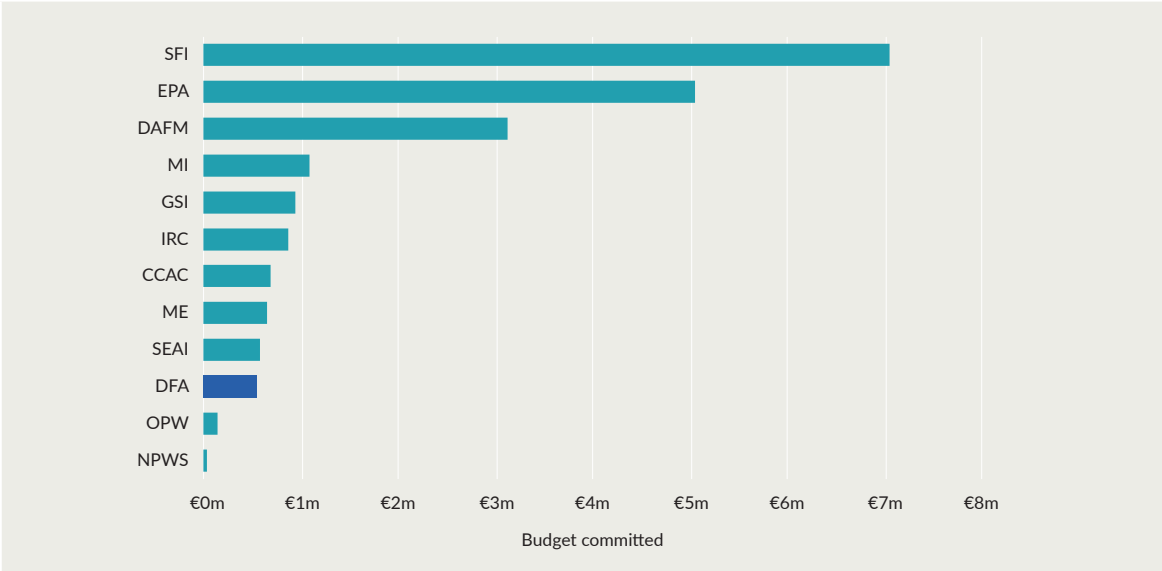


Figure 3: Budget committed by the CRCG members⁶³ for new 2020 competitive research awards (awards are from research calls from previous years as well as from 2020 research calls).

Table 4 details the funding committed for new competitive awards as reported by the CRCG members. Appendix 4 provides the list of the new competitive 2020 awards.

Table 4: New competitive awards budget committed in 2020⁶⁴

Organisation	Funding received from	Lead funder	As co-funder	Total
SFI	DBEI (now DFHERIS)	€7,063,452	–	€7,063,452
EPA	DECC	€4,031,096	€1,041,020	€5,072,116
DAFM	Government Exchequer	€2,989,001	€149,000	€3,138,001
MI	DAFM	€1,088,400	–	€1,088,400
GSI	Government Exchequer	€747,807	€201,540	€949,347
IRC	DFHERIS	€903,285	–	€903,285
CCAC	DECC and Climate Action Fund	€696,015	–	€696,015
MÉ	Government Exchequer	€599,226	€88,068	€688,056
SEAI	DECC	€614,846	–	€614,846
DFA	Government Exchequer	–	€555,226	€555,226
OPW	DPER	€157,500	–	€157,500
NPWS	Government Exchequer	–	€38,600	€38,600

DFA, Department of Foreign Affairs; DPER, Department of Public Expenditure and Reform; GSI, Geological Survey Ireland; MÉ, Met Éireann; OPW, Office of Public Works; SEAI, Sustainable Energy Authority of Ireland.

63 The Department of Foreign Affairs (DFA) is not a CRCG member, but has co-funded climate research to a value of €555,226 and is included in the chart.
64 DFA is not a CRCG member, but co-funded €555,226 in climate-related research in 2020.

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Figure 4 illustrates the breakdown of the total budget committed in 2020 via competitive new awards per receiving lead research organisation. The figure identifies that Trinity College Dublin was awarded the most funding based on the data provided, getting 33% of the total budget awarded, where nearly half of its total funding granted came from one single award. The top three research performing organisations (Trinity College Dublin, National University of Ireland, Galway (NUIG) and University College Dublin) were, together, awarded 73% of the total budget committed for new competitive awards in 2020. The data, it should be noted, do not account for funding received by partner organisations, ascribing the full award amount to the lead partner organisation.

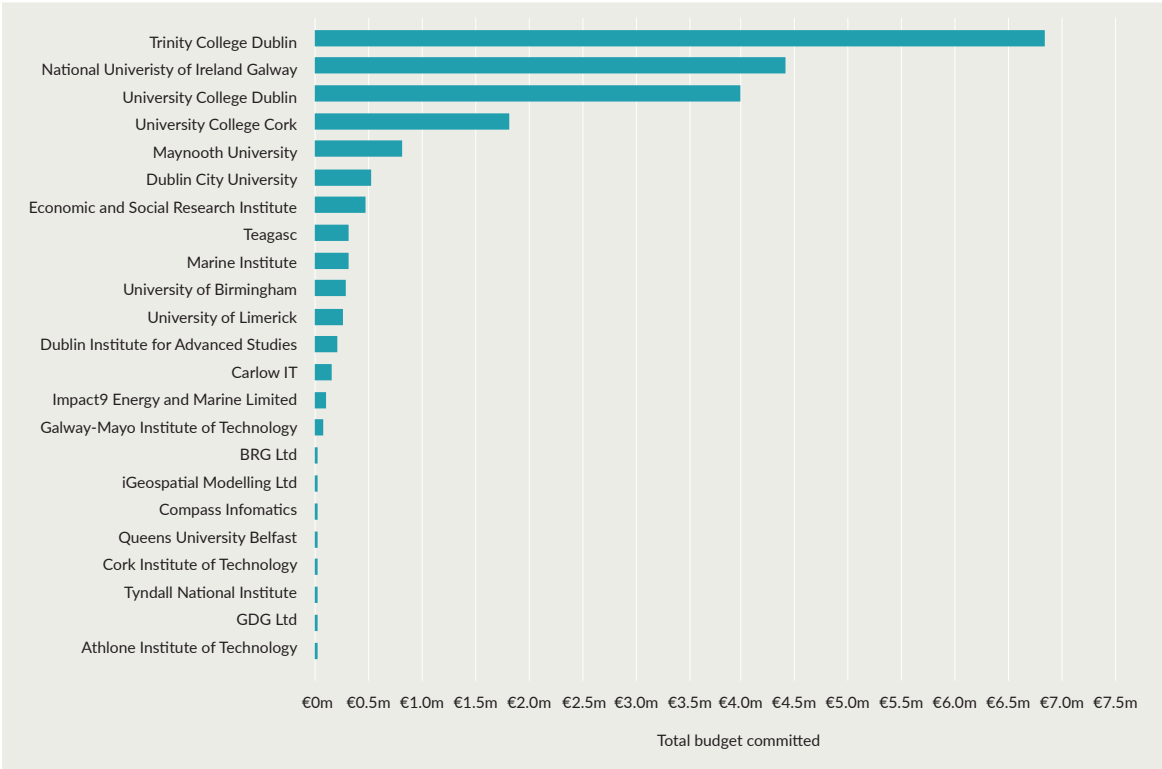


Figure 4: Total budget awarded in 2020 per receiving lead research performing organisation through competitive new awards.

Figure 5 presents the distribution of awards by award size, which ranged from €7,000 up to €2,989,001, with an average size of €249,790. The figure identifies that there were many awards of relatively small scale (39 awards in the range of €0 to €100k) and a small number of large awards (three awards greater than €1,000,000).

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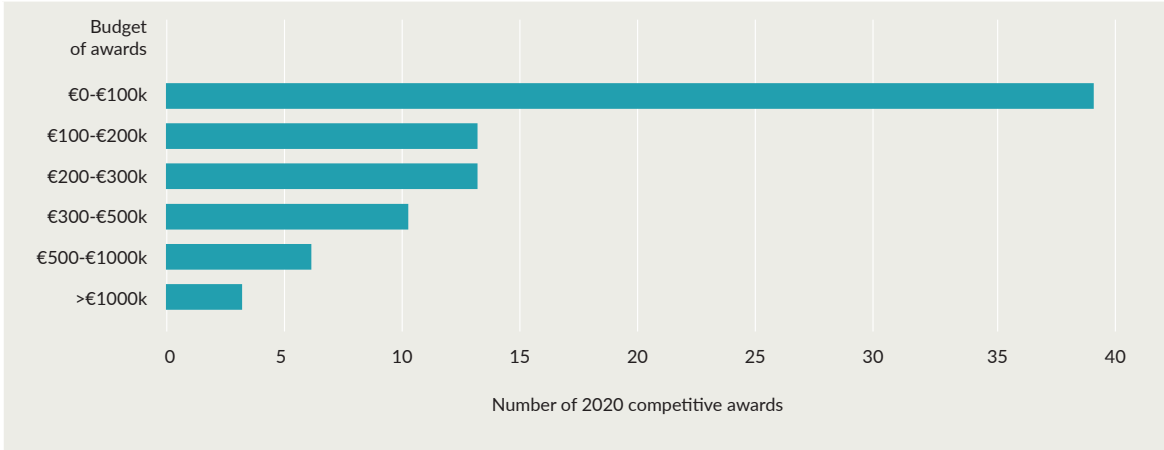


Figure 5: Distribution of 2020 competitive awards by budget.

Co-funding of the 2020 competitive awards

Among the new 2020 competitive awards detailed in the previous section, some awards were co-funded between members of the CRCG. The NAF calls for better coordination of national climate change research priorities. **Figure 6** illustrates the breakdown of co-funding committed under the thematic areas.

Based on the information provided, among the 84 new 2020 competitive awards, 14 (€2.07 million) have been identified as being co-funded between members of the CRCG in 2020⁶⁵.

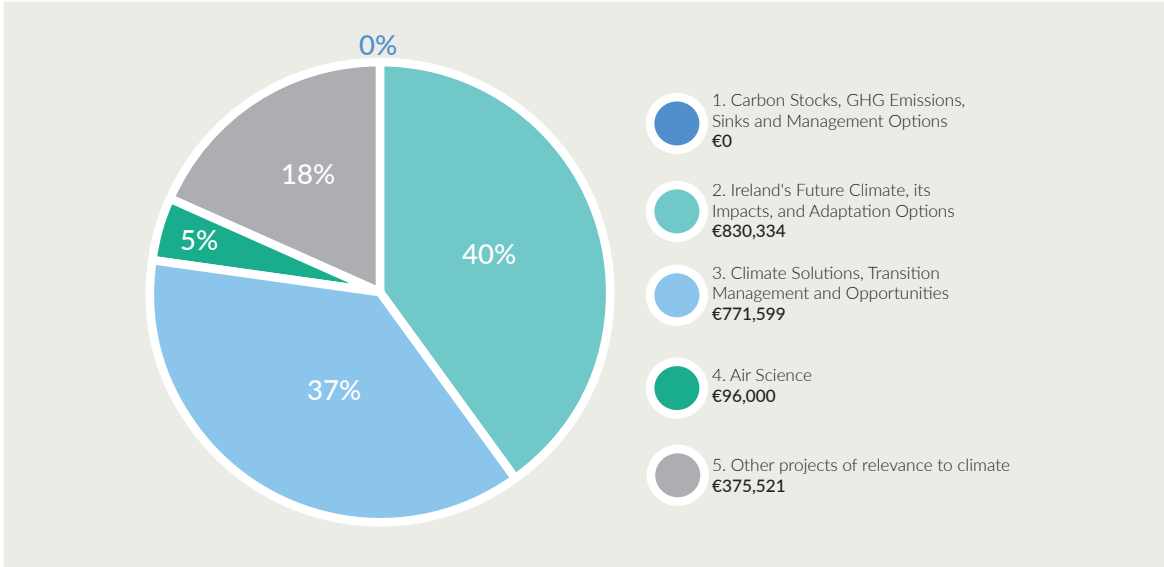


Figure 6: Breakdown of new competitive co-funded research awards in terms of budget committed (total budget committed €2.07 million) by thematic area by the CRCG members during 2020⁶⁶. No co-funding related to theme 1 (Carbon Stocks, GHG Emissions, Sinks and Management Options) was identified.

65 This includes €555,226 co-funding from DFA, which is not currently a CRCG member.

66 Competitive funding only for research and development performed elsewhere.

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2020 core research activities (i.e. internally completed research)

In addition to competitive research awards granted by CRCG members or leveraged from EU/international funding programmes, several CRCG members undertake research activities themselves, i.e. core research activities. These research activities are funded by these organisations and performed in-house.

In excess of €4.2 million was also reported as core research activities in 2020, i.e. research activities that are funded by an organisation and performed in-house.

Met Éireann (MÉ) reported **€2.6 million** dedicated to core research activities in 2020 in areas related to impacts and adaptation. In particular, this included work on climate modelling, climate services, climate communications, coastal flood forecasting capability, coastal monitoring, fluvial (river) flooding capability, pluvial flooding capability, national climate monitoring capabilities, coordination of the Irish GCOS and support of the National Emergency Coordination Group.

Marine Institute (MI) reported up to **€0.81 million** dedicated to core research activities in 2020 in relation to (i) its operation of the National Data Buoy Network, (ii) the National Tide Gauge Network, (iii) its annual climate monitoring of the shelf and open ocean, (iv) its operation of a newly constituted multi-disciplinary climate team to define and deliver MI climate services, and (v) lake monitoring in Burrishoole catchment.

Geological Survey Ireland (GSI) reported c.**€0.48 million** dedicated to new core research activities in 2020 in the area of climate change adaptation, looking at (i) production of a landslide hazard assessment methodology for three pilot areas

(Breifne, Dingle and Wicklow) and (ii) a groundwater monitoring and modelling project that aims to investigate the impact of climate change on groundwater in Ireland.

Central Statistics Office (CSO) reported **€171,600** dedicated to core research activities in 2020 in relation to (i) a climate data rescue project for MÉ historical daily station records, (ii) the creation of a research microdata file for the 2011 and 2016 Censuses of Population (environmental variables, e.g. on solid fuel heating), (iii) the creation of a research microdata file for the 2014 Labour Force Survey environment module and (iv) publishing a statistical release covering 2000–2018 fossil fuel subsidies.

Department of Transport (DT) reported **€90,000** dedicated to core research activities in 2020 in relation to phase 2 of its Low Emission Bus Trial and a road freight decarbonisation study co-funded with Transport Infrastructure Ireland.

Eastern & Midlands Climate Action Regional Office (CARO) reported **€35,081** dedicated to core research activities in 2020 in relation to sensitivity of fluvial flood peak flows to a changing climate.

National Economic and Social Council (NESC) reported **€14,676** dedicated to core research activities in 2020 in relation to three scoping papers: (i) economic resilience in sustainable communities, (ii) exploring what might help cities to build resilience and sustainable development, and (iii) green investment and conditionality, to examine conditionality as a potential tool to deliver necessary low-carbon and biodiversity supportive changes as part of economic recovery and into the future in Ireland.

A breakdown of expenditure on core research activities reported by CRCG members is presented in **Figure 7**.

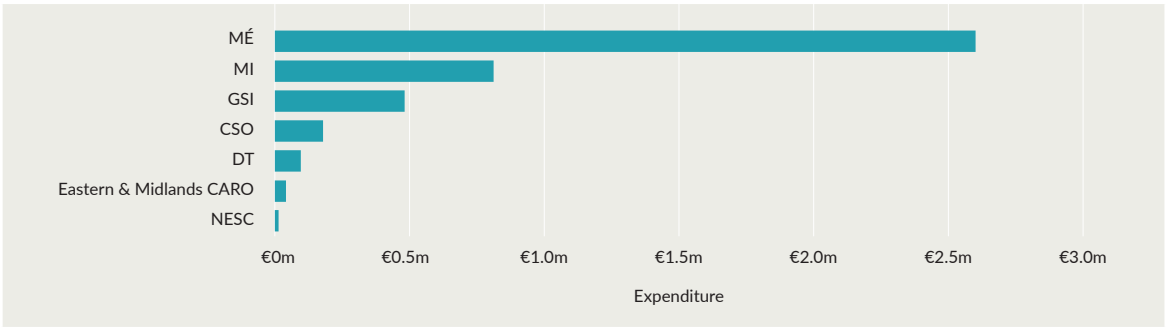


Figure 7: Expenditure on core research activities reported by CRCG members in 2020.

4.3 2020 Highlights of Climate-related Activities of CRCG Members

This section provides an overview of the climate-related activities of the members of the CRCG during 2020.

Central Statistics Office

The main workload of the Environment and Climate Division of CSO is to meet Eurostat requests for environmental accounts. CSO also makes extensive use of administrative microdata to publish statistical releases. Under the Statistics Act, 1993, CSO is authorised to make anonymised Research Microdata Files (RMFs) available to approved researchers. CSO produced two RMFs in 2020, which were used in EPA-funded research. CSO continued work on a climate data rescue project⁶⁷, which involves rescuing detailed daily data for around seven weather stations for the period 1870–1959. The Phoenix Park series starts in 1829, and CSO has made a longitudinal file of quality checked data available to MÉ for further checking.

Climate Action Regional Offices

The four CAROs⁶⁸, with funding from DECC, continue to work directly with local authorities on the development and implementation of their Climate Change Adaptation/Action Plans and relevant actions from the National CAP⁶⁹. The CAROs' work programme comprises six key areas: governance, adaptation, mitigation, communications and citizen engagement, training and education, and knowledge development. The CAROs are also directly involved with relevant government departments and agencies on the implementation of Sectoral Adaptation Plans. The rollout of a comprehensive Climate Action Training Programme for the local authority sector has commenced and includes collaboration with many organisations such as Climate Ireland, the Sustainable Energy Authority of Ireland (SEAI), MÉ, EPA, the Office of the Planning Regulator (OPR) and the Office

of Public Works (OPW). The CAROs are represented on the steering groups of a range of climate research projects and working groups associated with the implementation of Sectoral Adaptation Plans and climate mitigation activities. The CAROs also engage with the third level sector to improve the knowledge base for the local authority sector. Through their communications channels, the CAROs aim to increase the awareness of dissemination of climate research publications and projects to the local authority sector to assist in the planning and implementation of local climate action projects.

Climate Change Advisory Council

The CCAC funded focused, small-scale and desk studies to provide insight into various issues related to climate change.

Department of Agriculture, Food and the Marine

DAFM invited applications for funding under its Competitive Research Funding Programme. This is the first call under a restructured approach to research funding, seeking projects across key thematic areas including climate and biodiversity; sustainable animal and plant health and production; agri-digitalisation and the bioeconomy; and safe, healthy food production and processing.

DAFM committed to a number of ERA-Nets⁷⁰, in particular:

- €500,000 for *Food Systems and Climate*⁷¹, which will specifically address the reduction of the environmental footprint of the sector;
- €750,000 for *Circularity*⁷², which will specifically address the reduction of GHGs on (re-) integration of crop and livestock farming systems.

DAFM, in collaboration with the Department of Agriculture, Environmental and Rural Affairs – Northern Ireland (DAERA-NI) and the US National Institute of Food and Agriculture, launched the 2020 US-Ireland Research and Development Partnership

67 The data rescue project will extend Ireland's daily data from 60 years to 150 years. The files contain around 40 daily observations on temperature, rainfall, cloud cover, humidity, wind direction and speed, etc. (<https://www.cso.ie/en/methods/climateandenergy/cso-climatedatarescue/#~:text=The%20CSO%20and%20Met%20C3%89ireann,by%20Met%20C3%89ireann%20Meteorological%20Officers.&text=As%20of%20mid%2DAugust%2C%20data,but%20not%20yet%20fully%20checked>)

68 www.caro.ie

69 <http://dev.climateireland.ie/#!/tools/adaptationStrategyExplore>

70 European Research Area Networks (ERA-Nets) are networks of public research organisations that coordinate joint research activities in research areas which are of significant strategic value and relevance to the EU.

71 <https://www.foscera.net/en/foscera.htm>

72 <https://www.eragas.eu/en/eragas.htm>

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Call for Proposals in Agriculture. The call aims to advance knowledge in both fundamental and applied sciences important to agriculture, and support education and extension activities that deliver science-based knowledge to end users, allowing them to make informed and practical decisions.

With input from its climate change division, DAFM launched a National “Climate & Air Roadmap” for the agriculture sector entitled Ag Climatise. The roadmap sets an ambitious vision for a “climate neutral agriculture sector by 2050” and includes 29 actions with specific and challenging targets aimed at reducing the environmental footprint and further building on the strong credentials of Irish agriculture. DAFM funded the establishment of a “National Agricultural Soil Carbon Observatory” by supplying the scientific infrastructure to measure GHG fluxes from soils under agricultural management.

Department of the Environment, Climate and Communications

DECC continued to fund the SEAI, GSI and EPA research programmes, which support research through annual calls in a number of areas and which report separately on their activities. DECC supported the EU LIFE Programme in Ireland through stakeholder engagement and information events.

Department of Further and Higher Education, Research, Innovation and Science and Department of Enterprise, Trade and Employment

DBEI had responsibility for overseeing the implementation of Innovation 2020, Ireland’s whole-of-government strategy for research and development in science and technology. Work commenced in 2020 on the development of the next national research and innovation strategy. In July, the new government announced the formation of DFHERIS and the change of DBEI to the Department of Enterprise, Trade and Employment (DETE). Roles and responsibilities in relation to research and innovation policy have altered. Responsibility for national and international research and innovation policy (including the development of the next national research and innovation strategy), oversight of SFI and Tyndall National Institute was transferred to DFHERIS (effective from 1 January 2021).

In line with the requirement for National Development Plan (NDP) funds, in 2020 DETE and Enterprise Ireland (EI) agreed that prioritising low-carbon investment in the Disruptive Technologies Innovation Fund (DTIF) could be achieved by modifying one of DTIF’s selection criteria to include “sustainability”, and now reads “Economic Impact and Sustainability”. This applied for Call 3 of DTIF, which launched in September 2020, with the results announced in April 2021⁷³.

Department of Transport

In 2020, DT, in tandem with Transport Infrastructure Ireland, carried out a multi-stakeholder study with the objective of identifying and co-designing effective and affordable interventions to reduce carbon emissions from the Irish freight sector. DT also initiated the second phase of its Low Emission Bus Trial, which compared the performance of a single-deck hydrogen fuel cell electric (FCEV) bus with the performance of a range of conventional and alternative bus technologies as determined by the results of the Phase 1 trial (2019). The Phase 2 trial is ongoing, and its results will inform procurement strategies for the national public service obligation fleet.

The overarching objectives of research undertaken by DT is to support its wider commitment to shape the safe and sustainable development of transport, and to support economic growth and social progress. Other key research priorities currently being progressed by DT include a focus on the transition of the transport sector to low-emission vehicles and sustainable mobility networks; the climate resilience of transport infrastructure; the reduction of air pollutants and carbon emissions from land transport, particularly from the heavy-duty sector; an examination of the potential impact of traffic demand measures in Ireland’s five major cities; and consideration of the potential role of sustainable alternative fuels in decarbonising transport.

Environmental Protection Agency

In 2020, EPA continued to facilitate national climate research coordination. The EPA organised three workshops for national stakeholders to explore key findings in the IPCC special reports: (i) energy,

73 <https://enterprise.gov.ie/en/News-And-Events/Department-News/2021/April/20210421a.html>

heating and transport; (ii) agriculture and land use; and (iii) sea level rise. The EPA granted nine awards related to climate research in 2020. This included one award to a project from a transnational call and eight national awards. The EPA supported the CCAC award of four research fellowships related to climate change and supported the award of six lead author awards and one support fellowship for the 5YAR activities in Ireland. The EPA continued its strategic partnerships with SFI, DAFM, IRC and Fulbright Commission Ireland, resulting in 12 awards relating to climate change research. The EPA commitments on awards in 2020 related to climate research had a value of approximately €5.1 million.

In 2020, the EPA published the 4-yearly SOER 2020 for Ireland, as well as 29 EPA research reports related to climate change. The EPA initiated a consultation process in 2020 for the preparation of the new EPA Research Framework 2021–2030, which included hosting the EPA Research 2030 Thematic Hubs Virtual Workshop. The EPA continued to chair JPI Climate, which held its Second Scoping Forum Symposium in December under Germany’s EU Presidency.

Geological Survey Ireland

In 2020, GSI committed a further €1.5 million to new research projects, including in the area of climate change, and continued work on national and international projects in this area. Internal climate activities focused on five key areas: coastal change, geothermal energy, landslide hazards (primarily resulting from increased storminess), soil and soil carbon, and estimating and understanding ground water resources in the context of both flooding and drought and for groundwater protection.

One of the key outputs for 2020 was the Assessment of Geothermal Energy in Ireland for District Heating (GSI) and the accompanying roadmap and regulatory framework for geothermal energy in Ireland (DECC). These documents will provide information and guidance for the new Geoscience Policy Division and Geoscience Regulatory Office in DECC in the area of geothermal energy.

Other tools developed include the Coastal Vulnerability Index (a method for assessing the

vulnerability of coastal areas around Ireland) and studies of groundwater flooding in the west and potential groundwater drinking water resources in the east.

GSI continues to work with both academic groups and colleagues across the agencies and government departments, including interdisciplinary work with social and behavioural scientists. GSI is also a partner in a number of EU-funded initiatives in the climate space, including COST Actions, ERA-Nets, INTERREG, European Space Agency and Horizon 2020 projects. See www.gsi.ie for details of projects.

Irish Research Council

In 2020, the IRC was pleased to announce forthcoming strategic funding partnerships, many of which are linked to climate research, including with M  , EPA, DAFM and the Department of Rural and Community Development (DRCD).

IRC-funded awardees are continuously publishing the outputs of their research, including on climate research. For instance, “Samburu Stories: Communicating Architecture in the Climate Emergency” has been temporarily installed in the Irish Architectural Archive on Merrion Square, Dublin. Through a range of media, it illustrates the collaboration between UCD and the Samburu tribe (northern Kenya). The 2020 IRC Early Career Researcher of the Year award went to Dr Kathryn Schoenrock (NUIG). Dr Schoenrock’s groundbreaking work in this field has made her the authoritative voice on Irish kelp forest ecology and the productivity and biodiversity of these systems in nearshore waters.

This year, the Thomas Mitchell Medal of Excellence was awarded to Dr Tara Dirilgen (University College Dublin) “for being the top-ranked postdoctoral researcher in the STEM category”. Dr Dirilgen’s research investigates soil, plant and pollinator interactions. The IRC is also a proud sponsor of 10 Things to Know About, a six-part series on RT   One showcasing the best in Irish scientific research. In 2020, the series covered a number of environmental topics such as bioluminescence, biodiversity, flooding and drought, and hydrogen, while in August 2020, COALESCE (Collaborative Alliances for Societal Challenges)⁷⁴ awardee Arlene Crampsie was featured,

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74 <https://research.ie/funding/coalesce/>

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speaking about her research in managing rainfall and future weather extremes.

Marine Institute

The following are some of the 2020 key highlights for MI.

- ▶ A total of €5.3 million in new research investments was awarded under the MI's Marine Research Programme for 2020, including €3 million for ship-time and €2.3 million for research and innovation actions.
- ▶ €51.3 million is the total research investment under the MI's Marine Research Programme from 2014 to 2020, including €20.3 million for ship-time and €31 million for research projects and awards (total of 345 awards, with 98 still ongoing on 31 December 2020).
- ▶ The MI was successful in five Horizon 2020 projects in 2020, bringing a total European Commission-requested contribution of €2.117 million. The projects were (i) JERICO-S3 (Joint European Research Infrastructure of Coastal Observatories: Science, Service, Sustainability), (ii) MISSION ATLANTIC (mapping and assessing the present and future status of Atlantic marine ecosystems under the influence of climate change and exploitation), (iii) ASTRAL (All Atlantic Ocean Sustainable, Profitable and Resilient Aquaculture), (iv) GROOM II (Gliders for Research, Ocean Observations and Management: Infrastructure and Innovation) and (v) JERICO-DS (Joint European Research Infrastructure of Coastal Observatories-Design Study).
- ▶ A new online National Marine Research Database was launched in July 2020 displaying more than 500 marine research projects that have received combined funding of over €230 million from national and international competitive funding programmes. The collection and analysis of national marine research investment data commenced in collaboration with the Marine Research Funders' Forum. The database is an important aspect of the National Marine Research and Innovation Strategy 2017-2021.

Met Éireann

In 2020, MÉ's key core research activities included the continued work on climate modelling, climate services, climate communications, coastal flood

forecasting, coastal monitoring, fluvial (river) flooding, pluvial flooding capability developments, national climate monitoring capabilities, coordination of the Irish GCOS and support of the National Emergency Management. The year 2020 saw the launch of MÉ's multi-annual competitive research call programme, with its first call for proposals in the area of climate services entitled "TRANSLATE".

National Economic and Social Council

Since 2012, NESC has been conducting sustainable development research. NESC was asked by the government to take responsibility for work previously carried out by Comhar (the Sustainable Development Council). Work has focused on a range of diverse areas (a full list of research is available at www.nesc.ie).

In 2020, NESC work focused on just transition and the provision of strategic advice to the government on the management of the low-carbon and digital transformation. A number of reports were produced, including *Addressing Employment Vulnerability as Part of the Just Transition* (NESC Report 149) and *Progressing Sustainability in the Context of Covid-19: Grasping the Opportunity* (Secretariat Covid-19 Working Paper, April 2020).

In addition, NESC organised a European Conference on a Just Transition, the 28th Annual European Environment and Sustainable Development Advisory Councils Network (EEAC Network) Conference, online. The conference focused on the principles of justice, fairness, equality and equity of a just transition and how these can act as a lever and guide to shape policies and practices to deliver the transformation. Minister Eamon Ryan addressed the conference and President Michael D. Higgins made a keynote presentation at the closing event. Speakers from outside Ireland included Sharon Burrows (International Trade Union Confederation, ITUC), Stefano Grassi (European Commission), Alice Charles (World Economic Forum), Sandrine Dixon-Declève (The Club of Rome) and a range of academics and practitioners. Speakers from Ireland were also present, including the Irish Just Transition Commissioner Kieran Mulvey.

National Monuments Service/Built Heritage (DHLGH)

National Monuments Service/Built Heritage began the implementation of its Sectoral Adaptation Plan

for Built and Archaeological Heritage. As a first step it began collecting information from all stakeholders related to priority actions within the plan. OPW is a key partner and is leading, with participation from the Department of Housing, Local Government and Heritage (DHLGH), on an EU LIFE application submitted in October 2020, for which the award decision is pending. Led by their heritage partners in OPW, a climate vulnerability assessment for Skellig Michael has been carried out and a climate change risk assessment on Ballinskelligs Priory has been commissioned. These are informing the overall state approach to adaptation and meeting objectives actions within its adaptation plan.

National Parks & Wildlife Service

In 2020, the National Parks & Wildlife Service (NPWS) concluded a research contract with Queen’s University Belfast that aimed to develop the understanding of the potential impacts of climate change on protected species. This research built on recent and ongoing NPWS monitoring projects and looked at three widespread species (bats) as well as an endangered species of restricted distribution (the natterjack toad). In addition, NPWS is collating GHG measurements at six peatland sites.

Office of the Planning Regulator

During 2020, the Office of the Planning Regulator (OPR) developed a “Strategic Research Framework” to guide its future research function. The OPR also prepared a “Strategic Planning Research Programme”, which identifies specific projects that the OPR will conduct research on for the next 2 years. The OPR’s National Planning Knowledge Group (NPKG), which includes representation from higher education institutes, non-governmental organisations, planning institutes and government organisations and departments, held three meetings in 2020. The group acts as an advisory committee for the OPR and was integral to the development of the framework and programme. The RTPI Measuring Planning Outcomes research project, of which the OPR was a co-sponsor, was published in November 2020. During 2020, work was initiated, including stakeholder engagement on a number of projects identified in the programme.

Office of Public Works

During 2020, the OPW continued its involvement in projects focusing on the impacts of climate change

on flood risk. In terms of fluvial flood risk, the OPW’s research interests are focused on assessing the sensitivity of fluvial flood peak flows to climate change. This research will aim to provide guidance on the application of allowances for climate change to extreme flood estimates. With regard to coastal flood risk, the OPW has provided funding to study the effects of climate change on sea levels, including astronomical tide levels and storm surges, and on wave climate conditions around the coast of Ireland. As noted previously in the summary of activities for National Monuments Service/Built Heritage, OPW is participating with DHLGH on an EU LIFE Application. The two parties have also carried out a climate vulnerability assessment for Skellig Michael and commissioned a climate change risk assessment on Ballinskelligs Priory.

Science Foundation Ireland

In 2020, SFI continued to support climate-relevant research through awards across various programmes in its portfolio. These included awards in basic research, capacity building, industry-academia collaboration, challenge research awards and public engagement. Research awards were made through the SFI Frontiers for the Future Programme (including co-funding from EPA and GSI), the SFI Industry Fellowship Call, SFI President of Ireland Future Research Leaders Programme. SFI continued to grow its challenge-funding portfolio, funding 11 teams under its Zero Emissions Challenge to develop solutions for a climate-neutral future. Other climate-relevant teams were also funded within the SFI AI for Societal Good Challenge, and two further challenges related to the circular economy – the SFI Plastics Challenge and SFI Food Challenge – were launched in 2020. SFI continued to fund major climate-relevant research initiatives through its research centres and strategic partnerships programmes, including MaREI, BiOrbic, iCrag and CONSUS, among others. Through its public engagement programmes in 2020, SFI supported some key activities associated with climate action, including National Science Week with the theme “Choosing Our Future” as well as through its broadcasting partnership with RTÉ, co-funding the series “What Planet Are You On”.

Sustainable Energy Authority of Ireland

The SEAI National Energy Research, Development & Demonstration (RD&D) Funding Programme

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supports innovative energy RD&D projects that contribute to Ireland's transition to a clean and secure energy future. In 2020, SEAI continued to support ongoing projects awarded through previous annual SEAI National Energy RD&D Funding Programme competitive calls. A number of further projects selected for funding through the 2019 competitive call commenced in 2020. Details of projects awarded that align with the CRCG Thematic Areas have been included in this update.

In November 2020, SEAI and DECC co-hosted the 2020 National Energy Research and Policy Conference. This conference series aims to facilitate discussion on the role of energy research and policy in achieving Ireland's long-term clean energy goals. The thematic focus for the 2020 conference centred on the decarbonisation of Ireland's heat sector. This conference was delivered via a series of four webinars throughout the month of November. Full conference details, including slides and webinar recordings, are available at <https://www.seai.ie/events/research-conference/>.

Teagasc

Teagasc was involved in funding three ERA-GAS/ SUSAN/ICT-AGRI Joint Call projects (Milkey, MELS and SeaSolutions). Teagasc contributed €88,000 to each of these in the form of PhD student funding. Additionally, Teagasc was involved in a project funded by the SFI VistaMilk centre and industry titled N₂O from CAN (calcium ammonium nitrate). Total funding for this project was €17,019.

4.4 Snapshot of 2020 Joint Research Events

This section provides examples of climate research communication workshops and selected examples of research project briefings and workshops.

Table 5 provides examples of climate research communication events and workshops that took place in 2020.

Table 5: Examples of 2020 climate research communication events and workshops (42 in total)

Event	Website	Date(s)
CAMS User Workshop in Dublin, Copernicus Atmosphere Monitoring Service (CAMS), in collaboration with the EPA	https://atmosphere.copernicus.eu/cams-user-workshop-dublin	30 January 2020
DAFM Ag Climatise stakeholder conference	https://www.gov.ie/en/publication/07fbc-ag-climatise-a-roadmap-towards-climate-neutrality/	1 February 2020
EPA Climate Change Lecture Series: The European Green Deal – <i>Towards a climate-neutral EU</i> by 2050	https://www.youtube.com/watch?app=desktop&v=uqKMcgglMFU&list=PLCDE951EB77E87100&index=1	6 February 2020
Launch of the Network of Arctic Researchers in Ireland (NARI)	https://www.marine.ie/Home/site-area/news-events/news/new-network-arctic-researchers-ireland	28 February 2020
Irish Geological Research Meeting	https://www.gsi.ie/en-ie/events-and-news/events/Pages/IGRM2020.aspx	28 February–1 March 2020
World Meteorological Organization (WMO) World Met Day 2020	https://www.met.ie/world-met-day-23rd-march	23rd March 2020
Irish Global Climate Observing System (GCOS) meeting	N/A	23 March 2020
Pathways workshop on IPCC special reports: 1. Sea Level Rise	N/A	1 April 2020
2020 AGMET Conference	https://www.met.ie/2020-agmet-conference	19–22 May 2020
National Marine Research Funders’ Forum 5th Meeting	N/A	21 May 2020
EU LIFE Information Day	https://www.gov.ie/en/publication/7e5e8-life-programme/#2020-calls-for-proposals-and-life-information-day	10 June 2020

Event	Website	Date(s)
Pathways workshop on IPCC special reports: 2. Energy, Transport and Heating	N/A	24 June 2020
Climate Conversations No. 1: Fossil Fuel Lock-in in Ireland – How Much Value Is at Risk, Celine McInerney (Royal Irish Academy and EPA)	N/A	24 June 2020
Pathways workshop on IPCC special reports: 3. Agriculture and Land Use	N/A	26 June 2020
ICOS Ireland meeting	https://www.eventbrite.ie/e/icos-ireland-tickets-113078980274#	27 July 2020
Climate Conversations No. 2: Ireland's Future Climate Projections, Paul Nolan (Royal Irish Academy and EPA)	N/A	29 July 2020
CIAAN Research Survey (Constraining the Impact of Arctic Amplification in the Nordic Sea: A Biogeochemical Approach)	https://www.marine.ie/Home/site-area/news-events/press-releases/understanding-past-help-predict-future	16 September 2020
Climate Conversations No. 3: The Potential Role of Negative Emissions Technologies in Ireland, Barry McMullin (Royal Irish Academy and EPA)	N/A	2 October 2020
EU Innovation Fund Information Day	https://www.gov.ie/en/publication/bee1c-innovation-fund/#innovation-fund-information-seminar	7 October 2020
Information Session for Ocean Ecosystems and Climate Call	https://www.marine.ie/Home/site-area/research-funding/research-funding/ocean-ecosystems-and-climate-call	14 October 2020
EPA National Air Event 2020 – The Air We Breathe (Online Conference)	https://www.youtube.com/playlist?list=PLFesobjWT1FgiuWbcH5Y2Wl-tPg8gOI06	14–15 October 2020
Irish Association of Hydrologists	https://www.gsi.ie/en-ie/events-and-news/events/Pages/IAH-Characterisation-and-Management-of-Groundwater-in-Limestones.aspx	19–20 October 2020
“Delivering a Just Transition for All” 28th EEAC Annual Conference	https://www.nesc.ie/news-events/events/nesc-to-host-the-28th-eeac-annual-conference-delivering-a-just-transition-for-all-online-27-to-29-october-2020-2/	27–29 October 2020
EPA Research 2030 Strategy Thematic Hubs Virtual Workshop	https://crowdcomms.com/eparesearch20/modules/58794/html	28 October 2020
Explorers Education Programme Climate Action Day	https://www.marine.ie/Home/site-area/news-events/press-releases/explorers-primary-school-joins-international-experts-and	3 November 2020
2020 National Energy Research and Policy Conference – Webinar Series Thematic focus – Decarbonisation of Ireland's Heat Sector	https://www.seai.ie/events/research-conference/	5, 12, 18 and 26 November 2020
Science Week – Choosing Our Future	https://www.sfi.ie/engagement/science-week/	8–15 November 2020
GeoERA webinar series	https://www.gsi.ie/en-ie/events-and-news/events/Pages/GeoERA-Webinar-Series.aspx	9–13 November 2020
CHERISH: Climate Change Impacts on Coastal Change in Dublin	https://www.gsi.ie/en-ie/events-and-news/events/Pages/Climate-change-impacts-on-the-coastal-heritage-of-county-Dublin.aspx	10 November 2020

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EPA Climate Change Lecture Series Online: <i>Covid-19 and Global Carbon Emissions: A Glimpse of the Challenge of Reaching the Paris Climate Commitment</i>	https://www.youtube.com/watch?v=cU_ZqDBPTmQ	11 November 2020
Environmental Law Enforcement Conference – Emerging Challenges 2020 (co-hosted with Irish Centre for European Law (ICEL))	https://www.youtube.com/playlist?list=PLFesobjWT1FgaEN2j4vGBK3k20hHS07Ds	11 November 2020
ICOS Ireland meeting (to liaise with Director of ICOS ERIC and identify sites in Ireland that may be included in the ICOS-RI)	N/A	12 November 2020
Geoscience 2020 – Geoscience for Policy	https://www.gsi.ie/en-ie/events-and-news/events/Pages/Geoscience-2020-Conference---save-the-date!.aspx	18–19 November 2020
Launch of Ireland’s shortlisted proposal to host the European Centre for Medium-range Weather Forecasting (ECMWF)’s EU-funded activities	https://www.met.ie/irelands-proposal-to-host-the-ecmwf-eu-funded-activities	23 November 2020
National Marine Research Funders’ Forum 6th Meeting	https://www.marine.ie/Home/site-area/news-events/press-releases/research-funders-meet-review-ireland%E2%80%99s-progress-marine-research	26 November 2020
Launch of “ACCORD”, the largest research consortium globally focused on the research and development of world-leading weather prediction for local and regional weather conditions in Europe	https://www.met.ie/new-accord-consortium-met-eireann-expands-its-international-collaboration-in-knowledge-leading-weather-prediction-science	30 November 2020
Can mining make the world a greener place?	https://www.gsi.ie/en-ie/events-and-news/events/Pages/Debate-Can-mining-make-the-world-a-greener-place.aspx	3–4 December 2020
EPA/IIEA Environmental Resilience Lecture Series – Lecture 1: Innovation Driving a Green and Just Transition: Mission 2050 (co-organised with Institute of International & European Affairs)	https://www.iiea.com/events/innovation-driving-a-green-and-just-transition-mission-2050innovation-driving-a-green-and-just-transition-mission-2050	4 December 2020
MI Research Symposium 2020	N/A	9 and 10 December 2020
Monitoring Coastal Erosion from Space	https://www.gsi.ie/en-ie/events-and-news/events/Pages/Monitoring-Coastal-Erosion-from-Space-Workshop-Ireland.aspx	10 December 2020
National Modelling Forum 2020 virtual event – co-organised with MÉ	N/A	18 December 2020
Launch of “TRANSLATE” project to standardise future climate information for Ireland	https://www.met.ie/irelands-weather-in-2020-indicates-further-evidence-of-climate-change	21 December 2020

N/A, not available.

4.5 Meetings of the Climate Research Coordination Group

In 2020, **four meetings** took place (the first meeting was a combined meeting of the Climate, Water and Sustainability Research Coordination Groups) in February, June, August and November.

CRCG meetings have focused on the 5-year assessment and synthesis of research report, the development of national research programmes given the constraints posed by Covid-19, information exchange on activities, feedback to the European Commission on the development of Horizon Europe, coordination of research and leveraging of EU funding and realising the benefits of Europe-wide research.

External presentations were given by:

- ▶ Jeremy Gault (University College Cork – UCC/ MaREI), Irish delegate to European Strategic Framework for Research Infrastructure (ESFRI) Environmental Strategic Working Group (SWG), on the roles of the ESFRI, its environmental SWG and the Irish context⁷⁵;
- ▶ Martin Le Tissier and Hester Whyte (UCC) on the research project Identifying Interactions for SDG Implementation in Ireland, which focused on the Sustainable Development Goals (SDGs) within the context of integration of national social, economic and environmental policy and the development of a tool that facilitates and enables integrated SDG implementation across policy domains;
- ▶ the newly established All-Island Climate and Biodiversity Research Network (AICBRN).

4.6 Research Publications

This section provides an overview of where to find research publications arising from the funded research projects⁷⁶ that were published in 2020, as reported by the CRCG members (see **Table 6**).

Table 6: Climate change-related CRCG research publications (2020)

Lead funding organisation	Information source/website/publication link
DAFM	https://www.agriculture.gov.ie
GSI	https://www.gsi.ie/en-ie/publications/Pages/default.aspx
EPA	https://www.epa.ie/publications/research/epa-research-2030-reports/
MÉ	https://www.met.ie/science ; https://www.met.ie/climate/ https://www.met.ie/education
MI	https://oar.marine.ie/
IRC	https://research.ie/funding/ https://research.ie/resources/publications/
NESC	https://www.nesc.ie/publications/
SEAI	https://www.seai.ie/data-and-insights/seai-research/research-projects/
CAROs	www.caro.ie
SFI	www.sfi.ie https://www.sfi.ie/funding/researcher-database/
CSO	https://www.cso.ie/en/statistics/environmentaccounts/ https://www.cso.ie/en/statistics/environmentstatistics/ https://www.cso.ie/en/statistics/climateandenergy/
OPR	https://www.opr.ie/research/ https://www.opr.ie/planning-performance/

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75 <https://www.esfri.eu/>
76 Accessible to the public from the CRCG members' websites.

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Section 5

2020 Developments related to the National Climate Research Infrastructure



5. 2020 Developments related to the National Climate Research Infrastructure

5.1 Climate Ireland

Climate Ireland is an operational support, funded by the EPA and DECC, in relation to the implementation of the NAF (i.e. Action 7). It provides information, support and capacity building to help organisations, sectors and government to adapt to the consequences of climate change. The service is provided through the Climate Ireland web portal (<https://www.climateireland.ie/>) and through provision of scientific and technical advice, training programmes and workshops, etc. Ownership and responsibility for overseeing Climate Ireland operations switched to the EPA in January 2021.

Climate Ireland has advised that the following activities were carried out in 2020:

1. The Climate Data Explorer tool was updated for the latest data related to projections developed under EPA-funded research projects that issued final reports in 2020⁷⁷.
2. The observation information included in the Climate Status Tool has also been updated based on data from EPA-funded research⁷⁸, but will go live with the publication of the final report (in press).
3. Employing CSO data and information, a social vulnerability tool was developed and deployed.
4. Climate Action Awareness Training: at the request of the CAROs, Climate Ireland led the development of online and in-person climate action training, in line with Action No. 150 of CAP19. The online training is targeted at all local authority staff. The 3-day in-person training programme is targeted at climate action teams and themed staff, with contributions from SEAI, M  , OPW, DECC, the Institute of Public Administration and the local authority energy agencies.

5. The menu system for the Climate Ireland web portal was upgraded to assist users to navigate the service.



5.2 Atmospheric Composition and Climate Change and AEROSOURCE Networks

The Atmospheric Composition and Climate Change (AC3) and AEROSOURCE networks are composed of the European Monitoring and Evaluation Programme (EMEP) network, the AEROSOURCE network for chemical speciation of aerosols and the GHG monitoring network (see the second report⁷⁹ for more details). In 2020, the EPA agreed a new contract with NUIG in the operation and maintenance of this research infrastructure.

5.3 Integrated Carbon Observation System for Ireland (ICOS Ireland)

Two meetings of the ad hoc ICOS Ireland group were held in 2020⁸⁰. These meetings covered the significant developments being planned for advanced measurements of GHGs at ecosystem sites including grassland, drained peatland and peatlands under restoration. Further steps towards joining the ICOS-RI⁸¹ were outlined.

77 EPA Research Report 339 (*High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach*, <https://www.epa.ie/publications/research/climate-change/research-339-high-resolution-climate-projections-for-ireland--a-multi-model-ensemble-approach.php>) and EPA Research Report 350 (*Towards a Definitive Historical High-resolution Climate Dataset for Ireland – Promoting Climate Research in Ireland*, <https://www.epa.ie/publications/research/climate-change/research-350-towards-a-definitive-historical-high-resolution-climate-dataset-for-ireland--promoting-climate-research-in-ireland.php>)

78 *Climate Status Report Ireland* (EPA Ref. 2017-CCRP-MS.48).

79 <https://www.epa.ie/publications/research/climate-change/climate-research-coordination-group-second-report-on-activities.php>

80 The ad hoc ICOS Ireland group consists of representatives of national stakeholders (including state agencies and government departments), site operators and the research community engaged in GHG observations at atmospheric, land and ocean locations in Ireland.

81 <https://www.icos-cp.eu/>

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Section 6

New 2020 EU Funding Leveraged by Ireland for Climate Change Research Projects



6. New 2020 EU Funding Leveraged by Ireland for Climate Change Research Projects

National research investment is the main funding source for climate change research in Ireland. However, researchers from Ireland have been successful in attracting international funding at the European level. This enables researchers from Ireland to work with, lead on and learn from projects that involve multi-disciplinary international research groups.

Based on the projects identified by the CRCG members, the Irish research community leveraged **€18.8 million (46 projects)** of EU funding via Horizon 2020; **€6.9 million** of funding from **INTERREG (one project⁸²)** and c.**€10.5 million** from **LIFE (three projects)** for climate-related research. No new climate-related **COST Actions** involving Irish partners were approved in 2020.

Several of the CRCG members, namely DAFM, the Health Service Executive (HSE), Teagasc, DECC, EPA, GSI, MI and NPWS, participated in successful proposals. The list of the climate-related 2020 successful proposals with Irish participants is provided in **Appendix 5** for Horizon 2020, **Appendix 6** for INTERREG and **Appendix 7** for LIFE.

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82 Includes projects approved, contracted and started in 2020.

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New 2020 EU Funding Leveraged by Ireland for Climate Change Research Projects



7. Conclusions and Proposed Actions for 2021

7.1 Conclusions

This third report presents a summary of the CRCG activities during the 12-month period from **January to December 2020**.

CRCG members have not reported that the Covid-19 pandemic had an impact on research funding calls in 2020. However, the pandemic has caused delays in the implementation of the funded research projects owing to Covid-19-related restrictions, e.g. restricted lab access and difficulty with recruitment of researchers. As a result, this will have an impact on the timeline for completion of the projects (with most projects seeking extensions of 6 to 12 months) and in some cases may result in the restructuring of the proposed research projects work plans.

One of the expected developments for 2021 will be the publication of the new national research and innovation strategy. Under the aegis of the Innovation 2020 Implementation Group, for which RFOs and government departments have already been consulted on an organisational basis in 2019 and 2020.

In summary, in 2020:
The most significant highlight of 2020 was initiating the first 5-year assessment and synthesis of research (which shall contribute to Action 14(j) of the iCAP21) with the grant of six lead author awards and one support fellowship award. The work is scheduled to be completed in 2022.
Based on the information provided, 84 new climate-related research competitive awards were made during the reporting period, with a total budget commitment of €21 million . Among these 84 projects, collaboration between the CRCG members was evident through the co-funding of 14 research projects with a committed budget of €2.07 million . Of the €21 million, €6.9 million (33%) awarded from competitive national calls were not specific to climate but related to it.
73% of the budget for competitive new awards in 2020 went to three institutions: Trinity College Dublin, NUIG and University College Dublin (when assigning funding for successful projects solely to lead partner), based on the data provided on national competitive awards. Project awards ranged in size from €7,000 to €2,989,001, with an average size of €249,790.
In excess of €4.2 million was also reported as core activities in 2020, i.e. research activities that are funded by the organisation and performed in-house.
The Irish research community achieved a drawdown of €18.8 million under Horizon 2020 (46 projects), €6.9 million from INTERREG (one project ⁸³) and €10.5 million under the LIFE Programme, with three climate-related research projects. There were no new climate-related COST Actions involving Irish partners approved in 2020.
One new member joined the CRCG, namely DoT.
The CRCG held four meetings, one of which specifically related to carrying out the 5-year assessment and synthesis of research report.
In addition, 42 climate research communication events and workshops took place in 2020 involving the CRCG members.

Table 7 summarises the CRCG activities for 2020 compared with those reported in the first report, which covered an 18-month period (June 2017–December 2018), and the second report, which covered a 12-month period (January–December 2019).

The review of climate change-related research during the period January–December 2020 indicated a decrease in co-funding between the CRCG member organisations. Crucial complementarities exist between the research areas, and the reasons for the decrease need to be identified and a path to improve the level of co-funding, which is an important indicator of collaboration, agreed. Some CRCG members did not have research calls in 2020, which meant less opportunity to identify research co-funding opportunities.

83 Includes projects approved, contracted and started in 2020.

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On the other hand, 42 climate research communication events and workshops involving the CRCG members took place in 2020 (compared with 18 reported in the second report). This is a good indication of extensive communication and collaboration among CRCG members, when most events had to be held online on account of the Covid-19 pandemic, which caused the National Climate Conference to be cancelled.

Table 7: CRCG activity indicators 2020

Indicator	First annual report	Second annual report	Third annual report	Comments
Reporting period	June 2017–December 2018 (18 months)	January–December 2019 (12 months)	January–December 2020 (12 months)	Not applicable
Number of new competitive awards	104	72 + MaREI-Phase 2	84	Sections 4.1 and 4.4 identify changes in the research funding landscape for 2020. Although more awards were made in 2020, this may not mean that greater funding was committed.
Budget committed towards new competitive awards	€25 million	€23.1 million + €19.5 million towards the MaREI-Phase 2 SFI Centre	€21 million	Lower commitments for climate-related research calls reported for 2020 compared with previous years. Research funding for RFOs naturally varies from year to year; their research calls may not be annual and/or their support for European/ international research programmes will depend on the relevance of those research calls for Ireland and the success of proposals submitted by the Irish research community. The EPA, SEAI and DAFM did not have a scheduled national call in 2020.
Collaboration/ co-funding among CRCG members	€6 million (19 projects)	€6.8 million (21 projects)	€2.07 million (14 projects)	Significantly lower level of co-funding in 2020. CRCG meetings allow its members to review research gaps, avoid duplication, promote synergies and identify opportunities among funding programmes of CRCG members. This strengthens collaboration, which is reflected in the level of co-funding. Some CRCG members did not have research calls in 2020, which meant less opportunity to identify research co-funding opportunities. Notwithstanding the decrease in co-funding, the CRCG agreed on how to progress the 5-year assessment and synthesis of research. DFA co-funded an additional €555,226 in climate-related research in 2020. The CRCG could consider inviting DFA into CRCG in 2021.
Core research activities	Not reported	c.€3.4 million	c.€4.2 million	Increased amount of core research activities reported, which may reflect an improvement in how these activities are reported.
Number of CRCG meetings	3	3	4	One extra meeting was held to progress work on the first five-year assessment and synthesis of climate research in Ireland.
Irish drawdown under Horizon 2020	€3 million (14 projects)	€29.8 million (50 projects)	€18.8 million (46 projects)	Similar number of Horizon 2020 projects reported but resulting in lower drawdown than reported in 2019.
Irish drawdown under INTERREG	Not reported	€15.1 million (11 projects)	€6.9 million (1 project)	Lower drawdown than reported for 2019. A number of assemblies did not have calls in 2020.
Irish drawdown under LIFE	Not reported	€14.9 million (2 projects)	€10.5 million (3 projects)	Lower drawdown than reported for 2019. Some LIFE projects carry substantial funding and large year-to-year variations may not be unexpected. Most of the drawdown for 2020 (€9.9 million) related to enhanced restoration of peatland – a key area of climate research for Ireland.

DFA, Department of Foreign Affairs.

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7.2 Review of Planned 2020 Actions

Table 8 summarises the progress made on the proposed actions for 2020 that were included in the second report.

Table 8: Review of proposed actions for 2020

Proposed action for 2020	Action taken
Schedule of call timing and co-funding opportunities	Completed. This was included in Appendix 8 of the second report.
Development of an online database for climate research projects	Postponed. This did not happen in 2020 because of the need to upgrade the EPA's current (SAFER) database for research. The upgrade is scheduled for 2021. This project will also be aligned with future recommendations from the National Research Classification System Exercise currently being carried out (Action of Innovation 2020).
Review of thematic structure for reporting research projects/activities in annual CRCG reports	In progress. The 5-year assessment of research was initiated in 2020 and will look at the thematic structure used for reporting research projects/activities in the annual CRCG reports. This will also need to be aligned with future recommendations from the National Research Classification System Exercise currently being carried out (Action of Innovation 2020).
Improve how the CRCG functions as a group	Ongoing. Recognised as ongoing activity of CRCG. Under Covid-19, the focus was on keeping things going (e.g. meetings held online).
Improve the research coordination (linked to above)	In progress. It is expected that improved coordination will be enabled/informed by the 5-year assessment of research process.
Develop metrics on the targets the CRCG is trying to achieve that could be monitored and reported on in the annual reports	In progress. This will be addressed through the 5-year assessment of research.
Review how core research activities are reported	Ongoing. Relevant CRCG members agreed on how they would report core research activities. Actual expenditure incurred in 2020 was reported in this report.
Formation of a sub-group to review the funding agencies' impact indicators	To be started. This action is linked to the development of national research impact indicators, which was put on hold in 2020 because of restructuring of government departments. This work is now scheduled to be completed in 2021. While CRCG members may individually feed into the process, led by DFHERIS, to develop national impact indicators, a sub-group of the CRCG agreed to meet in 2021 and coordinate the development of impact indicators for climate research purposes. This sub-group will liaise with DFHERIS on the national process.

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Climate Research Coordination Group

Reporting Period:
January - December 2020

29
Members



4 CRCG
Meetings

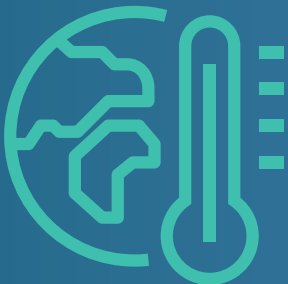


84 New climate-related awards

€21m
Committed



€36.2m
EU Funding leveraged



€4.2m
for core research activities

7.3 Proposed Actions for 2021

Synergies between RFO funding strategies and new national research strategy (all funders, DFHERIS)

DFHERIS plans to finalise the next national research and innovation strategy (successor to Innovation 2020) in 2021. CRCG members that are RFOs will review how synergies can be found between their strategies and the new national research strategy, for example in the development of research infrastructure.

Development of an online database for climate research projects

As part of collating the information reported by the CRCG members to prepare the CRCG annual report of activities, the EPA maintains a spreadsheet with details of all research projects and funding sources. It had been agreed in 2020 to progress the development of an online database for climate research projects. This did not happen because of the need to upgrade the EPA's current (SAFER) database for research. The upgrade is scheduled for 2021. The development of a national online database for climate research projects would harmonise how research data and outputs are held and accessed and, crucially, support open data and open research in line with national policy outlined in the Open Data Strategy 2017–2022⁸⁴ and the National Framework on the Transition to an Open Research Environment⁸⁵. The development of the online database will be coordinated with the development by DFHERIS of a standardised classification system for public investment in research, which will help in monitoring, managing and assessing the impact of publicly funded research nationally. The database will also link to the National Energy Research Database, a central hub for publicly funded energy research projects⁸⁶. The need for this database was also identified in the Organisation for Economic Co-operation and Development (OECD) Environmental Performance Review for Ireland, 2021⁸⁷.

Greater involvement in supporting knowledge transfer activities and the development of impact indicators (all)

At the CRCG meetings in 2020, CRCG members recognised the importance of improving the interface

between policymakers and academia in effecting knowledge transfer and getting the most out of funded research. Improving knowledge transfer with other stakeholders, e.g. practitioners, farmers and businesses, was also identified.

The CRCG will identify in 2021 how best to report on knowledge transfer activities as part of efforts to develop national research impact indicators for climate change. The CRCG will also identify how best to gather information on capacity building and explore a better mapping of research outputs (including products and services) and impacts. In the development of climate change research impact indicators, CRCG will coordinate its efforts with DFHERIS, which is developing national research impact indicators.

The CRCG will also consider, in its research coordination capacity, what knowledge transfer activities would be suitable to support the development of the next Climate Action Plan 2021.

Mapping research projects (all funders)

This report has included other projects awarded from competitive national calls that were not specific to climate but of relevance to it. The report identified that €6.9 million out of the €21 million awarded from competitive national calls falls into this category. For the next annual report of CRCG activities, the CRCG will define what research areas are to be included in this category and map research projects that may not obviously be in the “climate” space but would deliver climate co-benefits, e.g. research projects on ecosystems and the circular economy, including bioeconomy. This exercise will be coordinated with the DFHERIS research classification project.

Invitation to Department of Foreign Affairs to join the CRCG (all)

Following review of the funding data collected for 2020, the CRCG members acknowledged that the Department of Foreign Affairs (DFA) was also a key stakeholder and agreed that it should be invited to join the CRCG.

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84 <https://data.gov.ie/pages/open-data-strategy-2017-2022>
85 <https://repository.dri.ie/catalog/0287dj04d>
86 <https://www.seai.ie/data-and-insights/seai-research/research-projects/>
87 <https://www.oecd.org/ireland/oecd-environmental-performance-reviews-ireland-2021-9ef10b4f-en.htm>

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Section 8

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Appendix 1:

Terms of Reference for Climate Research Coordination Group

Purpose

The main purpose of the CRCG is to provide a cross-sectoral, national strategic coordination forum for climate research in Ireland.

Aims and Objectives

The objectives for each Research Coordination Group will be to:

- ▶ facilitate, support and promote coordination, synergies and liaison between relevant cross-sectoral funding organisations, public and private, to reduce the fragmentation and/or duplication of climate research in Ireland;
- ▶ facilitate an exchange forum between research funders and key stakeholders, providing an interface for funding organisations of climate research to facilitate the dissemination, sharing and uptake of relevant scientific outputs to policymakers and decision-makers and the uptake of research outputs for commercialisation;
- ▶ identify key research needs and emerging policy needs with the aim of informing the research strategy of Irish funding organisations of climate research;
- ▶ provide a platform for cross-sectoral RFOs to liaise and/or collaborate with European and international activities related to climate research, such as JPIs, technology platforms and LIFE.

Added Value

Each of the Research Coordination Groups acts as a research forum, coordinated by the EPA (i.e. Research Coordination Groups do not serve as an EPA forum). The added value of membership and participation in the Research Coordination Groups includes:

1. networking, collaboration, consultation, maximised synergies and coordination between the strategic partners throughout the whole research funding cycle to will ensure that research programmes are relevant and responsive to current and new emerging policy priorities;
2. provision of a platform to coordinate co-funding opportunities between the strategic partners

and thus contribute to maximising the impacts of funding provided across Ireland;

3. promotion and facilitation of increased synergies and reduced risk of duplication;
4. support and facilitation of increased communication and visibility and better dissemination for national research strategies;
5. provision of a platform for knowledge transfer and knowledge exchange of research outputs and uptake for commercialisation.

Composition

The Research Coordination Groups comprise RFOs, the EPA, relevant government departments and other strategic stakeholders. Many environmental issues can have transboundary and/or cross-border impacts. Therefore, the Research Coordination Groups invite contributions from relevant strategic stakeholders across the island of Ireland.

Meetings

The Research Coordination Group meetings are facilitated by the EPA. Secretariat support will be provided by EPA Research. It is anticipated that the Research Coordination Groups will meet three times per year:

- ▶ meeting 1: combined cross-disciplinary and cross-sectoral meeting for all three Research Coordination Groups chaired by the EPA;
- ▶ meeting 2: May/June;
- ▶ meeting 3: October.

The EPA will circulate the schedule of meetings for the following year in December.

Each Research Coordination Group has the option to rotate the position of the meeting chairperson between the strategic partners/membership for the second and third meetings, to promote and support partner engagement and inclusiveness.

Each Research Coordination Group may decide to have additional meetings depending on developments within the national/European policy and/or research funding landscape.

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Appendix 2:

New Climate Research Coordination Group Member

The CRCG is facilitated by the EPA and includes members across several government departments, local authorities, agencies and stakeholders whose functional areas are directly or tangentially relevant to furthering Irish climate change research. This appendix provides a brief overview of the members who joined in 2020.

Department of the Taoiseach

In supporting the work of the Taoiseach and government, DoT works with other departments to implement policy primarily through the Cabinet Committee structure, including a Cabinet Committee on the Environment and Climate Change. This Cabinet Committee oversees the implementation of Programme for Government commitments in relation to the environment and climate change.

A dedicated Climate Action Unit also operates within DoT⁸⁸. The Unit supports the organisation of the Cabinet Committee on the Environment and Climate Change, the related Senior Officials Group and the Climate Action Delivery Board, which is co-chaired with DECC. The Climate Action Unit plays a leading role in monitoring and driving implementation of the CAP, working across government to produce quarterly Progress Reports to maintain transparency and accountability for climate action.

With respect to climate research coordination, DoT also chairs a research & modelling sub-group on the environment and climate change.

88 More details regarding the work of the Climate Action Unit in DoT can be found at <https://www.gov.ie/en/publication/2d98d0-climate-action/>. This link identifies what the government is doing and reports on progress.

Appendix 3:

Source of the Data Reported in the 2020 CRCG Report on Activities

Data	Received from
Competitive National Awards	CRCG members (funders)
Core Research Activities	MI MÉ GSI CSO Eastern & Midlands CARO NESC DT
Horizon 2020 Awards	EI Teagasc
LIFE Awards	DECC EPA Teagasc
INTERREG Awards	INTERREG North-West Europe Southern Regional Assembly
COST Actions	EI
Events and Publications	CRCG members

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Appendix 4:

New 2020 Climate-related Competitive Awards

Lead CRCG funding organisation	CRCG co-funders ⁸⁹	Project title	Total Irish grant aid approved/requested ⁹⁰
Theme 1. Carbon Stocks, GHG Emissions, Sinks and Management Options			
EPA	–	5YAR – Writer Support Award – Volume 1A (Earth system process, carbon cycle, 5YAR, climate change)	€219,278
EPA	–	5YAR – Writer Support Award – Volume 2A (climate neutrality, pathways, energy, emissions, Paris Agreement, 5YAR)	€208,133
EPA	–	Carbon capture and soil carbon sequestration in annual and perennial grasslands	€19,500
EPA	–	Consumption-based Greenhouse Gas Emissions	€62,333
SFI	–	An ocean microlab for autonomous dissolved inorganic carbon depth profile measurement	€380,102
SFI	–	Processes and mechanisms controlling carbon sequestration and storage in “blue carbon habitats”; advancing Ireland’s capacity to mitigate and adapt to climate change (BlueCarbon)	€513,301
Theme 2. Ireland’s Future Climate, Its Impacts, and Adaptation Options			
CCAC	–	Review of Adaptation in Cities and Just Transition	€63,193
EPA	–	5YAR – Writer Support Award – Volume 1B (climate observations, climate change, 5YAR, atmosphere)	€196,394
EPA	–	5YAR – Writer Support Award – Volume 3 (impacts, adaptation, future climate, 5YAR)	€187,895
EPA	–	5YAR – Writer Support Award – Volume 3B (climate modelling, impacts, adaptation, 5YAR)	€220,870
EPA	–	Adaptive conservation management considering models of species population changes under climate change predictions	€12,000
EPA	NPWS	Irish peatland resilience to changing climate and increased frequency and severity of drought	€298,591
GSI	–	Integrated modelling of hydrogeological/hydrological data and climate change scenarios for preselected Irish groundwater systems	€169,781
IRC, MÉ	MÉ	FÓGRA: Delivering Effective, Evidence-based Weather & Climate Services for Ireland	€88,068
MÉ	–	TRANSLATE (standardising national climate projections for Ireland and developing climate services to meet the Irish adaptation sector’s climate information requirements)	€599,988
MI	–	Cullen Scholarship: Decadal Wave Prediction for the Irish coast (DeWaPIC)	€100,000
OPW	–	Impacts of a Changing Climate on Fluvial Flood Peak Flows in Ireland	€175,000
SFI	GSI, EPA	Geophysical and Earth Observation Tools for Evaluating the Condition of Slopes (GEOTECS)	€604,618

89 In italics: not CRCG members – added for completeness.
90 The total amount from projects identified in Appendix 4 is €20,982,343, which is different from the total amount presented in Table 5 (€20,964,854), because it includes national funding for a project that does not come from a CRCG member.

Lead CRCG funding organisation	CRCG co-funders ⁸⁹	Project title	Total Irish grant aid approved/requested ⁹⁰
SFI	EPA	STRIVE: Achieving Sustainable Agri-ecosystems through Advances in Modelling and Visualising the Biodiversity and Ecosystem Multifunctionality Relationship	€395,372
SFI	DFA	Tracking Adaptation Progress in Agriculture and Food Security Using an AI-powered Satellite Remote Sensing Platform – TAPAS	€283,000
Theme 3. Climate Solutions, Transition Management and Opportunities			
CCAC	–	An Economic Assessment of Climate Change Impacts and Adaptation Options in Ireland	€169,738
CCAC	–	An Irish Perspective on Negative Emissions: Forestry	€7,000
CCAC	–	Carbon budgets to inform climate action: a society-wide, integrated GHG quota and accounting perspective	€165,487
CCAC	–	Modelling Ireland's path to a net-zero energy system: informing carbon budgets to 2050	€180,000
CCAC	–	Review of the Heat Sector – Policies, Technologies and Best Practice (ReHEAT)	€77,365
CCAC	–	Transport Transition Research	€33,232
EPA	–	5YAR – Writer Support Award – Volume 4 (pathways, transition, transformation, economy, finance, society, governance, 5YAR)	€226,693
EPA	–	5YAR Fellowship	€171,791
EPA	–	Challenging the Climate Crisis: Children's Agency to Tackle Policy Underpinned by Learning for Transformation	€148,450
EPA	–	Designing a Green, Equitable and Socially Acceptable Subsidy Scheme	€124,667
EPA	–	Ex-Post Analysis of the Impact of National Landfill Policy for GHG Emissions in the Waste Sector	€59,955
EPA	–	Green VAT Reform	€62,333
IRC	–	Resilience at the margins: climate risk mapping and spatial decision support systems for strengthening the climate change resilience of the furthest behind in rural communities in Viet Nam	€349,219
IRC	EPA	Local environmental resistance to extractivism in Ireland: a feminist environmental justice lens	€72,000
IRC	–	Modelling the Role of Hydrogen in Decarbonising Future Energy Systems Aligned with the Paris Climate Agreement	€96,000
IRC	EPA	Private Transnational Environmental Regulation and Systemic Interactions in Global Environmental Governance	€72,000
IRC	–	Providing Insights from Climate Archives (PICA): a multiproxy approach for the reconstruction of AMOC response to Quaternary climate events	€72,000
SEAI	–	Building upon Copernicus Earth Observation services to augment wind measurement coverage of the OREDP offshore renewable energy assessment areas	€92,633
SEAI	–	HEAT CHECK (Heating and Temperature Characteristics in Irish Buildings)	€405,651
SEAI	–	Offshore Aquaculture Renewable Power Solutions (OARPS)	€116,562
SFI	EPA	Advancing the green transition via novel electrode materials for valorisation processes	€610,174
SFI	–	Beyond biofuel: advanced seaweed cultivation for marine biodiscovery and climate change mitigation	€1,374,383

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Lead CRCG funding organisation	CRCG co-funders ⁸⁹	Project title	Total Irish grant aid approved/requested ⁹⁰
SFI	–	Carbon-Impact: Implementing Atmospheric CO2-Capture Technologies	€272,443
SFI	DFA	Closing the circuit – bringing lithium cobalt batteries into the circular economy	€275,393
SFI	–	C-MINUS: Low energy carbon capture devices to enable on-site carbon capture and net negative carbon technologies	€271,000
SFI		Connecting Continents: The Role of Global Transnational Grids in Mitigating Climate Change	€374,999
SFI	–	Creating a carbon neutral resilient dairy farm	€285,752
SFI	DFA	Day-time radiative cooling for passive climate control	€270,623
SFI	–	Design and optimisation of highly efficient wind turbine blades for retrofitting existing Irish wind farms	€75,423
SFI	–	Development and testing of novel sandwich panel structure suitable for use in the next generation wind and tidal energy device	€74,024
SFI	–	EBSTAR: Efficient Biotransformation of Underutilised and Waste Food Processing Streams into Alternative and Renewable Products	€323,104
SFI	–	ElectroFuels in A Circular Economy (EFACE)	€255,765
SFI	–	Hybrid Bio-Solar Reactors for wastewater treatment and CO2 recycling (Ref. 19/FIP/ZE/7572PF)	€129,951
SFI	–	Hybrid Bio-Solar Reactors for wastewater treatment and CO2 recycling (Ref. 19/FIP/ZE/7572)	€24,904
SFI	–	MAME: Managing Agricultural Methane Emissions. Transforming the greenhouse gas footprint and bio-economic value of ruminant agriculture by selective inhibition of methanogenic archaea	€984,775
SFI	–	National Autonomous Pod Sharing Service (NAPSS) – Autonomous Roving Test Demonstration & Controlled Initial Deployment	€13,345
SFI	–	SMILE: Smart Mobility Initiative for Lower Emissions; Transforming mode selection through HMI, Machine Learning, Personalisation, Transport Engineering and Behavioural Science	€25,968
Theme 4. Air Science			
EPA	–	Source Apportionment of Air Pollution in the Dublin Port Area	€499,962
IRC	–	HealthyAIR: Modelling the Impact of Air Pollution and Climate Change on Public Health in Ho Chi Minh City for Policy Making and Awareness Creation using Machine Learning	€338,066
IRC	EPA	Spectroscopic Technology for Analysing Nitrogen Dioxide and Urgent Personal exposure measurements (STANDUP)	€96,000

Lead CRCG funding organisation	CRCG co-funders ⁸⁹	Project title	Total Irish grant aid approved/requested ⁹⁰
Other projects of relevance to climate			
DAFM	–	Development of an Ecosystem for Delivery of Next Generation Wood Products	€2,989,001
EPA	DAFM	WFD Future Scenarios and Management Tools	€1,499,851
GSI	–	Abrupt Climate Change in Ireland: Redefining our climate future through a lens of high-resolution glacial reconstruction	€29,975
GSI	–	Assessing the potential of Holocene shellbeds in Galway Bay as palaeoenvironmental and palaeoclimate archives	€29,948
GSI	–	RESULT Enhancing Reservoirs in Urban Development: Smart Wells and Reservoir Development	€22,696
GSI	–	BIM integrated geo hazard monitoring of at risk slopes and historical retaining structures	€30,000
GSI	–	DEEP Innovation for De-Risking Enhanced Geothermal Energy Projects	€199,958
GSI	–	Developing seabed scour assessment and prediction tools using computational fluid dynamics modelling (DeMo)	€29,975
GSI	–	Energy Critical Element Characterisation of Irish Mineral Deposits	€30,000
GSI	–	Extraction of Historic DEMs and Orthophotos using Digital Photogrammetry and its Applications in Coastal Evolution Studies	€30,000
GSI	–	Groundwater-g – Supporting Groundwater Resources Management using Low-Cost Microgravity Technology	€28,420
GSI	–	Linking ocean model predictions with coastal impacts using a low cost, time-lapse camera shoreline monitoring system	€29,909
GSI	–	Mapping weather and climate indices using seismic data (SeisStorm)	€28,145
GSI	–	Pile Ageing Study for Offshore Wind Applications	€30,000
GSI	–	Real time Monitoring of landslides using remote sensing approaches	€30,000
GSI	–	Using Earth Observation (Satellite) imagery for offshore renewable energy site selection and constraint analysis.	€29,000
IRC	–	Deisidaimonia (Panic!): A study of crisis, climate, and rebellion in Carthaginian North Africa	€48,000
MI	–	Constraining the Impact of Arctic Amplification in the Nordic Sea: A Biogeochemical Approach (CIAAN)	€570,000
MI	–	Cullen Scholarship: Biological Changes in Key Commercially Exploited Fish in the Light of Climate and Ocean Change	€100,000
MI	–	Ocean Climate Section: South Rockall Trough	€318,400
SFI	–	A novel sustainable electric motor using high-grade permanent magnets based on common metallic elements	€25,775
SFI	DFA	AI for Anti-Greenwashing	€281,436
SFI	–	Can we use the metabolic theory of ecology to predict disease outbreaks in a warming world?	€469,606
SFI	–	Quantification and reduction of the environmental impact of additive manufacturing processes	€26,000

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Appendix 5:

Climate-related Horizon 2020 Projects Awarded in 2020

Proposal title	Proposal acronym	Number of partners in consortium	Applicant role	Applicant name ⁹¹	Applicant EU financial contribution ⁹²
Theme 1. Carbon Stocks, GHG Emissions, Sinks and Management Options					
Soil Mission Support: towards a European research and innovation roadmap on soils and land management	SMS	10	Partner	Teagasc	€59,969
Theme 2. Ireland's Future Climate, Its Impacts, and Adaptation Options					
Technologies for Ocean Sensing	TechOceanS	13	Partner	Intrigo Limited	€113,805
			Partner	Aqua TT UETP Company Limited by Guarantee	€235,362
			Partner	Dublin City University	€808,567
Gliders for Research, Ocean Observations and Management: Infrastructure and Innovation	GROOM II	14	Partner	MI	€180,312
Network of Leading Ecosystem Scale Experimental AQUatic MesoCOSM Facilities Connecting Rivers, Lakes, Estuaries and Oceans in Europe and Beyond	AQUACOSM-plus	30	Partner	Trinity College Dublin	€181,977
Joint European Research Infrastructure of Coastal Observatories: Science, Service, Sustainability – JERICO-S3	JERICO-S3	39	Partner	MI	€352,560
Theme 3. Climate Solutions, Transition Management and Opportunities					
Co-creating resilient and sustainable food systems towards FOOD2030	CITIES2030	41	Partner	Waterford Institute of Technology	€413,500
Strategies and technologies to achieve a European fossil-energy-free agriculture	AgroFossilFree	16	Partner	Teagasc	€110,437
GREEN HYSLAND – Deployment of a H2 Ecosystem on the Island of Mallorca	GREEN HYSLAND	29	Partner	Energy Co-Operatives Ireland Limited	€17,500
			Partner	NUIG	€196,897

91 CRCG members highlighted by shading of cells.
92 Based on H2020 eCORDA data (extraction date: 24 April 2020).

Proposal title	Proposal acronym	Number of partners in consortium	Applicant role	Applicant name ²¹	Applicant EU financial contribution ²²
Demonstrating a Refinery-Adapted Cluster-Integrated Strategy to Enable Full-Chain CCUS Implementation	REALISE	14	Partner	Irving Oil Whitegate Refinery Limited	€485,625
			Partner	Bord Gais Energy Limited	€36,750
			Partner	ERVIA	€418,267
			Partner	Electricity Supply Board	€84,000
			Partner	University College Cork – National University of Ireland, Cork	€368,625
Application of Solar Thermal Energy to Processes	ASTEP	16	Partner	CROWDHELIX Limited	€223,125
Providing flexibility to the grid by enabling VPPs to offer both fast and slow dynamics control services	EdgeFLEX	10	Partner	Waterford Institute of Technology	€397,500
			Partner	University College Dublin	€348,750
Future Feedstock Flexible Carbon Upgrading to Bio Energy Dispatchable carriers	F-CUBED	14	Partner	Heating Equipment and Thermal System Europe Limited	€182,375
			Partner	NUIG	€237,021
Active Communities & Energy Prosumers for the Energy Transition	ACCEPT	16	Partner	University College Cork	€363,000
Holistic demand response services for European residential communities	HESTIA	19	Partner	Cork Institute of Technology	€421,250
Green energy hubs for local integrated energy communities optimization	eNeuron	17	Partner	EPRI Europe DAC	€301,000
One Network for Europe	OneNet	70	Partner	EPRI Europe DAC	€146,875
Market uptake of citizen energy communities enabling a high penetration of renewable energy sources	LIGHTNESS	13	Partner	IES R&D	€246,000
X-ROTOR: X-shaped Radical Offshore wind Turbine for Overall cost of energy Reduction	XROTOR	6	Partner	University College Cork	€585,016
Highly advanced probabilistic design and enhanced reliability methods for high-value, cost-efficient offshore wind	HIPERWIND	7	Partner	EPRI Europe DAC	€288,125
Verification through accelerated testing leading to improved wave energy designs	VALID	13	Partner	Aquatera Sustainability Ireland Ltd	€245,491
Innovative Methods for Wave Energy Pathways Acceleration through Novel Criteria and Test Rigs	IMPACT	5	Partner	University College Cork	€241,750

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Proposal title	Proposal acronym	Number of partners in consortium	Applicant role	Applicant name ⁹¹	Applicant EU financial contribution ⁹²
UP-lifting Communities: Structuring collective Action for Sustainable local Transition and Identifying Regulatory Solutions for adopting frontier technologies and disruptive business models	UP-STAIRS	10	Coordinator	University College Cork	€328,095
			Partner	Cork City Council	€203,125
Tailored measures supporting energy vulnerable households	EnergyMEAS-URES	12	Coordinator	University College Cork	€310,000
			Partner	Energy Action Limited	€242,375
An augmented intelligence-enabled stimulating framework for deep energy renovation delivering occupant-centred innovations	RINNO	17	Partner	Dublin City University	€231,250
Superhomes 2030: Up-scaling integrated home deep renovation services for Ireland	Superhomes2030	5	Coordinator	Tipperary Energy Agency Limited	€377,125
			Partner	Sustainability Works Limited	€124,000
			Partner	Electricity Supply Board	€106,937
			Partner	Limerick Institute of Technology	€249,125
Heat pumps skills for NZEB construction	HP4All	7	Coordinator	Limerick Institute of Technology	€198,031
			Partner	University College Cork	€127,875
Dedicated to stimulating demand for sustainable energy skills in the construction sector	BUSLeague	12	Partner	Irish Green Building Council Limited by Guarantee	€54,262
			Partner	Limerick Institute of Technology	€92,375
Adapt-&-Play: holistic cost-effective and user-friendly Innovations with high replicability to upgrade smartness of existing buildings with legacy equipment	PHOENIX	13	Partner	Arden Energy Limited	€241,918
Green power and energy efficiency investments community-Financed for football buildings	GREENFOOT	9	Partner	Cumann Peile na H-Eireann (Football Association Of Ireland)	€79,062
Mainstreaming of refinancing schemes as enhancer for the implementation of energy efficiency service projects	REFINE	11	Partner	Carr Communi-cations Limited	€157,461

Proposal title	Proposal acronym	Number of partners in consortium	Applicant role	Applicant name ²¹	Applicant EU financial contribution ²²
Intelligent building energy assets control for comfort, energy and flexibility optimisation	iBECOME	10	Coordinator	IES R&D	€467,687
			Partner	Irish Manufacturing Research Company Limited by Guarantee	€580,000
			Partner	Electricity Exchange Designated Activity Company	€367,934
Peer to peer learning in regional and local authorities to timely and accurately define, monitor and verify their sustainable actions	ENERGee Watch	10	Partner	Carlow Kilkenny Energy Agency Limited	€130,587
Decarb City Pipes 2050 – Transition roadmaps to energy efficient, zero-carbon urban heating and cooling	DecarbCityPipes 2050	11	Partner	City of Dublin Energy Management Agency Limited	€188,405
Deploying augmented intelligence solutions in EU buildings using data analytics, an interoperable hardware/software architecture and a novel self-energy assessment methodology	Auto-DAN	12	Coordinator	IES R&D	€542,062
			Partner	O Cualann Cohousing Alliance Company Limited by Guarantee	€301,562
			Partner	mSemicon Teoranta	€348,395
			Partner	Technological University Dublin	€545,947
Behavioural insights and effective energy policy actions	EVIDENT	9	Partner	Trinity College Dublin	€359,062
Smart Network Operator Platform Enabling Shared, Integrated and More Sustainable Urban Freight Logistics	SENATOR	10	Partner	Dublin City Council	€239,007
			Partner	University College Dublin	€264,450
Building bridges between consumers and producers by supporting short food supply chains through a systemic, holistic, multi-actor approach-based toolbox	agroBRIDGES	15	Partner	Institute of Technology Tralee	€204,937
			Partner	Teagasc	€130,031
Data-driven sustainable agri-food value chains	Ploutos	33	Partner	Mol Teic	€220,000
			Partner	Feirmeoiri Aontuithe Na h-Eireann Iontaobiathe Teoranta Lbg	€53,900
			Partner	Teagasc	€433,375

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Proposal title	Proposal acronym	Number of partners in consortium	Applicant role	Applicant name ⁹¹	Applicant EU financial contribution ⁹²
Agroforestry and mixed farming systems – participatory research to drive the transition to a resilient and efficient land use in Europe	AGROMIX	28	Partner	Teagasc	€71,785
Materials solutions for cost reduction and extended service life on wind off-shore facilities	MAREWIND	16	Partner	EireComposites Teoranta	€524,912
Development, engineering, production and life-cycle management of improved FIBRE-based material solutions for structure and functional components of large offshore wind energy and tidal power platform	FIBREGY	12	Partner	University of Limerick	€666,940
Novel design, production and operation approaches for floating WIND turbine farms	STEP4WIND	8	Partner	EireComposites Teoranta	€183,122
			Partner	University College Cork	€412,026
Other projects of relevance to climate					
Monitoring and Evaluation Frameworks for the Common Agricultural Policy	MEF4CAP	9	Partner	Teagasc	€319,480
Enhancing Belmont research action to support EU policy making on climate change and health	ENBEL	17	Partner	Royal College of Surgeons in Ireland	€36,000
Innovation-driven Collaborative European Inland Waterways Transport Network	IW-NET	26	Partner	Konnecta Systems Limited	€212,500
Promoting and implementing joint programming to reinforce transnational research for the conservation and restoration of degraded ecosystems and their biodiversity, including a focus on aquatic systems	BiodivRestore	34	Partner	EPA	€123,992

Appendix 6:

Climate-related INTERREG Projects 2020⁹³

Proposal title	Number of partners in consortium	Applicant role	Applicant name	Applicant EU financial contribution
MegaAWE (Maturing utility-scale Airborne Wind Energy)	11	Coordinator	Mayo County Council	€6,947,175

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93 Includes projects approved, contracted and started in 2020.

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Appendix 7:

Climate-related LIFE Projects 2020

Proposal title	Proposal acronym	Number of partners in consortium	Applicant role	Applicant name ⁹⁴	Applicant EU financial contribution	Total EU Contribution
LIFE IP Peatlands and People – Ireland’s Climate Action Catalyst ⁹⁵	LIFE IP Peatlands and People	5	Coordinator	Bord na Móna	€9,900,000 ⁹⁶	€9,900,000
			Partner	EPA		
			Partner	NPWS (of DHLGH)		
			Partner	NUIG		
			Partner	ERINN Innovation Ltd		
Demonstration and dissemination actions to reduce the carbon footprint in sheep farming	Green Sheep	24	Partner	Teagasc	€373,776	€2,536,683
LIFE EMERALD – Emissions Modelling and Forecasting of Air in Ireland	LIFE EMERALD	6	Coordinator	EPA	€0 ⁹⁷	€842,911
			Partner	HSE	€8800	
			Partner	Asthma Society of Ireland	€22,027	
			Partner	University College Cork	€144,787	
			Partner	DECC	€3988	

⁹⁴ CRCG members highlighted by shading of cells.

⁹⁵ DAFM is an associated beneficiary for this project, providing complementary funding in respect of both the project restoration and research elements.

⁹⁶ Breakdown for coordinator/partners not available.

⁹⁷ Information on EU contribution for non-Irish partners is not included.

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