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Climate Research Coordination Group

First Report on Activities: June 2017 - December 2018

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Rialtas na hÉireann
Government of Ireland

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Disclaimer

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Acronyms and Abbreviations

AR4	Fourth Assessment Report
AR5	Fifth Assessment Report
CCAC	Climate Change Advisory Council
CCMA	County and City Management Association
CLTRAP	Convention on Long-range Transboundary Air Pollution
CRCG	Climate Research Coordination Group
CSO	Central Statistics Office
DAFM	Department of Agriculture, Food and the Marine
DBEI	Department of Business, Enterprise and Innovation
DCCAE	Department of Communications, Climate Action and Environment
DG Research	Directorate-General for Research
DPER	Department of Public Expenditure and Reform
DTTAS	Department of Transport, Tourism and Sport
ECV	Essential climate variable
EMEP	European Monitoring and Evaluation Programme
EPA	Environmental Protection Agency
EU	European Union
GCOS	Global Climate Observing System
GHG	Greenhouse gas
GSI	Geological Survey Ireland
HLG	High Level Group
HSE	Health Service Executive
IEN	Irish Environmental Network
IGEES	Irish Government Economic and Evaluation Service
IPCC	Intergovernmental Panel on Climate Change
IRC	Irish Research Council
JPI	Joint Programme Initiative
KIC	Knowledge and Innovation Community
MI	Marine Institute
NACC	Network for Monitoring Atmospheric Composition and Change
NAF	National Adaptation Framework
NGO	Non-governmental organisation
NIEA	Northern Ireland Environment Agency
NMP	National Mitigation Plan
NPWS	National Parks & Wildlife Service
NTA	National Transport Authority
NUIG	National University of Ireland, Galway
OPW	Office of Public Works
RD&D	Research Development and Demonstration
SDG	Sustainable Development Goal
SEAI	Sustainable Energy Authority of Ireland
SFI	Science Foundation Ireland
SNI	Sustainable Northern Ireland
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

The Climate Research Coordination Group (CRCG) was established under the Environmental Protection Agency's (EPA) 2014–2020 Research Strategy. The main function of the CRCG is to coordinate climate change-related research in Ireland, to support and promote coordination between relevant funding organisations and to provide a platform to exchange knowledge and disseminate research findings. The CRCG is facilitated by the EPA and includes members from across several government departments, local authority representatives, agencies and stakeholders.

The CRCG is identified in the government's National Mitigation Plan (NMP) as the body representing the key actors in Irelands' climate change-related research activity. Action 11 of the NMP is led by the EPA and requires that the CRCG reports annually on its activities and provides an assessment and synthesis of key findings from the research programme and wider research activities every 5 years.

Innovation 2020 is Ireland's 5-year strategy for research and development, science and technology. In 2018, the Department of Business, Enterprise and Innovation published research priority areas for 2018–2023. This report revised the themes and priority areas established in 2012. The most significant changes have been to the "Energy" theme. Based on developments since 2012, including the urgency to address climate change and sustainability challenges, this theme has evolved and has been renamed "Energy, Climate Action and Sustainability", with the two priority areas updated to "Decarbonising the Energy System" and "Sustainable Living".

This first report presents a summary of the CRCG's activities during an 18-month period from June 2017 to December 2018. Activities detailed in this first report cover competitive research funding committed by members of the CRCG for research and development performed elsewhere, as well as Horizon 2020 leveraged funding.

This report is based on the information provided by the members of the group. Future reports will cover annual periods from January to December.

In summary, during this first reporting period (June 2017–December 2018):

- **Five** CRCG meetings were held and **one** research event took place in December 2017.
- **220** research projects were identified as ongoing, of which **104** were awarded during the reporting period, with a total budget allocation of **€25 million**.
- Irish drawdown was c. **€2.97 million** under Horizon 2020, with **14** successful projects.
- Collaboration between members was evident through the co-funding of **19** new research projects.


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Contents

1 Introduction

1. Introduction

1.1. Purpose of the Report

This is the first report by the Climate Research Coordination Group (CRCG). The membership of the CRCG encompasses the main national bodies who fund climate change research (see section 1.2). 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 primarily provides an overview of the climate change research that has been funded by CRCG members over the period June 2017–December 2018. It also outlines 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. As this is the first report, the scientific and policy context for climate change research is outlined. Activities detailed in this first report cover competitive research funding committed by members of the CRCG for research and development performed elsewhere, as well as Horizon 2020 leveraged funding. Future reports will cover annual periods from January to December.

Innovation 2020 is Ireland's 5-year strategy for research and development, science and technology (DBEI, 2015). In 2018, the Department of Business, Enterprise and Innovation (DBEI) published research priority areas for 2018–2023 (DBEI, 2018). This report revised the themes and priority areas established in 2012. The most significant changes have been to the "Energy" theme. Based on developments since 2012, including the urgency to address climate change and sustainability challenges, this theme has evolved and has been renamed "Energy, Climate Action and Sustainability", with the two priority areas updated to "Decarbonising the Energy System" and "Sustainable Living".

International and European Union (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). It is important for Ireland to have an active research community that is focused on Ireland-specific issues related to climate change and that is engaged with European and global research activities. A coherent well-structured research programme, which is designed to address Ireland-specific issues and which 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 National Mitigation Plan (NMP) and National Adaptation Framework (NAF).

The Environmental Protection Agency (EPA) has a statutory role to coordinate and develop environmental research. Consequently, it established the CRCG to advance these objectives. Action 11 of the NMP (DCCAE, 2017) mandated the CRCG to report annually on its activities. It also mandated the CRCG to provide an assessment and synthesis of key findings from the research programme and wider related research activities every 5 years.

This annual report therefore responds to that mandate. An assessment of the research findings will be provided in the 5-yearly report. This first report was prepared by the CRCG. It is based on the information provided by the members of the group and was completed with the assistance of Flannery Nagel Environmental Ltd.

1.2. The Climate Research Coordination Group

Under the Environmental Protection Agency Act 1992, the EPA is responsible for coordinating environmental research in Ireland. The NMP and 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 Strategy (EPA, 2014), three national Research Coordination Groups were established, focusing on sustainability, water and climate. 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 CRCG aims 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 funders of climate research;
- provide a platform for cross-sectoral research funding organisations to liaise and/or collaborate with European and international activities related to climate research, such as Joint Programming Initiatives, Technology Platforms, LIFE.

The terms of reference for the group are provided in Appendix 1. A list of current (January 2019) members is provided in Table 1. Appendix 2 provides short descriptions of the member organisations.

Table 1. Climate Research Coordination Group membership (as of January 2019)

Organisations/business units	Website	Funder/research/ stakeholder
Central Statistics Office (CSO)	www.cso.ie	Stakeholder
Climate Change Advisory Council (CCAC)	www.climatecouncil.ie	Stakeholder
County and City Management Association (CCMA)	www.lgma.ie	Stakeholder
Department of Agriculture, Food and the Marine (DAFM)	www.agriculture.gov.ie	Funder/stakeholder
Department of Business, Enterprise and Innovation (DBEI)	https://dbei.gov.ie	Funder/stakeholder
Department. of Communications, Climate Action and Environment (DCCAE)	www.dccae.gov.ie	Funder/stakeholder
Department of Transport, Tourism and Sport (DTTAS)	www.dttas.ie	Funder/stakeholder
Environmental Protection Agency (EPA)	www.epa.ie	Funder/stakeholder
(DCCAE) Geological Survey Ireland (GSI)	www.gsi.ie	Funder/research
Health Service Executive (HSE)	www.hse.ie/eng/	Stakeholder
Irish Environmental Network (IEN)	https://ien.ie	Stakeholder
Irish Research Council	http://research.ie	Funder
Marine Institute (MI)	www.marine.ie	Funder/research
(DHPLG) Met Éireann	www.met.ie	Funder/research
National Parks & Wildlife Service (NPWS)	www.npws.ie	Funder/research
National Transport Authority (NTA)	www.nationaltransport.ie	Stakeholder
National Treasury Management Agency (NTMA)	www.ntma.ie	Stakeholder
Northern Ireland Environment Agency (NIEA)	www.daera-ni.gov.uk/northern-ireland-environment-agency	Funder/stakeholder
Office of Public Works (OPW)	www.opw.ie	Funder/research
Science Foundation Ireland (SFI)	www.sfi.ie	Funder
Sustainable Energy Authority of Ireland (SEAI)	www.seai.ie	Funder
Sustainable Northern Ireland (SNI)	www.sustainableni.org	Funder/research
Teagasc	www.teagasc.ie	Research

Policy Context

2. Policy Context

Scientific concerns about potential human impacts on the Earth's climate emerged in the 1960s and 1970s. These were voiced at two World Climate Conferences in 1979 and 1988 and resulted in the formation of the IPCC in 1988.

The IPCC is mandated by governments to provide authoritative assessments of the scientific understanding of climate change in terms of its causes, consequences and response options. Ireland has been actively engaged with the IPCC since 2004, when it hosted a key workshop for the Fourth Assessment Report (AR4). In total, Ireland hosted five IPCC lead author/expert meetings. The most recent of these was in September 2018, when it hosted the Lead Author meeting for the Special Report on Land. Ireland has also provided funding to support the work of the IPCC. Experts from Ireland have participated as authors of the IPCC AR4 and of the reports published during the fifth and current sixth assessment cycles. It is crucial to encourage and enable scientists from Ireland to contribute to the work of the IPCC by the publication of high-quality research reports and through the writing and review processes.

The IPCC Assessment Reports have informed major developments in international climate policy and EU climate policy development. Globally, these include the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and adoption of the Kyoto Protocol in 1997. Based on the science in the Second Assessment Report, the EU adopted the goal of limiting the global temperature increase to 2°C in the run-up to the negotiations on the Kyoto Protocol in 1997. This goal has informed subsequent EU climate policy, including the 2020 and 2030 emission reduction targets. The most recent IPCC Fifth Assessment Report was a key factor in the adoption of the 2015 Paris Agreement under the UNFCCC. The relationships between scientific research and policy development across various scales are illustrated in Figure 1.

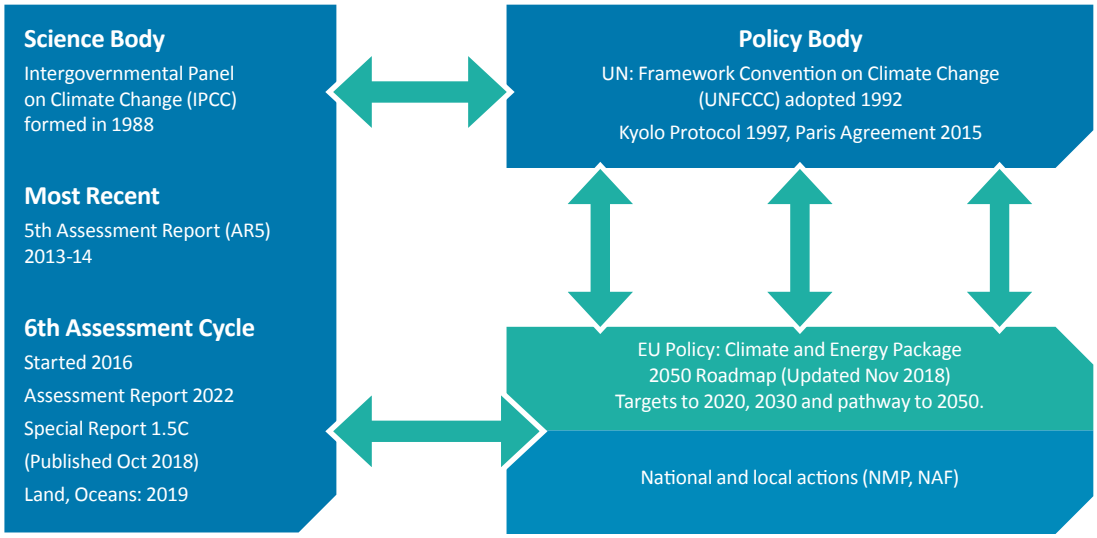


Figure 1. Schematic showing the science–policy interface from national to global levels.

The 2015 Paris Agreement established three goal that are designed to enable the achievement of the ultimate objective of the UNFCCC to prevent dangerous climate change. These can be stated as:

1. to hold the increase in the global average temperature to well below 2°C and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels;
2. to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas (GHG) emissions development, in a manner that does not threaten food production;
3. to make finance flows consistent with a pathway towards low GHG emissions and climate-resilient development.

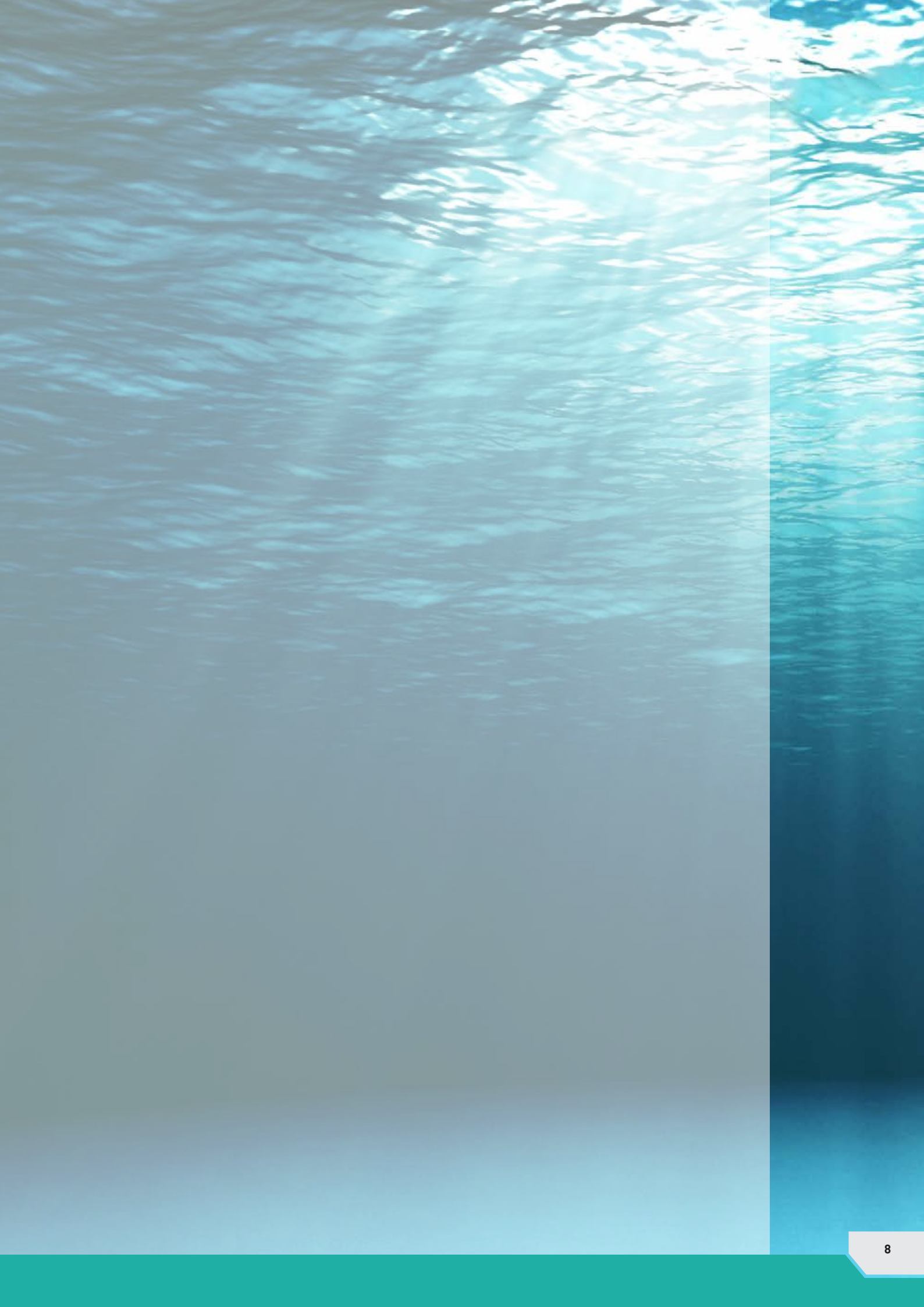
The Paris Agreement also specifies that, in order to achieve the long-term temperature goal, Parties aim to reach peak GHG emissions as soon as possible and to undertake rapid reductions thereafter, in accordance with best available science, to achieve a balance between anthropogenic emissions of GHGs by sources and removals of GHGs by sinks in the second half of this century. Progress on this is to be assessed under a global stocktake every 5 years. A revised 2050 Roadmap was published in November 2018 (EC, 2018), taking into account the Paris Agreement, with the aim of achieving a climate-neutral Europe by 2050.

In order to clarify how Parties could achieve the temperature goal, the IPCC was requested to provide a Special Report on Global Warming of 1.5°C (IPCC, 2018; referred to as the 1.5°C Report). The report highlights the level of mitigation ambition required to achieve the temperature goal of the Paris Agreement. This includes reaching net zero CO_2 emissions between 2045 and 2080 to keep the global temperature increase between 1.5°C and 2°C. The 1.5°C Report also provides an analysis of synergies and trade-offs between climate action and the United Nations (UN) Sustainable Development Goals (SDGs) (UN, 2015a). These were adopted in Transforming our World: The 2030 Agenda for Sustainable Development (UN, 2015b).

Ireland's national policy position, adopted in 2014 (DCCAE, 2014), is to reduce emissions of CO_2 from key sources by at least 80% by 2050 and achieve carbon neutrality in the agriculture and land-use sector, including forestry, while not compromising the capacity for sustainable food production. This is the basis for the national transition objective in the Climate Action and Low Carbon Development Act 2015 (DCCAE, 2015). The Act introduced the requirement for the development of a National Mitigation Plan (NMP) and National Adaptation Framework (NAF).

The 2017 NMP contains 106 actions (DCCAE, 2017). Action 11 specifically relates to the work of the CRCG. The NMP supports research playing a key role in achieving the national transition objective through the provision of expertise and analysis that informs policy decisions. The CRCG has a key role in this process. The 2018 NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change (DCCAE, 2018a). Twelve sectors under seven government departments are required to submit sectoral plans and local authorities are also required to prepare local adaptation strategies by September 2019.

As a party to the UNFCCC, Ireland is committed to the development and provision of support for climate change research and systematic observations of the climate system. Progress in these areas is reported by parties in National Communications to the UNFCCC every 4 years. The Seventh National Communication was communicated to the UNFCCC in 2018.



Funding Landscape for Climate Change Research

3. Funding Landscape for Climate Change Research

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 a 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. This section provides an overview of the international funding landscape and activities related to climate change in which researchers from Ireland are active.

3.1. EU and International Funding Landscape

3.1.a. Horizon 2020

Horizon 2020 (EC, 2014) is the European Commission financial instrument that implements the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. It is the biggest EU research and innovation programme, with nearly €80 billion of funding available over 7 years (2014–2020). The work programme, as set out in EU Regulation 1291/2013 (EC, 2013), includes a target that at least 35% of the total Horizon 2020 budget should be directed towards climate action. Most of the climate-related funding comes from Pillar 3 Societal Challenges and, in particular, from Bio-economy (SC2), Energy (SC3), Transport (SC4) and Environment and Climate Action (SC5).

3.1.b. Joint Programme Initiatives

Joint Programme Initiatives (JPIs) are voluntary partnerships between European Member States (and Associated Countries) that aim to tackle some major but common European societal challenges by combining national research programmes, thereby making better use of Europe's public research and development resources. The main climate-related JPI is the JPI Climate (Connecting Climate Knowledge for Europe; http://www.jpi-climate.eu). Ireland, through the EPA, currently chairs the JPI Climate. Other relevant JPIs include the Agriculture, Food Security and Climate Change (FACCE) JPI (https://www.faccejpi.com/), which addresses agriculture and food security in the context of climate change; JPI Water Challenges for a Changing World (Water JPI; www.waterjpi.eu); and JPI Healthy and Productive Seas and Oceans (JPI Oceans; http://www.jpi-oceans.eu/).

Although not a JPI, BiodivERsA (https://www.biodiversa.org) is a network of national and regional funding organisations promoting pan-European research on biodiversity and ecosystem services and its research agenda is relevant to climate-related issues.

3.1.c. Belmont Forum

The Belmont Forum (http://www.belmontforum.org/) is an international partnership of funding organisations, international science councils and regional consortia committed to the advancement of interdisciplinary and transdisciplinary science. Forum operations are guided by the Belmont Challenge (Belmont Forum, 2016), which is a global environmental research mission for sustainability that was revised and published in 2016. The Forum wants to contribute to the implementation of the UN SDGs under existing conditions of global change by supporting relevant interdisciplinary research.

3.1.d. Global Climate Observing System and Copernicus

The UNFCCC also recognises the importance of systematic observations in understanding climate change. It has developed the Global Climate Observing System (GCOS). The GCOS has identified a set of essential climate variables (ECVs) for the atmospheric, oceanic and terrestrial domains that are required to provide reliable physical, chemical and biological observations for the climate system. Many of these are based on remote sensing using Earth observation satellites.

Copernicus is Europe's Earth Observation Programme, designed to observe our planet and its environment for the ultimate benefit of all European citizens. It is based on satellite Earth observation and in situ (non-space) data. It is managed by the European Commission and implemented in partnership with the Member

States, the European Space Agency (ESA) and other European organisations, including the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the European Centre for Medium-Range Weather Forecasts (ECMWF) and the European Environment Agency. Copernicus is served by a set of dedicated satellites (the Sentinel families) and contributing missions (existing commercial and public satellites). It aims to deliver operational services for climate, atmosphere, land and oceans. It is developing key programmes to observe GHGs, including the CO_2 Human Emissions (CHE) project (https://www.che-project.eu/), which has been designed for global CO_2 observations.

3.1.e. Interreg Europe

Interreg Europe (www.interregeurope.eu) helps regional and local governments across Europe to develop and deliver better policy. Interreg Europe aims to ensure that government investment, innovation and implementation efforts all lead to integrated and sustainable impacts for people and places and that maximum return is obtained from the €359 million financed by the European Regional Development Fund (ERDF) for 2014–2020. The "Research and Innovation" theme budget for 2014–2020 is €66 million, under which the "Climate Change Adaptation and Risk" theme budget is €4 million.

3.1.f. LIFE

The LIFE programme is the EU's funding instrument for the environment and climate action. The LIFE programme contributes to the implementation, updating and development of EU environmental and climate policy and laws by co-financing projects with European added value. The current funding period, 2014–2020, has a budget of €3.4 billion. The LIFE programme is divided into two sub-programmes, one for the environment (representing 75% of the overall financial envelope) and one for climate change (https://ec.europa.eu/easme/en/section/life/life-climate-action-sub-programme; representing 25% of the overall financial envelope).

3.1.g. European Knowledge and Innovation Communities

European Knowledge and Innovation Communities (KICs) are public–private partnerships that bring together businesses (large corporate companies and small and medium-sized enterprises, including start-ups), research centres and higher education institutions as partners. Two are relevant to climate research, namely:

1. Climate KIC;
2. KIC InnoEnergy.

3.1.h. Summary Involvement

Table 2 provides a summary of the EU/international funding landscape and of the current Irish involvement.

Table 2. EU and international funding landscape

Funding stream	Instrument/programme	Irish representation
Horizon 2020		As national delegates and contact points:
	Societal Challenge 2 (food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bio-economy)	DAFM and MI
	Societal Challenge 3 (secure, clean and efficient energy)	SEAI and MI
	Societal Challenge 4 (smart, green and integrated transport)	EI
	Societal Challenge 5 (climate action, environment, resource efficiency and raw materials)	EPA and EI
JPIs	JPI Climate	Chaired by Ireland (EPA)
	Water JPI	Co-chaired by Ireland until November 2018
	FACCE JPI	DAFM/Teagasc
	JPI Oceans	MI
	BiodivERsA	EPA
Belmont Forum		–
Interreg Europe		Northern and Western Regional Assembly, Southern Regional Assembly
LIFE		DCCAE
European KICs	Climate KIC	Sustainable Nation Ireland
	KIC InnoEnergy	–

DAFM, Department of Agriculture, Food and the Marine; DCCAE, Department of Communications, Climate Action and Environment; EI, Enterprise Ireland; GSI, Geological Survey Ireland; MI, Marine Institute; SEAI, Sustainable Energy Authority of Ireland.

A search of the Horizon 2020 Participant Portal for climate-related topics included in the Horizon 2020

Work Programmes under the Focus Area "Building a Low-Carbon Climate-resilient Future"[1] identified 60 funding opportunities within the 2018 Work Programmes.

Table 3 lists all Public-to-Public Partnership (P2P) climate-related Joint Calls that opened during the reporting period for which the Irish research community can/could apply.

Table 3: Public-to-Public Partnership (P2P) climate-related Joint Calls 2017–2018[2]

Joint Call title	Network	Launch date	Deadline for full proposal	Irish funder
Manunet Call 2017	MANUNET III	16/01/2017	12/07/2017	Enterprise Ireland
ERA-MIN Joint Call 2017	ERA-MIN 2	01/02/2017	28/09/2017	GSI (with EPA co-funding)
GeoERA Cofund Call	GeoERA	04/04/2017	12/01/2018	GSI
Geothermica Cofund Call	Geothermica	10/04/2017	24/11/2017	GSI
Scenarios of Biodiversity and Ecosystem Services	BiodivScen	02/10/2017	09/03/2018	EPA (with MI co-funding)
ForestValue Cofund Call – Innovating forest-based bioeconomy	ForestValue	17/10/2017	14/08/2018	DAFM
1st Transnational Joint Call on Sustainable Crop Production	SusCrop	15/01/2018	31/08/2018	DAFM and Teagasc
Water JPI 2018 Joint Call Closing the Water Cycle Gap	WaterWorks2017	19/02/2018	18/09/2018	EPA
AXIS Joint Call for Transnational Collaborative Research Projects 2018	AXIS	09/04/2018	08/10/2018	EPA
First Joint Call on Integrated Regional Energy Systems	EN SGplusRegSys	23/05/2018	02/11/2018	SEAI
2018 Joint Call	ERA-GAS	08/10/2018	31/01/2019	DAFM and Teagasc
ERA-MIN Joint Call 2018	ERA-MIN 2	31/10/2018	31/01/2019	GSI (with EPA co-funding)
MarTERA Call 2019	MarTERA	30/11/2018	06/09/2019	MI
1st BlueBio Joint Call	BlueBio	17/12/2018	16/09/2019	MI and SFI

DAFM, Department of Agriculture, Food and the Marine; GSI, Geological Survey Ireland; MI, Marine Institute; SEAI, Sustainable Energy Authority of Ireland; SFI, Science Foundation Ireland.

1 Introduced for the Work Programmes 2018–2020.

2 Source: ERALearn: https://www.era-learn.eu/network-information/overview-jointcalls (accessed April 2019).

3.2. National Climate Change Research Funding

Innovation 2020 is Ireland's 5-year strategy for research and development, science and technology (DBEI, 2015). In 2018, the DBEI published research priority areas for 2018–2023 (DBEI, 2018). This report revised the themes and priority areas established in 2012. The most significant changes have been to the "Energy" theme. Based on developments since 2012, including the urgency to address climate change and sustainability challenges, this theme has evolved and has been renamed "Energy, Climate Action and Sustainability", with the two priority areas updated to "Decarbonising the Energy System" and "Sustainable Living".

In 2017, the Department of Public Expenditure and Reform (DPER)/Irish Government Economic and Evaluation Service (IGEES) published the report, Spending Review 2017: Climate Change Related – Research & Funding in Ireland (DPER/IGEES, 2017), which demonstrated that:

- Irish researchers are sourcing funding from both Irish and EU sources to carry out climate change-related research;
- €38.2 million in research funding has been provided in total by the EPA, Sustainable Energy Authority of Ireland (SEAI) and Department of Agriculture, Food and the Marine (DAFM) for climate change-related research in Ireland over the period 2010–2015; and
- Irish researchers have been successful in securing climate change-related research funding at EU level under Horizon 2020's societal challenge research sub-programmes.

The main recommendations, aimed at assisting policymakers and stakeholders involved in the climate change area, were as follows:

- A national cross-institutional database should be established whereby details of climate change-related research can be readily accessed. Such a facility could assist policymakers and various stakeholders to access climate change-related information produced by Irish-funded researchers.
- An annual climate change-related research conference/workshop should be established, which would enhance coordination between researchers and policymakers.
- A "Research Prioritisation Plan" should be produced to provide detailed blueprints for actions to be taken by funding departments/agencies to align the majority of competitive public research funding around priority areas.
- To aid consistency and to increase the likelihood that research makes its way in a timely manner to the relevant policymakers, efforts to disseminate research to policymakers should be coordinated at an appropriate level.

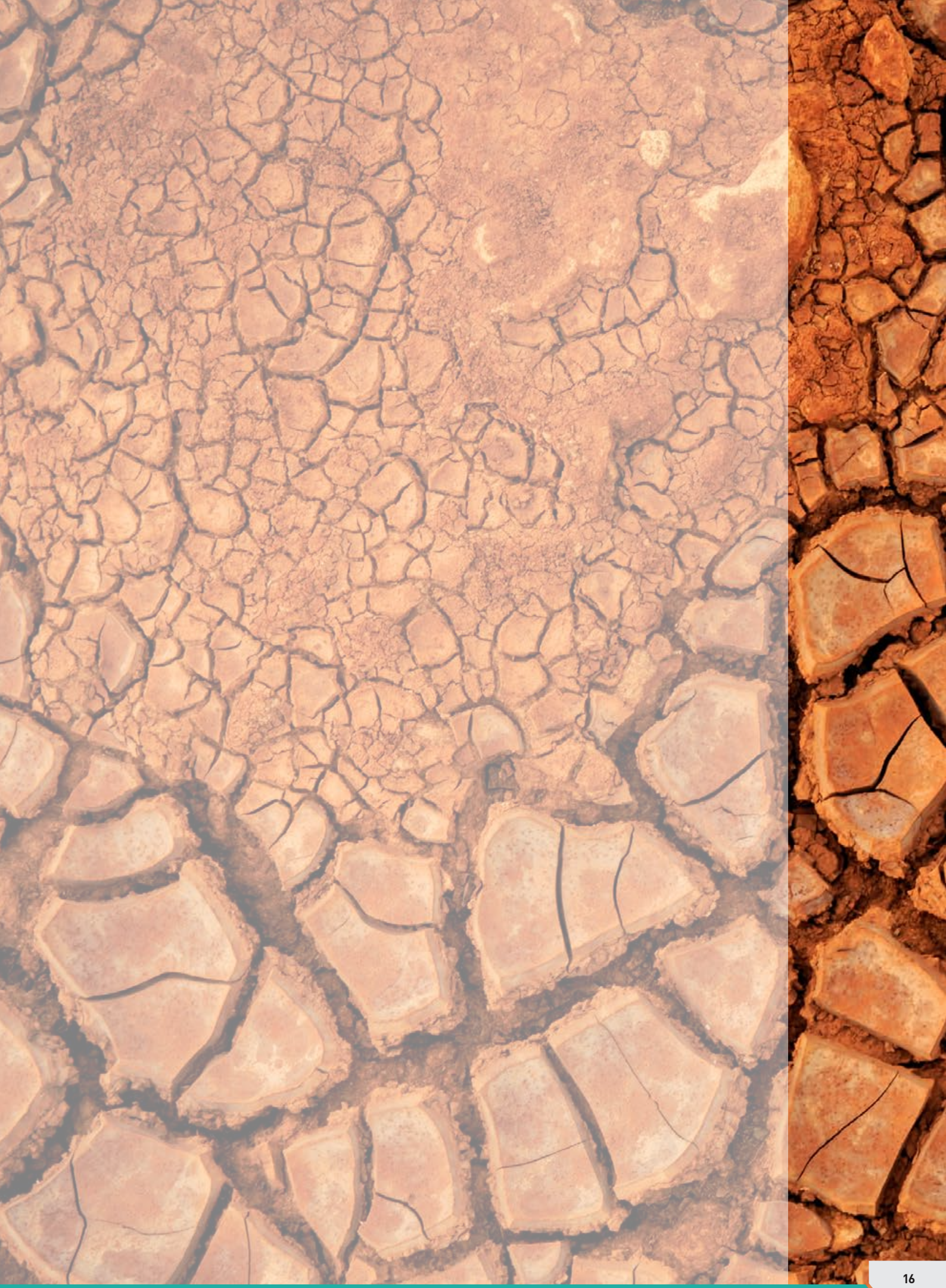
As the climate change challenge is a cross-sectoral issue, government funding support for climate-related research, development and innovation is provided by a variety of different departments and agencies and specific programmes. Collaboration between national, EU and international research programmes 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 4. Not all funders provide specific climate-related research funding.

Table 4. National funding landscape

National organisations	Funding Programmes	Funding received from
DAFM	Food – Food Institutional Research Measure (FIRM); agriculture – Research Stimulus Fund (RSF) and Teagasc research; forestry –Programme of Competitive Forestry Research for Development (CoFoRD)	Government Exchequer
DTTAS	Climate Change Research Platform	Government Exchequer
EPA	EPA Research Programme 2014–2020	DCCAE
(DCCAE) GSI	Funding for small- to medium-scale research studies. Provides funding and co-funding with the EPA, iCRAG, Marine Institute, SEAI, Science Foundation Ireland, Irish Research Council and Fulbright Commission of Ireland	Government Exchequer
Health Service Executive	Co-funding with the EPA	Department of Health
Irish Research Council	Funds bottom-up research projects that may include climate change topics	Department of Education and Skills
Marine Institute	Cullen Fellowship; Ship Time Programme; Networking and Travel Initiative; research funding for capacity building, industry and infrastructure	DAFM
(DHPLG) Met Éireann	Climate services research	Government Exchequer
OPW	Carries out research on flood risk and rivers. Provides university research funding	Government Exchequer
Science Foundation Ireland	Science Foundation Ireland research centres, e.g. MaREI (marine and renewable energy), iCRAG (applied geosciences), Beacon (bio-economy) and VistaMilk (precision dairy); Research Infrastructure Programme; Investigator Programme; Career Development Award; Starting Investigator Research Grant; SFI–NSFC Partnership, etc.	DBEI
SEAI	Funds research into sustainable technology, renewable and ocean energy and low-carbon technology	DCCAE
Teagasc	Carries out and administers research and knowledge transfer programmes on animals, crops and grassland management, food and rural development	DAFM

DCCAE, Department of Communications, Climate Action and Environment; DHPLG, Department of Housing, Planning and Local Government; DTTAS, Department of Transport, Tourism and Sport; iCRAG, Irish Centre for Research in Applied Geosciences; MaREI, Centre for Marine and Renewable Energy; NSFC, National Natural Science Foundation of China.



Climate Change Research Thematic Areas

4. Climate Change Research Thematic Areas

A thematic approach has been used to develop climate change research in Ireland since 2007, when it was adopted at a cross-agency level[3]. The thematic areas were informed by the structure used by the IPCC (Figure 2) but are not directly aligned with its operational structure.

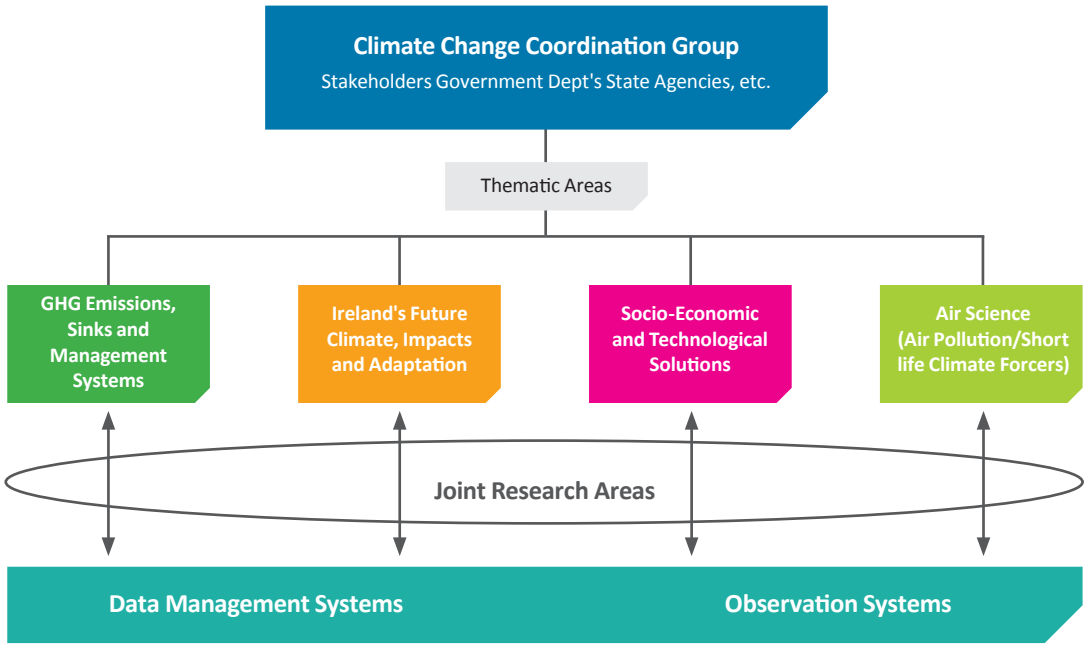


Figure 2. Climate change research thematic areas.

The CRCG is also aware of and recognises the importance of research on broader climate change issues, including on fundamental science and processes. This report uses the standard thematic structure but recognises that this may evolve to encompass other areas.

Since 2007, policy-related climate change research in Ireland has been developed across four linked thematic areas, with observation systems and data management being key underpinning elements. The thematic areas are primarily designed to inform and assist national policy development and responses to the challenges of climate change and to enable national engagement with EU and UN policy bodies addressing climate change and wider atmospheric protection issues. At the EU level, these include the Directorate-General for Climate Action (DG Clima), the Directorate-General for Environment (DG Environment) and the Directorate-General for Research (DG Research). At the UN level, these include the IPCC, UNFCCC and United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (CLRTAP), as well as other bodies such as the Climate and Clean Air Coalition (http://www.ccacoalition.org/en). This approach has been commended in reviews of Ireland's National Communications.

3 The NDP 2007–2013 included funding for climate change research, which allowed for the development of the Climate Change Research Programme (CCRP), with a thematic coordination structure.

4.1. Theme 1: Carbon Stocks, GHG Emissions, Sinks and Management Options

Research under this thematic area is focused on the development of analysis of carbon stocks, sinks/removals and GHG emissions and removals. The annual National Inventory Report on GHG emissions and removals is a key user and driver of the research focus for this thematic area. Research has primarily been targeted at enabling Ireland to move from use of international default values in the inventory (Tier 1) to use of national data (Tier 2) and national systems models (Tier 3) analysis. This is essential as the national inventory is central to policy development, and assessment of its implementation, in meeting targets. It is therefore critical to ensure that it captures activities and processes in an effective manner that informs and enables policy and, specifically, the NMP. This research is therefore informed by national, EU and UN review processes.

A secondary focus is the development of independent top-down analysis of GHG emissions and removals. This is based on utilisation of advanced observation systems and modelling systems to determine emissions and removals. These top-down analyses can be used in combination with the bottom-up inventory data to enhance understanding of emissions and removals. These systems can also provide more detailed temporal and spatial data, which are of particular interest for dispersed emissions/removals, such as those from agriculture and land use. Development of these systems can assist in policy development and decision making. The work carried out also feeds into the development of IPCC Good Practice Guidelines and emissions factor databases, which are used globally for emissions inventory development.

Fundamental science it is not the central driver of research in this area; however, this area does encompass issues such as the carbon and nitrogen cycles and localisation of certain Earth systems models.

4.2. Theme 2: Ireland's Future Climate, its Impacts, and Adaptation Options

Research in this area is designed to examine how global climate change has impacted on, and is impacting on, Ireland, as well as to examine projected changes in Ireland's climate as a result of ongoing global changes. This is essential for understanding how climate change may impact on Ireland over the course of this century. In order to understand climate change, it is essential to understand past climate variables. This has been a key area of research. It has involved research on indicators of climate change, including changes in ECVs, as identified by the World Metrological Organization (WMO), and analysis of these based on instrumental and pre-instrumental records and archives.

A central feature has been the development of high-resolution climate models and climate projections for Ireland. These are based on downscaling of global climate models and the development of regional climate modelling capacity in Ireland, including with Met Éireann.
This allows for the ongoing development of impacts and vulnerability analysis for key sectors. These outcomes have been summarised in a State of Knowledge report (EPA Research Report 223) (https://www.epa.ie/pubs/reports/research/climate/). This theme has also been central to the development of guidelines to enable risk assessment and adaptation planning, as required under the NAF. This information is available via the Climate Ireland information platform (www.climateireland.ie). The aim is to provide information and data from the research programme and outcomes from relevant research and analysis at European levels. This can inform steps in the transition to a climate-resilient Ireland by 2050, as envisaged in the national policy statement. This research is also linked to the development of climate services (http://www.jpi-climate.eu/ERA4CS) at a European level through JPI Climate and DG Research and engagement with development and comparison of global climate models under the World Climate Research Programme (https://www.wcrp-climate.org/wgcm-cmip), in support of the IPCC Sixth Assessment Report.

4.3. Theme 3: Socio-economic and Technological Solutions and Transition Management and Opportunities

Research in this area is focused on transition and transformation and the socio-economic and technological changes required for a carbon-neutral climate-resilient Ireland by 2050. Research has been focused on the development of key systems models and analysis. These include energy models for Ireland, as well as analysis of key sectoral issues such as transport and potential solutions such as carbon capture and storage. This has enabled the development of national energy systems modelling capacity and Irish versions of European integrated assessment models. This research has been at the forefront of enabling the inclusion of Ireland-specific analysis and data in pan-European analysis and has supported engagement with the European Commission and other European and international bodies, such as the International Energy Agency modelling groups (https://iea-etsap.org/index.php/etsap-tools). It has also informed energy policy development and the 2014 national policy position on climate change.

Funding under this theme has supported and allowed assessment of national research on technological solutions and storage and emerging technologies. Behavioural issues and market-based solutions have emerged as key areas of research. This is linked to the development of pan-European research, such as that being advanced by JPI Climate (West and Worliczek, 2019). Current research is focused on shared socio-economic pathways, synergies between mitigation and adaptation and the multiple benefits of climate actions, including for human health, biodiversity and ecosystem services. The research aims to inform actions to achieve national targets under the EU Climate and Energy Package.

4.4. Theme 4: Air Science (Air Pollution and Short-lived Climate Forcers)

The objective of research in this area is to inform pathways for Ireland to achieve the highest air quality standards. Research topics include increasing understanding of emissions to the atmosphere, pollutant transport, atmospheric reactions and deposition impacts for human health and ecosystems. Research on emissions and activities that give rise to emissions informs the development of the national pollution inventory provided to the UNECE CLRTAP annually, as well as being used to determine progress on targets established under the National Emission Ceiling Directive (2016/2284/EU; https://www.eea.europa.eu/themes/air/national-emission-ceilings). This includes key air pollutants such as sulphur dioxide, nitrous oxides, ammonia and particulate matter.

More broadly, research in this area supports air quality modelling capacity, integrated assessment modelling and ecosystems studies. These inform and enable engagement with the UNECE CLRTAP and its associated programmes, including on impacts of air pollutants and critical loads. This research also informs engagement with EU working groups under the Clean Air For Europe (CAFE) programme. Data from research feed into pan-European analysis of the effectiveness of protocols and associated polices. European Monitoring and Evaluation Programme (EMEP) sites in Ireland, including Mace Head, provide data and analysis that are key to studies of the hemispheric transport of air pollution, which are considered under the CLRTAP Task Force on Hemispheric Transport of Air Pollution (HTAP). These pollutants also influence climate systems and Ireland is a member of the international Climate and Clean Air Coalition, which aims to promote synergies between policy actions on climate and air quality in realising co-benefits for climate, health, environment and society. Research in this area also supports fundamental research on issues such as interactions between pollutants and solar radiation and the impacts of pollutants on cloud formation and characteristics. These pollutants can mask global warming but remain challenging and a key source of scientific uncertainty in the determination of the global energy balance.

Activities of the Climate Research Coordination Group 2017-2018

5. Activities of the Climate Research Coordination Group 2017–2018

The CRCG is focused on the development of research that informs policy and that enables actions to address the various challenges that arise from climate change.

CRCG meetings have focused on the development of national research programmes, information exchange on activities, coordination of research and leveraging of EU funding and realising the benefits of Europe-wide research. The activities of the group in the period from June 2017 to December 2018 are outlined in this section, including meetings, events, research collaborations and an overview of the research projects initiated in this period and the associated funding commitments (for research and development performed elsewhere). Specific funding per project has been identified. Research reports published during this period are also listed.

5.1. Climate Change Research Projects

The information provided here is based on the inputs provided by the CRCG members. This section covers competitive research funding for research and development performed elsewhere.

Based on the information provided, **220** live research projects (competitive funding only for research and development performed elsewhere) were identified for the reporting period [i.e. currently in progress (grants awarded before 2017 but not yet completed) and/or newly awarded during the reporting period]. These relate to c. €62 million of competitive research funding. Figures 3 and 4 illustrate the breakdown of these projects (number of projects and total project budgets, respectively) under the four thematic areas.

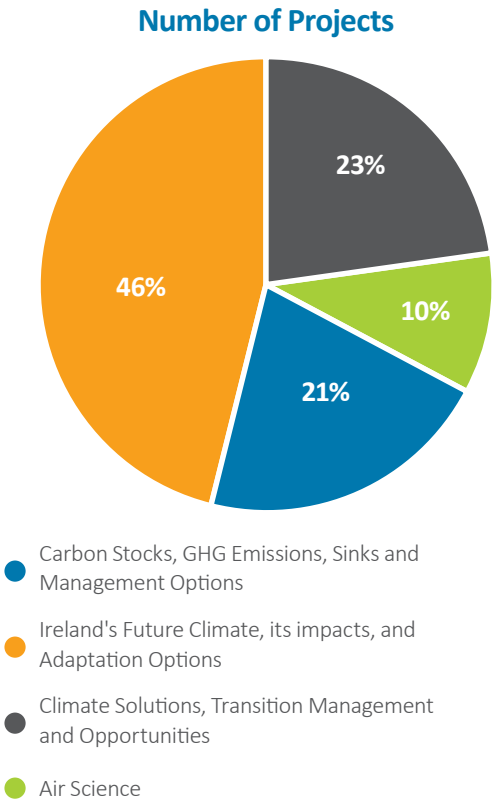


Figure 3. Breakdown of live research projects (number) by thematic area during the period 2017/2018 (competitive funding only for research and development performed elsewhere).

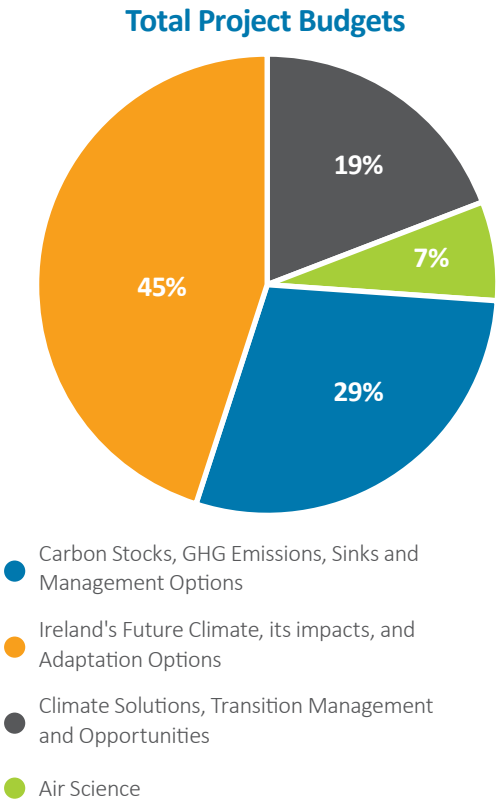


Figure 4. Breakdown of live research projects (total project budget) during the period 2017/2018 (competitive funding only for research and development performed elsewhere).

Based on the information provided, there were 104 new awards (competitive research funding) made during the reporting period, with a total budget commitment of €25 million. Figures 5 and 6 illustrate the breakdown of these new competitive awards (number of projects and total project budgets) under the four thematic areas. Figure 7 provides the breakdown by CRCG member of the budget committed for new competitive awards during the reporting period.

Appendix 3 provides details of funding for 2017/2018 as reported by the CRCG members.

Appendix 4 provides the listing of the new climate research competitive awards funded in 2017-2018.

Total competitive research data (i.e. funding and number of projects) do not include funding related to research activities, performed in-house by agencies such as Met Éireann, Teagasc, Office of Public Works (OPW) and Geological Survey Ireland (GSI).

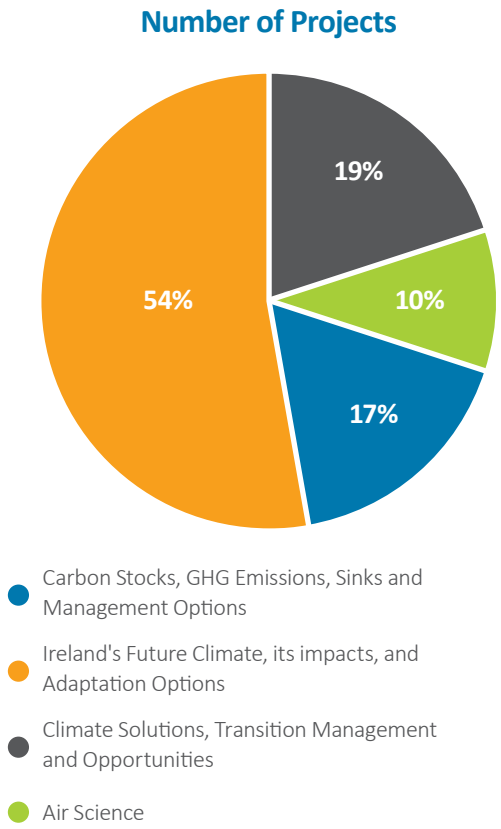


Figure 5. Breakdown of new competitive research awards (number) by thematic area during the period 2017/2018 (competitive funding only for research and development performed elsewhere).

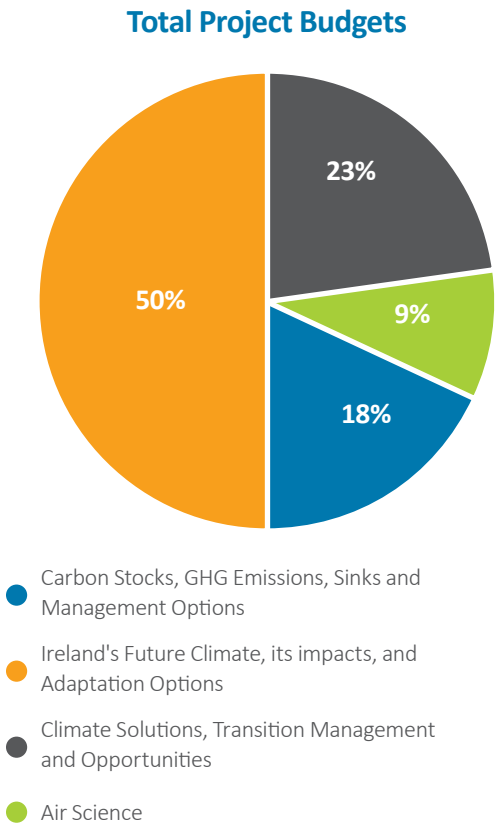


Figure 6. Breakdown of new competitive research awards (total project budget) by thematic area during the period 2017/2018 (competitive funding only for research and development performed elsewhere).

New Climate Research Competitive Awards 2017-2018: Budget Committed

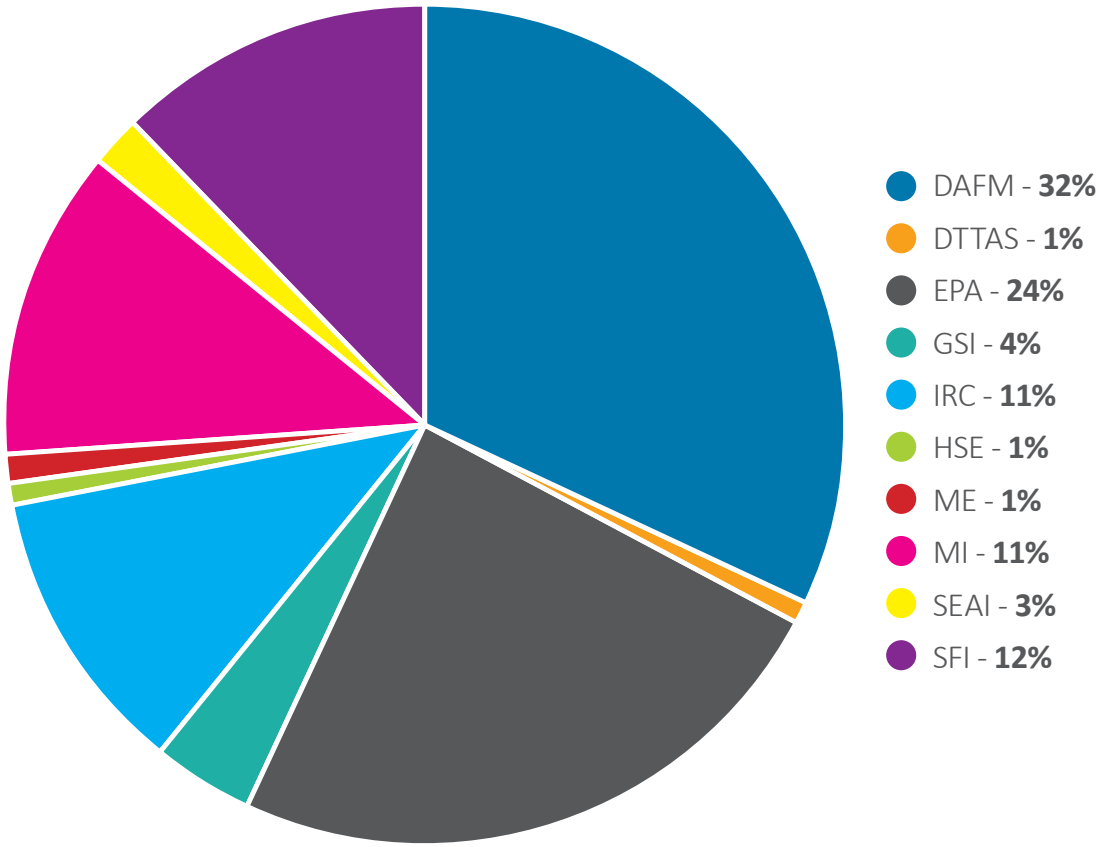


Figure 7. Breakdown by CRCG member of the budget committed for new competitive awards during the reporting period. IRC, Irish Research Council.

The Irish research community leveraged **€2.97** million of EU funding via Horizon 2020 during 2017 and 2018 for 14 climate-related projects (Appendix 5). Additional funding may also have been leveraged from Interreg, LIFE [4], COST, etc.

4 LIFE projects with Irish lead partners have, to date, all been under the environment rather than the climate change sub-programme.

5.2. Strategic Partnerships and Collaborations

5.2.a. Research Co-funding

Based on the information provided, in total, **19** new competitive awards in climate change research (c. €6 million) have been identified as being co-funded between members of the CRCG between July 2017 and December 2018. This is in line with keeping with the objectives of the NAF, which calls for better coordination of national climate change research priorities. The **19** projects progressed through national co-funding are listed in **Table 5**.

Table 5. Co-funding of competitive new awards between CRCG members in 2017–2018

Lead funding organisation	Co-funders	Project title	Total Irish grant aid approved/ requested
Theme 1. Carbon Stocks, GHG Emissions, Sinks and Management Options			
DAFM	EPA	AGRI-SOC: Evaluating Land Use and Land Management Impacts on Soil Organic Carbon in Irish Agricultural Systems	€598,052
EPA	DAFM	Scenarios Quantifying Land Use and Emissions Transitions towards Equilibrium with Removals	€348,934
Theme 2. Ireland's Future Climate, its Impacts, and Adaptation Options			
EPA	DAFM	Mitigating Agricultural Impacts through Research and Knowledge Exchange	€499,753
EPA	Met Éireann, MI	Ireland's Contribution to CMIP6 and High-Res Regional Climate Projections for Ireland	€349,000
EPA	MI	Achieving Resilience in the Marine and Coastal Environment of Ireland	€239,621
EPA	MI, Met Éireann	Climate Status Report Ireland	€199,969
EPA	SEAI	Imagining2050: Engaging, Envisioning and Enabling Dialogue on Pathways towards a Low Carbon, Climate Resilient Ireland	€378,344
Irish Research Council	GSI	Geophysical Remote Sensing of Subsurface Properties for Sustainable Agricultural Management	€96,000
Irish Research Council	EPA	Climate Change Impacts on the Water-Quality and Functioning of Irish Rivers in a Multi-stressor Environment	€96,000
SFI	GSI, MI	Integrating Multidisciplinary Geoscientific Data into Forecasting Models to Monitor and Predict Coastal Change: Proof of Concept in Dublin Bay	€1,141,029
SFI	GSI, MI	Mapping, Modelling and Monitoring Key Processes and Controls on Cold-water Coral Habitats in Submarine Canyons (MMMonKey_Pro)	€1,046,883
Theme 3. Climate Solutions, Transition Management and Opportunities			
SEAI	DTTAS	Desktop Study to Assess Potential Mitigation Measures That Would Reduce CO_2 and/or Air Pollutant Emissions from the Existing Irish Heavy Duty Vehicle Fleet	€93,392
EPA	SEAI	A Structured Evaluation of Ireland's Climate Policy Response	€98,410
SEAI	DTTAS	DiSTRaCT: modal ShifT Reduce Carbon in Transport	€91,524

Lead funding organisation	Co-funders	Project title	Total Irish grant aid approved/ requested
Theme 4. Air Science			
EPA	DTTAS	Eco-driving: Trends and Potential Impacts for Irish Heavy Duty Vehicles	€87,641
EPA	HSE	Irish Nationwide Health and Air Quality Linkage	€270,846
EPA	Met Éireann	POMMEL: Pollen Monitoring and Modeling	€199,718
Irish Research Council	Met Éireann	Development and Analysis of a Long Term, Quality Assured Precipitation Network for Ireland	€114,000
SEAI	DTTAS	Mitigation of Air Pollution Impacts of Irish Heavy Duty Vehicles (MAP-HDV)	€103,564

DTTAS, Department of Transport, Tourism and Sport; HSE, Health Service Executive; MI, Marine Institute; SFI, Science Foundation Ireland.

5.2.b. Irish Climate Information Platform

The Irish Climate Information Platform provides informational support and advice to help organisations, sectors and government to adapt to the consequences of climate change. The platform is a service provided through the Climate Ireland web portal (www.climateireland.ie) and through provision of scientific and technical advice, workshops, etc.

Climate Ireland has been designed and developed by the Centre for Marine and Renewable Energy (MaREI) at University College Cork (UCC) (EPA Research Report 135[5], EPA Research Report 222[6] and EPA Research Report 258[7]), and the Irish Centre for High End Computer (ICHEC) at the National University of Ireland, Galway (NUIG).

Climate Ireland aims to deliver climatic and adaptation information that is of direct relevance to climate adaptation planning in Ireland and, as such, the work revolves around three key areas:

1. raising awareness and increasing understanding of climate change and climate adaptation;
2. providing the information and data required for climate adaptation planning in Ireland;
3. facilitating decision makers in developing their adaptation plans.

Climate Ireland works as a bridging organisation between scientific research, policymaking and adaptation practice. This allows it to bring together the key stakeholder groups who are responsible for addressing the challenges that climate change will bring. The work is inspired by the needs of stakeholders and their experiences of climate change and adaptation, as well as learning from national and international experiences of adaptation. The initial focus was on services to local authorities, with Climate Ireland planning to extend the service to key sectoral groups (tourism, forestry, health, critical infrastructure, etc.).

The Irish Climate Information Platform is an operational support in relation to the implementation of the NAF (i.e. Action 7).

5 http://www.epa.ie/pubs/reports/research/climate researchreport135thedevelopmentofanirishclimateinformationplatform.html (accessed April 2019)

6 http://www.epa.ie/pubs/reports/research/climate/research222.html (accessed April 2019)

7 http://www.epa.ie/pubs/reports/research/climate/research258.html (accessed April 2019)

5.2.c. Network for Monitoring Atmospheric Composition and Change

The Network for Monitoring Atmospheric Composition and Change (NACC) is composed of the EMEP network and GHG monitoring network. The NACC consists of the monitoring stations and instruments, which are run in cooperation with Met Éireann and Teagasc, with support provided from NUIG towards their operation and maintenance. The stations operated and maintained by the EPA include Carnsore Point (located at the ESB wind farm), Malin Head (located at the Met Éireann station), Oak Park (located at the Teagasc research farm) and Johnstown Castle (located at the Teagasc research farm). The national network also includes Mace Head Atmospheric Research Station (operated and maintained by NUIG with financial support from the EPA) and Valentia (operated and maintained by Met Éireann). The data from the EMEP network are important in assessing the impact of air pollution on ecosystems, which is required under the revised National Emission Ceiling Directive (2016/2284/EU).

5.2.d. Joint Research Events

One climate change research event involving CRCG members took place during the reporting period. This was the EPA Climate Symposium held on 7 December 2017 (EPA, 2018). The EPA hosted the symposium, which included over 100 participants from the Irish research community and end users of their research. The purpose of the day was to:

- highlight some of the outputs from the EPA Climate Research Programme;
- demonstrate how targeted research can identify pressures, inform policy and develop solutions;
- build a framework and a longer-term process on how best to tackle Irish research and policy needs in supporting our transition to a low-carbon, climate-resilient and environmentally sustainable economy by 2050;
- contribute to the EPA's mid-term review of its Research Strategy 2014–2020.

Over the past few years, researchers at Met Éireann have produced a climate reanalysis dataset called MÉRA – Met Éireann Reanalysis – for the period 1981–2017 for an area covering Ireland, the UK and northern France. This dataset was launched in May 2017 and currently has over 100 users in Ireland, the UK, Germany, the Netherlands, Canada and the USA. On 17 May 2018, Met Éireann held the first workshop for users of the data. The workshop consisted of 15 very interesting talks spread across sessions on climate applications, precipitation and hydrology, energy, waves and storms. CRCG member participation included the OPW, GSI, EPA, Marine Institute (MI) and Teagasc.

5.2.e. Meetings

During the 18-month period between June 2017 and December 2018, five meetings took place. The first CRCG meeting in June 2017 occurred prior to the publication of the NMP (November 2017). The focus of the CRCG meetings has been the sharing of information regarding climate change research funding opportunities arising within Ireland and funding available from international funding sources. The need for more co-funded research across Irish stakeholders has been recognised by CRCG members as a main priority and goes hand in hand with an urgent need to improve research data management and access to research outputs across all research bodies. It was noted that this has previously been highlighted as a recommendation in the DPER/IGEES climate research funding report (DPER/IGEES, 2017).

5.3. Research Publications

Research publications in the context of this report are published reports accessible to the public on the CRCG member websites. These are listed in **Table 6**.

Table 6. Climate change-related research publications (2017–2018)

Lead funding organisation	Project title	Information source/website/ publication link
DAFM	List of Publications	https://www.agriculture.gov.ie/publications/
DTTAS	Decarbonising Transport Initiative	https://www.itf-oecd.org/shared-mobility-dublin
EPA	Climate Information Platform (Phases 1–3)	http://www.epa.ie/pubs/reports/research/climate/research257.html
EPA	21st Century Deforestation in Ireland	http://www.epa.ie/pubs/reports/research/climate/research221.html
EPA	A Summary of the State of Knowledge on Climate Change Impacts for Ireland	http://www.epa.ie/pubs/reports/research/climate/research223.html
EPA	An Operational Climate Information Platform for Ireland: Summary Report	http://www.epa.ie/pubs/reports/research/climate/Research_Report_257.pdf
EPA	Climate and Air Policy in Ireland: Synergies and Tensions – A GAINS Ireland and Irish TIMES analysis	https://www.epa.ie/pubs/reports/research/climate/EPA_Research%20212_webEssentra.pdf
EPA	GHG Fluxes from Terrestrial Ecosystems in Ireland	http://www.epa.ie/pubs/reports/research/climate/Research_Report_227.pdf
EPA	HOMERUN: Relative Homogenisation of the Irish Precipitation Network	http://www.epa.ie/pubs/reports/research/climate/Research_Report_242.pdf
EPA	Integrated Modelling Project Ireland	http://www.epa.ie/pubs/reports/research/climate/EPA%20RR%20224_webEssentra.pdf
EPA	Irish TIMES Energy Systems Model Phase 2	http://www.epa.ie/pubs/reports/research/climate/EPA%20-%20Research%20Report%20199_webEssentra.pdf
EPA	National Preparedness to Adapt to Climate Change: Analysis of State of Play	http://www.epa.ie/pubs/reports/research/climate/Research_Report_256.pdf
EPA	PeatGHG – Survey of GHG Emission and Sink Potential of Blanket Peatlands	http://www.epa.ie/pubs/reports/research/climate/Research_228_Report.pdf
EPA	Protecting the North Atlantic Atmosphere: A Report on the Outcome of an International Meeting on the Twentieth Anniversary of the Second Aerosol Characterisation Experiment (ACE2)	http://www.epa.ie/pubs/reports/research/climate/Research_Report_247.pdf
EPA	Reflecting on Adaptation to Climate Change: International Best Practice Review and National MRE and Indicator Development Requirements	http://www.epa.ie/pubs/reports/research/climate/Research_Report_263.pdf
EPA	Regional Climate Model Simulations for Ireland for the 21st Century	http://www.epa.ie/pubs/reports/research/climate/Research_Report_244.pdf
EPA	State of Play of Air Science Research in Ireland: Discussion Document	http://www.epa.ie/pubs/reports/research/climate/research211.html
EPA	SoilC – Feasibility of Grassland Soil Carbon Survey	http://www.epa.ie/pubs/reports/research/climate/EPA%20RR225_web.pdf

Lead funding organisation	Project title	Information source/website/ publication link
EPA	The Development of an Irish Climate Information Platform (ICIP) – Phase 2 (2013–2015)	http://www.epa.ie/pubs/reports/research/climate/EPA%20RR%20222%202013-CCRP-MS.11%20(O'Dwyer)%20final%20web.pdf
EPA	The Development of an Irish Climate Information Platform (ICIP) – Phase 3 (2015–2017)	http://www.epa.ie/pubs/reports/research/climate/Research_Report_258.pdf
EPA	The Irish Land Mapping Observatory: Mapping and Monitoring Land Cover, Use and Change	http://www.epa.ie/pubs/reports/research/climate/EPA%20RR%20198_web%20Essentra.pdf
EPA	Vulnerability Assessment of Peatlands: Exploration of Impacts and Adaptation Options in Relation to Climate Change and Extreme Events (VAPOR)	http://www.epa.ie/pubs/reports/research/climate/Research_Report_250.pdf
EPA	WARNDIS Project Final Report: A Review of Climate Change-related Hazards and Natural Disaster Vulnerabilities and of Agencies Involved in Warning and Disaster Management	http://www.epa.ie/pubs/reports/research/climate/Research_Report_233.pdf
GSI	An Economic Review of the Irish Geoscience Sector	https://www.gsi.ie/en-ie/publications/Pages/An-Economic-Review-of-the-Irish-Geoscience-Sector.aspx
GSI	Karst of Ireland – Landscape Hydrogeology Methods	https://www.gsi.ie/en-ie/publications/Pages/Karst-of-Ireland-Landscape-Hydrogeology-Methods.aspx
Met Éireann	Publications	https://www.met.ie/education/publications
MI	Publications	https://www.marine.ie/Home/site-area/publications/publications
Teagasc	TResearch: Communicating Science	https://www.teagasc.ie/publications/tresearch/

Other Research-related National Mitigation Plan Actions

6. Other Research-related National Mitigation Plan Actions

The 2017 NMP contains 106 actions. The NMP supports research playing a key role in achieving the transition to a low-carbon economy through the provision of expertise and analysis to inform policy decisions. The CRCG has a key role in this process. NMP actions relating to research are considered in this section.

A review of the NMP identified research across 13 action areas as being important in progressing the transition to a low-carbon economy:

- Four of these areas focus on technological research needs to further energy transition to a low-carbon economy.
- Three action areas identify research needs around transport options, transport emission reduction and behaviour change.
- Six action areas set out research needs in the agricultural arena, for example to elaborate on carbon neutrality concepts; develop integrated abatement strategies and cost curves across climate, air (including GHGs), water, biodiversity and agriculture; continue investigating sequestration and land-use change; identify behaviour change opportunities with farmers; and analyse the benefits of beef genomics.

Table 7 provides an overview of the progress made against other research-related actions included in the NMP.

Table 7. Other research-related actions included in the NMP

Research actions in the NMP	Responsibility	Annual transition statement 2018 update (DCCAE, 2018b)
Action 21: Economic and technical research on the merits of further interconnection for Ireland	DCCAE	**Completed**
Action 25: Ongoing research into technology to increase variable renewable electricity generation	Eirgrid	**On schedule:** In April 2018 Eirgrid announced that up to 65% variable renewable energy can be handled on the grid at any given time. The ability of the electricity network to safely move to higher limits of wind penetration is vital to achieving our 40% renewable target by 2020. The current objective of Eirgrid's DS3 is to reach 75% wind power at any given point by 2020. The level of funding associated with the SEAI Research Development and Demonstration (RD&D) Funding Programme is on an upward trajectory and will contribute to this goal on an ongoing basis
Action 29: Wider economic costs and benefits – including in the areas of climate, decarbonisation and rural development – of potential extensions of the Irish natural gas network	DCCAE	**Completed**
Action 67: Continue support for the International Transport Forum's (ITF) Decarbonising Transport Worldwide research and modelling project	DTTAS	**Completed since 2018 update:** https://www.itf-oecd.org/shared-mobility-dublin

Research actions in the NMP	Responsibility	Annual transition statement 2018 update (DCCAE, 2018b)
Action 68: Climate change and air quality research and analysis in the Irish transport sector	DTTAS	**On schedule:** Three SEAI co-funded research projects to begin in 2019 are: • Mitigation of Air Pollution Impacts of Irish Heavy Duty Vehicles (MAP-HDV) • DiSTRaCT: modal ShifT Reduce Carbon in Transport • Desktop study to assess potential mitigation measures that would reduce CO_2 and/or air pollutant emissions from the existing Irish heavy duty vehicle fleet Another EPA co-funded project relating to eco-driving in Ireland will also be undertaken
Action 72: Establish Behavioural Economics Working Group to consider behavioural change	DTTAS	**Completed** To acknowledge the importance of human and psychological factors in influencing the uptake of sustainable solutions, SEAI has established a dedicated Behavioural Economics Unit that is tasked with researching and communicating methods to encourage people to make better energy use decisions across a range of areas including within the transport sector. DTTAS is working with this Unit on transport projects and in 2018 co-funded a research project with SEAI entitled "Examining a range of behavioural nudges that would assist in decarbonising the national car fleet". The work of this SEAI Unit, securing relevant research and the collaboration with DTTAS were considered more effective means of advancing this key work than establishing a separate transport-specific Behavioural Economics Working Group
Action 78: Undertake research to further elaborate the concept of carbon neutrality from an Irish agriculture and land-use perspective, to include a number of scenarios	EPA/DAFM	**On schedule:** EPA's 2018 Research Call included a project on pathways to carbon neutrality in the agriculture, forest and other land-use sectors. The project is to include an interim report including definitions and possible approaches to carbon neutrality from an Irish perspective
Action 82: Undertake research to evaluate abatement actions across the areas of climate, air (including GHGs), water and biodiversity to develop an integrated abatement strategy and cost curve	DAFM/Teagasc	**On schedule:** The Minister for Agriculture announced awards of almost €14.3 million in funding for collaborative research projects arising from last year's Research Call under DAFM's three competitive research programmes. DAFM will seek to include this topic again in the 2019 Research Call. **Update (March 2019):** No proposals received in the 2017 Stimulus Research Call and so relaunched in the 2019 Research Call
Action 89: Continue to support climate and land-based research at national and international levels	DAFM	**On schedule:** DAFM is providing 50 : 50 co-funding for a topic entitled "Pathways to carbon neutrality in the agriculture, forest and other land-use sectors" in the EPA's 2018 Research Call. In addition, DAFM is providing 50 : 50 co-funding for a topic entitled "An investigation to quantify the impact of applying circular economy principles to the Irish biomass sector" in the SEAI's 2018 Research Call

Research actions in the NMP	Responsibility	Annual transition statement 2018 update (DCCAE, 2018b)
Action 90: Continue to engage with international projects for investigating sequestration and land-use change, such as the GRA and the French Initiative "4 per 1000"	DAFM/Teagasc/ EPA	**On schedule:** Over €598k in funding has been committed under DAFM's 2017 Research Call to a project entitled "AGRI-SOC: evaluating land-use and land management impacts on soil organic carbon in Irish agricultural system". This project is co-funded by the EPA and plans to examine carbon sequestration mitigation options that do not adversely impact agricultural production. The work will be undertaken in cooperation and coordination with the EU FACCE JPI's "Thematic Annual Programming on organic matter sequestration in the soil" (TAP-Soil) initiative in order to maximise international synergies **Update (March 2019):** Ongoing engagement with GRA and 4 per 1000 initiative
Action 91: Carry out further research to understand the behavioural barriers that influence farmers' participation in environmental schemes	DAFM/Teagasc	**On schedule:** This is being carried out as part of GLAS evaluation, which will assess the effectiveness of the GLAS measure under the RDP **Update (March 2019):** The GLAS participant survey report is complete and in the final stages of review, awaiting DAFM approval
Action 96: Carry out further research to analyse the benefits of beef genomics	DAFM	**On schedule:** Over €2.9 million in funding has been committed under DAFM's 2017 Research Call to the GREENBREED project entitled "Sustainable ruminant breeding programs for low environmental footprint". This project aims to assess the implications, benefits and additional future opportunities of incorporating direct selection of environmental traits into current ruminant breeding programmes (including beef genomics) with a view to improving the environmental footprint of Irish production systems **Update March 2019:** 2018 – co-funded Stimulus Project with Teagasc awarded to University College Dublin (UCD) in collaboration with the Irish Cattle Breeding Federation (ICBF)

DCCAE, Department of Communications, Climate Action and Environment; DTTAS, Department of Transport, Tourism and Sport. GRA: Global Research Alliance, GLAS: Green Low-Carbon Agri-Environment Scheme and RDP: Rural Development Programme 2014-2020

7

Conclusions

7. Conclusions

This first report presents a summary of the CRCG activities during an 18-month period from June 2017 to December 2018. Activities detailed in this report cover research funding committed by members of the CRCG for research and development performed elsewhere and do not include in-house core activities. This report is based on the information provided by the members of the group. Subsequent reports will cover annual periods from January to December.

In summary, during this first reporting period (June 2017–December 2018):

- **Five** CRCG meetings were held and **one** research event took place in December 2017.
- **220** research projects were identified as ongoing, of which **104** were awarded during the reporting period, with a total budget allocation of **€25 million**.
- Irish drawdown was c. **€2.97 million** under Horizon 2020, with **14** successful projects.
- Collaboration between members was evident through the co-funding of **19** new research projects.

The review of climate change-related research during the period from July 2017 to December 2018 highlights the increasing collaboration between the CRCG member organisations. Crucial complementarities exist between the research areas. There may be gaps in the research projects and funding identified as the collation of research outputs was reliant on the receipt of research and funding details from members. Although research details were received from some members, the collation of research was supplemented with publicly available research lists available on CRCG members' websites.

A research database was compiled as part of this exercise. Plans for developing it further and making it publicly available (similar to what is available for energy-related research or to the DROPLET interface for water-related research) will be discussed within the CRCG in 2019.

In addition, in preparation for the next Annual Report, the CRCG will consider whether in-house core research activities as well as a bibliometric study of peer-reviewed publications should be included. The CRCG will also review the thematic structure on a regular basis in line with best international practice. Finally, the CRCG will consider possible key performance indicators (KPIs) that could be tracked.

References

8. References

Belmont Forum, 2016. The Belmont Challenge: A Global, Environmental Research Mission for Sustainability. Available online: http://www.belmontforum.org/wp-content/uploads/2017/04/belmont-challenge-white-paper.pdf (accessed January 2019).

DAFM (Department of Agriculture, Food and the Marine), 2017. Statement of Strategy, 2016–2019. Available online: https://www.agriculture.gov.ie/media/migration/publications/2017/StatementStrategyMainDoc030217.pdf (accessed January 2019).

DBEI (Department of Business, Enterprise and Innovation), 2015. Innovation 2020. Available online: https://dbei.gov.ie/en/Publications/Publication-files/Innovation-2020.pdf (accessed January 2019).

DBEI (Department of Business, Enterprise and Innovation), 2018. Research Priority Areas 2018 to 2023. Available online: https://dbei.gov.ie/en/Publications/Publication-files/Research-Priority-Areas-2018-to-2023.pdf (accessed January 2019).

DCCAE (Department of Communication, Climate Action and Environment), 2014. Climate Action and Low Carbon Development National Position. Available online: http://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/National-Policy-Position.aspx (accessed January 2019).

DCCAE (Department of Communication, Climate Action and Environment), 2015. Climate Action and Low Carbon Development Act 2015. Available online: https://www.dccae.gov.ie/en-ie/climate-action/legislation/Pages/Climate-Action-and-Low-Carbon-Development-Act-2015.aspx (accessed April 2019).

DCCAE (Department of Communication, Climate Action and Environment), 2017. National Mitiga-tion Plan. Available online: https://www.dccae.gov.ie/en-ie/climate-action/publications/Pages/National-Mitigation-Plan.aspx (accessed November 2018).

DCCAE (Department of Communication, Climate Action and Environment), 2018a. National Adap-tation Framework. Available online: https://www.dccae.gov.ie/documents/National%20Adaptation%20Framework.pdf (accessed April 2019).

DCCAE (Department of Communication, Climate Action and Environment), 2018b. Update Report on the National Mitigation Plan Actions. Available online: https://www.dccae.gov.ie/documents/Update%20Report%20on%20National%20Mitigation%20Plan%20Actions%20Final%20031218.pdf (accessed April 2019).

DPER (Department of Public Expenditure and Reform)/IGEES (Irish Government Economic and Eval-uation Service), 2017. Spending Review 2017: Climate Change Related – Research & Funding in Ireland. Available online: https://www.per.gov.ie/wp-content/uploads/Climate-Change-Related-Research-and-Funding-in-Ireland.pdf (accessed April 2019).

EC (European Commission), 2012. The System of Environmental-Economic Accounting 2012. Avail-able online: https://ec.europa.eu/eurostat/web/ess/-/the-system-of-environmental-economic-accounting-2012-experimental-ecosystem-accounting (accessed January 2019).

EC (European Commission), 2013. Regulation (EU) No 1291/2013 of the European Parliament and of the Council establishing Horizon 2020. Available online: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0104:0173:EN:PDF (accessed January 2019).

EC (European Commission), 2014. Horizon 2020 Programme. Available online: https://ec.europa.eu/programmes/horizon2020/ (accessed January 2019).

EC (European Commission), 2018. Communication from the commission to the European parlia-ment, the European council, the council, the European economic and social committee, the committee of the regions and the European investment bank: A Clean Planet for all A Europe-an strategic long-term vision for a prosperous, modern, competitive and climate neutral economy. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773 (accessed April 2019).

EPA (Environmental Protection Agency), 2014. EPA Research Strategy 2014–2020. Available online: http://www.epa.ie/pubs/reports/research/eparesearchstrategy2014-2020/EPA%20Research%20Strategy%202014-2020.pdf (accessed January 2019).

EPA (Environmental Protection Agency), 2018. Summary of Proceedings from the Environmental Protection Agency Climate Research Symposium, December 2017. Available online: http://www.epa.ie/pubs/conferencesandevents/EPA_Climate_Research_Symposium.pdf (ac-cessed January 2019).

European Climate Foundation, 2018. Roadmap 2050. Available online: http://www.roadmap2050.eu/ (accessed April 2019).

GSI (Geological Survey Ireland), 2016. Geological Survey Ireland Research Roadmap 2016. Available online: https://www.gsi.ie/en-ie/publications/Pages/Geological-Survey-Ireland-Research-Roadmap-2016.aspx (accessed January 2019).

HSE (Health Service Executive), 2013. Healthy Ireland Framework 2013–2025. Available online: https://www.hse.ie/eng/health/hl/hi/ (accessed January 2019).

IPCC (Intergovernmental Panel on Climate Change), 2018. Special Report. Global Warming of 1.5°C. Available online: www.ipcc.ch/report/sr15/ (accessed January 2019).

Met Éireann, 2017. Met Éireann Strategic Plan 2017–2027. Available online: https://www.met.ie/cms/assets/uploads/2017/08/Met_Eireann_Strategy_2017-2027.pdf (accessed January 2019).

MI (Marine Institute), 2017. National Marine Research Strategy. Available online: https://www.marine.ie/Home/site-area/research-funding/national-marine-research-strategy/national-marine-research-strategy (accessed January 2019).

MI (Marine Institute), 2018. Marine Institute Strategic Plan 2018-2022; Building Ocean Knowledge, Delivering Ocean Services. Available online: https://oar.marine.ie/bitstream/handle/10793/1382/Marine%20Institute_Strategic_Plan_2018-22_English_FINAL_03012019.pdf (accessed April 2019).

NPWS (National Parks & Wildlife Service), 2017. National Biodiversity Action Plan 2017–2021. Available online: https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf (accessed January 2019).

Teagasc, 2017. Statement of Strategy 2017–2020. Available online: https://www.teagasc.ie/publications/2017/teagasc-statement-of-strategy-2017-2020.php (accessed December 2018).

UN (United Nations), 2015a. Sustainable Development Goals. Available online: www.un.org/sustainabledevelopment/sustainable-development-goals/ (accessed January 2019).

UN (United Nations), 2015b. Transforming our World: The 2030 Agenda for Sustainable Develop-ment. Available online: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf (accessed December 2018).

West, J. and Worliczek, E., 2019. White Paper. *Operationalising Knowledge on and for Societal Transformations in the Face of Climate Change*. JPI Climate.

Appendix 1: Terms of Reference for Research Coordination Groups

Climate Research Coordination Group Terms of Reference

Purpose

The main purpose of the CRCG is to provide a cross-sectoral, national strategic coordination forum for climate environmental 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 research funding organisations to liaise and/or collaborate with European and international activities related to climate research, such as JPIs, Technology Platforms, LIFE.

Added Value

Each of the Research Coordination Groups acts as a national 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. This 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 research funding organisations, 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.

Appendix 2: Climate Research Coordination Group Members

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 of the group

Climate Change Advisory Council (CCAC)

The Climate Change Advisory Council (CCAC) is an independent advisory body tasked with assessing and advising on how Ireland is transitioning to a low-carbon, climate-resilient and environmentally sustainable economy by 2050. It was established under the Climate Action and Low Carbon Development Act 2015 and is funded by the Department of Communications, Climate Action and Environment (DCCAE). It provides advice and opinion to the DCCAE and receives technical and administrative support. As an advisory body, the CCAC is not directly engaged in research and is not a funding body. The CCAC relies heavily on existing and newly published research reports for its work, from agencies including the EPA, SEAI, ESRI and Teagasc.

Central Statistics Office (CSO)

The Central Statistics Office (CSO) is Ireland's national statistical office whose purpose is to impartially collect, analyse and make available statistics about Ireland's people, society and economy. In recent years, statistical data have increasingly included environmental information, driven by EU legislation under the System of Environmental Economic Accounting (SEEA) implemented by Eurostat (EC, 2012). The CSO does not have a direct research function or a specific climate research strategy. The CSO makes anonymised microdata files available for researchers.

County and City Management Association (CCMA)

The County and City Management Association (CCMA) represents the local government management network. Its members are Chief Executives of the county and city councils and the Assistant Chief Executives of Dublin City Council. The CCMA is a key stakeholder in the areas of planning, the provision of infrastructure, housing, environment and sanitary services, as well as recreational, social inclusion and cultural and tourism services, and as such is consulted with by a broad spectrum of organisations. The CCMA operates through a number of established committees, each of which is concerned with a specific policy area, including the environment, climate change and emergency planning. The CCMA does not have a direct research function or a specific climate research strategy.

Department of Agriculture, Food and the Marine (DAFM)

The DAFM's functions are to progress the economic development of the agri-food, forestry and marine sectors. These functions include the promotion of economic, social and environmentally sustainable farming, fishing and forestry. The DAFM is also responsible for regulation and enforcement of high standards of food safety, consumer protection, animal health and welfare and plant health. The DAFM's Statement of Strategy 2016–2019 (DAFM, 2017) contains five strategic goals. Strategic Goal 3 (Policy and Strategy) is to provide the optimum policy framework for the sustainable development of the agri-food sectors. The DAFM operates three competitive research funding programmes for agriculture, food and forestry through periodic National Research Calls for proposals that include topics relevant to climate change. The three funding programmes are:

1. food – Food Institutional Research Measure (FIRM);
2. agriculture – Research Stimulus Fund (RSF); and
3. forestry – Programme of Competitive Forestry Research for Development (CoFoRD).

The DAFM allocates some funding from these programmes to support national participation in transnational research calls and provides support for Irish involvement in the EU Horizon 2020 research funding programme.

Department of Business, Enterprise and Innovation (DBEI)

The DBEI is a lead government department promoting the development of a competitive environment to encourage enterprise and employment growth, attract investment and drive productivity growth. Under the area of innovation research and development, the DBEI develops, promotes and coordinates innovation, research and development policy. The DBEI does not fund research. The DBEI influences the European and

international research agenda to allow research and enterprise in Ireland to avail of opportunities arising through research programmes. The DBEI chairs the Horizon 2020 High Level Group (HLG), whose core role is to oversee the development and implementation of the Horizon 2020 national strategy. The Horizon 2020 HLG consists of members from across departments and agencies. Since 2010, the DBEI Research Prioritisation Steering Group has been making recommendations to government on areas of focus for Ireland's science, technology and innovation strategy under 14 priority areas. Progress with research under the 14 priority areas was reported in Innovation 2020 progress reports published in 2016, 2017 and 2018. In 2018, the DBEI published the revised research priority areas for 2018–2023 (DBEI, 2018). One of the key updates was the change to the "Energy" research theme, which has been renamed "Energy, Climate Action and Sustainability".

Department of Communications, Climate Action and Environment (DCCAE)

The DCCAE is responsible for the delivery of policies and programmes in line with EU and global obligations in several areas including communications, broadcasting, postal, energy, natural resources, climate change, waste management, air quality and environmental policy. The Department also provides the core Exchequer funding to the EPA Research Programme.

Department of Transport, Tourism and Sport (DTTAS)

The Department of Transport, Tourism and Sport (DTTAS) has a key role in the development of Ireland's transport infrastructure and services and the support and enhancement of the tourism and sports sectors. The DTTAS has a Climate Change Unit, whose role is to develop and implement mitigation measures to decarbonise transport sectors. The DTTAS works according to the NMP and NAF. Especially relevant to the DTTAS is Measure T15 "Research and Development" of the NMP, which lists Actions 67 and 69, under which the DTTAS is involved in climate change-related research. In addition, in 2018 the Climate Change Unit co-funded four individual research projects to help close knowledge gaps relating specifically to successful mitigation measures in the Irish freight sector and promoting behavioural change in modal shift. The DTTAS also launched a comprehensive Low Emission Bus Trial to assess a range of fuels/technologies to inform future urban public service obligation fleet purchasing decisions in light of the commitment under the National Development Plan that no diesel-only buses should be purchased from July 2019.

Environmental Protection Agency (EPA)

The EPA is an independent public body that was established under the Environmental Protection Agency Act 1992. The other main instruments from which the EPA derives its mandate are the Waste Management Act 1996, the Protection of the Environment Act 2003 and the Radiological Protection (Miscellaneous Provisions) Act 2014. Since 1994, the EPA has funded research that has increased national understanding of the environment, the challenges it faces and the responses to these challenges. It has also developed high-quality research capacity and supported innovation that is internationally respected. The EPA Research Programme is a Government of Ireland initiative funded by the DCCAE. Under its 2014–2020 EPA Research Strategy (EPA, 2014), the EPA funds research under its Climate Pillar to address specific knowledge gaps of direct relevance to the National Climate Change Strategy and to enable a research programme under four specific themes:

- Carbon Stocks, GHG Emissions, Sinks and Management Options;
- Ireland's Future Climate, its Impacts, and Adaptation Options;
- Climate Solutions, Transition Management and Opportunities; and
- Air Science.

Geological Survey Ireland (GSI)

The GSI is Ireland's public earth science knowledge centre and is a division of the DCCAE. The GSI is committed to providing free, open and accurate geological data and maps on Ireland's subsurface to landowners, the public, industry and all other stakeholders, within Ireland and internationally. The GSI's Research Programme was launched in 2016 and is supported by the GSI's Research Roadmap 2016 (GSI, 2016). The research strategy goal is to build capacity, develop a network of geoscience researchers and fund excellent science in the area of earth resources, geological hazards and climate change and public perception and citizen science.

Health Service Executive (HSE)

The Health Service Executive (HSE) is responsible for the provision of health and personal social services for everyone living in Ireland, using public funds. The HSE's Health and Wellbeing Division

provides services including, but not limited to, environmental control, public health medical advice on environment and health issues, infection prevention and control, a health protection surveillance centre and Heathy Ireland. The HSE does not have a specific climate research strategy; however, the Healthy Ireland Framework 2013–2015 includes research and evidence as a key action theme (HSE, 2013).

Irish Environmental Network (IEN)

The Irish Environmental Network (IEN) is made up of nationally active Irish environmental non-governmental organisations (NGOs). The NGOs represent a broad range of issues, from wildlife conservation to climate change. The network is supported by the DCCAE. The Environmental Pillar of the IEN is the environmental partnership of all environmental NGOs. This pillar promotes policies and sustainable development under various areas. The Environmental Pillar does not have a research strategy and does not provide a research function or funding.

Irish Research Council

The Irish Research Council (IRC) is an associated agency of the Department of Education and Skills (DES) and operates under the aegis of the Higher Education Authority (HEA). The IRC has provided funding for numerous climate change research projects since 2010. The IRC manages a range of interlinked programmes funding researchers across all career stages and disciplines. It has established partnerships across government and civic society to support research, including with the DAFM, Department of Culture, Heritage and the Gaeltacht, EPA, Science Foundation Ireland (SFI), SEAI and Teagasc. A specific action in relation to Horizon 2020 is to act as a joint national contact point for the European Research Council to support the preparation, submission and follow-up of grant applications.

Marine Institute (MI)

The MI is an agency of the DAFM and is responsible to the Irish government for advice on and implementation of marine research, technology, development and innovation policy, and marine research services. Under its new Strategic Plan 2018–2022 (MI, 2018), the MI has identified "Forecasting Ocean and Climate Change" as a strategic focus area. Supported through operational, infrastructure and research programmes, its strategic intent is "to provide world-leading regional and localised forecasting outputs and services that support Ireland's challenge in responding and adapting to changes in our oceans and climate. This will support Ireland's effort to meet EU and international climate action targets. The Institute will strengthen their partnerships in climate action, mitigation and adaptation to deliver integrated earth and ocean science, technical solutions, predictive capabilities and expert advice".

A National Marine Research and Innovation Strategy (MI, 2017) was identified as a key enabling action in Ireland's Integrated Marine Plan – Harnessing Our Ocean Wealth. There is no specific climate change strategy; however, the research and innovation strategy does address climate change under the research theme "Healthy Marine Ecosystems" and identifies future research topics and the focus of funding in relation to research and investments.

Met Éireann

Met Éireann is a line division of the Department of Housing, Planning and Local Government and is Ireland's National Meteorological Service and the leading provider of weather and climate information and related services. The Met Éireann Strategic Plan 2017–2027 (Met Éireann, 2017) is aligned with the Programme for Government, the National Planning Framework, national climate change policy, the NAF, the NMP, Innovation 2020, the 2016–2025 Strategy of the European National Meteorological and Hydrological Services and the World Meteorological Organization Strategic Plan 2016–2019. The plan includes a commitment to provide high-quality climate data and information services. Key to delivering these is enhanced engagement in the meteorological and climatological research community, strengthening capacity in key research areas, targeting transfer of research knowledge to user services and securing research funding.

National Transport Authority (NTA)

The National Transport Authority (NTA) is a statutory non-commercial body that operates under the aegis of the DTTAS. Its statutory functions include (i) strategic planning of transport; (ii) investment in all public transport infrastructure; (iii) planning and funding of sustainable transport projects; (iv) administration of the Smarter Travel Workplaces programme; (v) management of the Green Schools Travel programme; and (vi) the provision of accessibility funding to transport operators and other relevant bodies. The NTA does not have a climate change research strategy and does not carry out climate-related research. The NTA accesses research and data appropriate to its

statutory function and collects significant numbers of transport data, which can be used in climate-related research.

National Parks & Wildlife Service (NPWS)

The National Parks & Wildlife Service (NPWS) is part of the Heritage Division of the Department of Culture, Heritage and the Gaeltacht. It is responsible for policy on and management of national parks and reserves, the nature services strategy and enforcement of the Wildlife Acts and EU Directive transposition, NATURA policy, licensing provisions under the Wildlife Acts, peatland policy, land restoration, scientific support and biodiversity policy. The NPWS has published the National Biodiversity Action Plan 2017–2021 (NPWS, 2017), which includes objectives and actions aligned to UN SDGs. Four actions in the plan relate to climate change and research.

National Treasury Management Agency (NTMA)

The Ireland Strategic Investment Fund (ISIF), managed and controlled by the National Treasury Management Agency (NTMA), is a sovereign development fund. The ISIF has a unique "double bottom line" mandate to invest on a commercial basis in a manner designed to support economic activity and employment in Ireland. ISIF has to date committed €4.1bn to investments in Ireland across the economy. ISIF's revised 2019 Investment Strategy, guided by the objectives of Project Ireland 2040, will target a €3 billion 5-year investment programme which will focus on five priority themes of key importance to the Irish economy: Regional development, Housing, Indigenous businesses, Climate change and Brexit. ISIF's Climate Strategy is to invest in Ireland to support the achievement of Ireland's national carbon transition objectives. ISIF has, to date, committed €295m to projects in Ireland in the renewable energy and forestry space and these investments have, in turn, attracted an additional €1.3bn in private sector co-investment. In the short term ISIF will continue to actively invest in renewable electricity. Subject to the availability of commercial investment opportunities, ISIF will seek to invest in renewable electricity, renewable transport, renewable heat and the food & agri sector.

Northern Ireland Environment Agency (NIEA)

The Northern Ireland Environment Agency (NIEA) is an Executive Agency within the Department of Agriculture, Environment and Rural Affairs. The strategic objective of the NIEA is to create prosperity and well-being through effective environment and heritage management and regulation.

Office of Public Works (OPW)

The remit of the OPW covers two areas: estate portfolio management, including heritage services, and flood risk management. The OPW is the lead agency for flood risk management in Ireland, which includes the provision of advice to the government on a whole-of-government approach to flood risk management. The OPW does not have a specific climate research strategy, nor a standing research programme. Climate-related research is undertaken to address specific flood-related needs as they are identified.

Science Foundation Ireland (SFI)

The SFI is the national foundation for investment in scientific and engineering research. The SFI invests in academic researchers and research teams that are most likely to generate new knowledge, leading-edge technologies and competitive enterprises in the fields of science, technology, engineering and maths (STEM). The foundation has provided funding for climate change-related research over the period 2017/2018.

Sustainable Energy Authority of Ireland (SEAI)

The SEAI is Irelands national sustainable energy authority. The SEAI will be central to bringing about a low-carbon economy through measures and activities focused on the transition to a smarter and more sustainable energy future. To achieve this mission, the SEAI will continue to build an environment for positive change through analysis, modelling and support for policymaking. The SEAI will catalyse direct action through its design and delivery of grant and incentive programmes and through its capacity-building processes with citizens, communities and private and public sector organisations. The SEAI's primary research supports are provided through the SEAI National Energy Research Development and Demonstration (RD&D) Funding Programme and the Prototype Development Fund. The key objectives of the National Energy RD&D Funding Programme are to accelerate the development and deployment in the Irish marketplace of competitive energy-related products, processes and systems; to support solutions that enable technical and other barriers to energy market uptake to be overcome; and to provide guidance and support to policymakers and public bodies through results, outcomes and learning from supported projects.

Sustainable Northern Ireland (SNI)

Sustainable Northern Ireland (SNI) came into existence in 1998 as a collaborative project between Northern Ireland Environment Link, WWF and the Local Government Training Group. SNI's objective is to promote the adoption of sustainable development principles by local authorities and other agencies of government. SNI offers a range of services that includes sustainability training, climate change guidance, information on EU funding and knowledge networks. SNI is publicly funded through support from eight local authorities and the Housing Executive. SNI does not have its own climate research strategy and does not provide research funding.

Teagasc

Teagasc is funded by the DAFM and is the national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities. The Teagasc mission is to support science-based innovation in the agri-food sector and wider bio-economy that will underpin profitability, competitiveness and sustainability. This is achieved through the close coupling of research and knowledge transfer in four programme areas: animal and grassland research; crops, environment and land use; food; and rural economy and development. The Teagasc Statement of Strategy 2017–2020 (Teagasc, 2017) mentions climate change as one of the "Grand Challenges" to be addressed by Teagasc Technology Foresight 2035. Teagasc is the coordinator of a consortium of researchers, students and professionals working collaboratively to develop verified strategies to decrease GHG emissions from Irish agriculture. Climate change is addressed in terms of GHG emissions studies from soil and agricultural activities, not as a distinct field of study.

Appendix 3: 2017/18 New Awards Budget Committed

	Lead funder	As co-funder	Total
DAFM	€7,565,619	€424,344	€7,989,963
DTTAS	€46,696	€188,061	€234,757
EPA	€5,735,296	€296,000	€6,031,296
GSI	€259,285	€797,128	€1,056,413
IRC	€2,835,167	–	€2,835,167
HSE	–	€135,423	€135,423
ME	–	€309,519	€309,519
MI	€1,793,349	€1,030,274	€2,823,623
SEAI	€445,517	€166,864	€612,381
SFI	€2,921,930	–	€2,921,930
Teagasc	€88,000	–	€88,000

Appendix 4: New Climate Research Competitive Awards 2017-2018

Theme 1: Carbon Stocks, GHG Emissions, Sinks and Management Options

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
DAFM	EPA	Teagasc	AGRI-SOC: Evaluating Land Use and Land Management Impacts on Soil organic Carbon in Irish Agricultural Systems
DAFM	ERAGas ERAnet Partners	University College Dublin	GHG Manage: Managing and Reporting of Greenhouse Gas Emissions and Carbon Sequestration in Different Landscapes
DAFM		University College Dublin	Managing and reporting of greenhouse gas emissions and carbon sequestration in different landscape mosaics
DAFM		Teagasc	Mitigating Agricultural Greenhouse Gas Emissions by improved pH management of soils
DAFM	ERAGas ERAnet Partners	ABER	RumenPredict: Predicting appropriate GHG mitigation strategies based on modelling variables that contribute to ruminants
DCCAE		GSI	Tellus – national-scale geophysical and geochemical surveying
EPA		Dublin Institute of Technology	A Mechanistic simulation of Carbon GHG Dynamics & Inventories in Irish Upland Mire Dominated Catchments
EPA		NUI Galway	Improvements in inverse modelling of Ireland's greenhouse gas emissions
EPA	DAFM	NUI Galway	Scenarios Quantifying land Use & Emissions Transitions towards Equilibrium with Removals
EPA		Trinity College Dublin	Climate Change and Land Use in Ireland
EPA		Trinity College Dublin	Quantitative approaches to Greenhouse Gas Emissions Neutrality
EPA		Trinity College Dublin	Smart observations of management impacts on peatland function
EPA	ERA4CS ERAnet partners	University College Cork	Clim2Power: Translating climate data into power plants operational guidance
GSI		University College Dublin	Geological GHG Emission Mitigation: A preliminary investigation of crushed basalt as a soil amendment to sequester atmospheric CO_2
GSI		SLR Consulting Ltd	Investigation of Irish Carboniferous Palaeokarst for CO_2 Geological Storage & deep geothermal resource
GSI		NUI Galway	Building on Tellus: Preliminary Investigations into Geochemical Processes occurring in Connemara Blanket Bogs
MI		NUI Galway	Analysis of climate relevant gases in seawater

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
SFI		University College Cork	Multi-model innovations in Integrated Assessment Modelling of Global, Chinese, and Irish energy-economy-environment-climate systems investigating deep decarbonisation pathways from the Paris Agreement to the United Nations sustainable development goals

Theme 2: Ireland's Future Climate, its Impacts, and Adaptation Options

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
Teagasc		Wageningen University & Research	Capturing Effects of Diet on Emissions from Ruminant Systems
DAFM		Teagasc	Co-definition and evaluation of SUSTAINable BEEF farming systems based on resources non-edible by humans
DAFM		Teagasc	Genomic evaluation for the sustainable Improvement of Sitka spruce
DAFM		University College Dublin	LiDAR Integrated FORecasting
DAFM	ERAGas ERAnet Partners	Teagasc	METHLAB: Refining direct microbials (DFM) and silage inoculants for reduction of methane emissions from ruminants
DAFM		Teagasc	NBPT[8] in grass-based food: Ensuring food safety in grass systems using NBPT treated urea
DAFM		Teagasc	Refining direct fed microbials (DFM) and silage inoculants for reduction of methane emissions from ruminants
DAFM		University College Dublin	Surveillance Welfare and Biosecurity of Farmed Animals
DAFM		University of Limerick	Sustainable Sheep Production
DAFM	USDA -NIFA[9], DAERA[10]	University College Dublin	Targeted genome editing to enhance genetic resistance to Mycobacterium bovis infection in domestic cattle populations
DAFM		Maynooth University	Towards Integrated Pest Management for Pine Weevil in Ireland
EPA	DAFM	Teagasc	Mitigating Agricultural impacts through Research and Knowledge Exchange
EPA		Gavin and Doherty Geosolutions Ltd.	Methodologies for Financing and Costing of Climate Impacts and Future Adaptation Actions
EPA	ERA4CS ERAnet partners	Marine Institute	CoCliME: Co-development of CLimate services for adaptation to changing Marine Ecosystems

8 N-(n-Butyl) Thiophosphoric Triamide
9 United States Department of Agriculture
10 Department of Agriculture, Environment and Rural Affairs (DAERA)

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
EPA	ERA4CS ERAnet partners	Marine Institute, Dundalk Institute of Technology	WaterX: Integration of climate seasonal prediction and ecosystem impact modelling for an efficient adaptation of water resources management to increasing climate extreme events
EPA	Met Éireann	NUI Galway	Ireland's Contribution to CMIP6 and High-Res Regional Climate Projections for Ireland
EPA		Maynooth University	HydroPredict - Ensemble Riverflow Scenarios for Climate Change Adaptation
EPA	MI	Trent University	Achieving Resilience in the Marine and Coastal Environment of Ireland
EPA	Met Éireann	University College Cork	Climate Status Report Ireland
EPA	SEAI	University College Cork	Imagining2050: Engaging, Envisioning and Enabling Dialogue on Pathways towards a Low Carbon, Climate Resilient Ireland
EPA		University College Cork	Impact of Climate Change on Phenology in Ireland
EPA		University College Cork	Multifactorial causes of fodder crises in Ireland and risks due to climate change
EPA		University College Cork	Policy Coherence in Adaptation Studies: Selecting and Using Indicators of Climate Resilience
EPA		University College Dublin	The phenology of perennial ryegrass and its potential contribution to grassland carbon sequestration
EPA	GSI	NUI Galway	GRACE Monitoring of Groundwater over Ireland
GSI		University College Dublin	Developing a toolkit for model evaluation using speleothem isotope data
GSI		Envo-Geo Environmental Geoinformatics	Intertidal Feature Mapping from Sentinel and Drone (INTREPID)
GSI		NUI Galway	Investigating abrupt interglacial climate change: A palaeoceanographic investigation of warmer than present environments
GSI		Trinity College Dublin	Quantification of coastal platform roughness
GSI		University College Dublin	Reconstructing the late Quaternary history of the River Nore using OSL dating
GSI		Gavin and Doherty Geosolutions Ltd.	Scour Potential Evaluation of the Western Irish Sea Mud Belt (SCOPE)
GSI		NUI Galway	Modelling maerl habitat dynamics in response to increased storminess
GSI		Realsim ltd	The development of the CoastSim platform: a virtual coastal landscape time travel experience exploring landscape evolution
GSI		University College Dublin	Developing a toolkit for model evaluation using speleothem isotope data
IRC		Dublin City University	A real options analysis approach to appraising CO_2 recycling technology investment
IRC	GSI	NUI Galway	Geophysical remote sensing of subsurface properties for sustainable agricultural management

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
IRC		NUI Galway	Spatial Adjustment to Climate Impacts and Economic Development
IRC		Maynooth University	Ensemble Reconstruction of River Flows 1871 to present
IRC		Trinity College Dublin	ExStream: Freshwater Ecosystems under Global Change
IRC		Trinity College Dublin	Understanding the effects of global change on ecological stability
IRC		Teagasc	Reconciling Irish agricultural and environmental targets through the use of novel fertiliser formulations: impact on yield and nitrous oxide emissions
IRC	EPA	University College Dublin	Climate change impacts on the water-quality and functioning of Irish rivers in a multi-stressor environment
IRC		University College Dublin	CO_2 reforming of CH_4 over novel Ni-based catalysts – the influence of preparation and plasma promotion
IRC		University College Dublin	PlaCE: Plasma-Catalysis-Electrolysis for CO_2 valorisation
IRC		University College Dublin	Risks, awareness, perceptions, and behaviours pertaining to the adverse human health effects of previous and future flood events in Ireland
MI		Galway Mayo Institute of Technology	Newport Research Cluster: Unlocking the Archive
MI		Galway Mayo Institute of Technology	Unlocking the archive: using scale and otolith chronologies to resolve climate impacts
MI		NUI Galway	Analysis of Trace Metals in Seawater for Marine Research
MI		NUI Galway	Next generation of Autonomous Upper Ocean Profiling Platform
MI		NUI Galway	Ocean Acidification and Biogeochemistry
MI		NUI Galway	Particle Size Analyser for Transdisciplinary Research in Marine Sciences
MI		NUI Galway	VOCAB
MI		Trinity College Dublin	Quantifying the Impacts of Multiple Stressors on marine benthic resources (QIMS)
SFI	GSI, MI	Dublin City University	Integrating multidisciplinary geoscientific data into forecasting models to monitor and predict coastal change: Proof of concept in Dublin Bay
SFI		University College Dublin	Predicting biome-level vegetation responses to future global change: Implications for future flood risk
SFI	GSI, MI	University College Cork	Mapping, Modelling and Monitoring Key Processes and Controls on Cold-water Coral Habitats in Submarine Canyons (MMMonKey_Pro)

Theme 3: Socio-economic and Technological Solutions and Transition Management and Opportunities

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
DAFM		Teagasc	GREENBREED: Sustainable ruminant breeding programs for low environmental footprint
DAFM	SusAn ERAnet Partners	Walloon Agricultural Research Center	SUSTAINBeef: Co-definition and evaluation of SUSTAINable BEEF farming systems based on resources non-edible by humans
EPA		APEnvEcon	Enabling Transition
EPA	SEAI	Dublin City University	A Structured Evaluation of Ireland's Climate Policy Response
EPA		Dublin City University	Deepening public engagement on Climate Change: Lessons from the Citizens' Assembly
EPA		Dublin City University	Society-wide Scenarios for Effective Climate Change Mitigation
EPA		Trinity College Dublin	Citizen's Views on Climate Action: evaluating and implementing public engagement research on low carbon transition
EPA		University of Limerick	Developing the Potential of Community Energy Action Groups Towards Transition to a Low Carbon Society
IRC	EC	NUI Galway	A grounded theory analysis of the drivers of adoption of clean cooking technologies in Low- and Middle-Income Countries
IRC	EC	Trinity College Dublin	Future Mangroves; effects of climate change on mangrove forests in semi-arid regions and consequences for coastal communities
IRC		University College Cork	Exploring New Dynamics in Civil-Military Cooperation and Emergency Humanitarian Aid in the Context of Climate Change
IRC	EC	University College Dublin	Building Cleantech Finance and Innovation Ecosystems: From Asset Owners to Entrepreneurs
IRC	EC	University College Dublin	Data and Governance Framework for Achieving Environmental Sustainable Development Goals (SDGs)
IRC	EC	University College Dublin	Development of Time-Robust Geospatial Information for enhancing Sustainable Mining in Northwest Ghana
IRC		University College Dublin	Environmental Politics and Carbon Trading in the European Union (EU): A Faustian Bargain? The Case of Lignite Coal Mining in Germany
IRC		University College Dublin	Green infrastructure and informal settlements: rapidly growing metropolitan areas in search of a sustainable solution
SEAI		Slainte Beoga Teoranta Ltd t/a Westway Health	Slurry-to-Energy: Slurry-to-Energy: A novel, closed-loop treatment of farm slurries to generate biogas energy

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
SEAI	DTTAS	Trinity College Dublin	GEBTechTM (Green Energy Boosting Technology): A novel treatment for farm slurries to reduce greenhouse gas emissions and to generate energy
SEAI		University College Cork	Desktop study to assess potential mitigation measures that would reduce CO2 and/or air pollutant emissions from the existing Irish heavy-duty vehicle fleet
SFI		University College Cork	New Societal and Energy System Frameworks; Case Study "Transition Dingle 2030"

Theme 4: Air Science (Air Pollution and Short-lived Climate Forcers)

Lead Funding Organisation	Cofunders	Lead Research Organisations (Org. of project coordinator)	Project Title
EPA	Met Éireann	Dublin Institute of Technology	POMMEL: Pollen Monitoring and Modelling
EPA		Dublin Institute of Technology	Ammonia cycling and emerging particulate matter pollutants under arable land-use management: A modelling approach
EPA		Dublin Institute of Technology	Emissions From and Fuel consumption associated with Off Road vehicles and oTher machinery
EPA		Dublin Institute of Technology	Fungal mOnitoring NeTwork ANd Algorithm (FONTANA)
EPA	DTTAS	Trinity College Dublin	Eco-driving: Trends & Potential Impacts for Irish Heavy-Duty Vehicles
EPA	HSE	University College Cork	Irish Nationwide Health and Air Quality Linkage
IRC	Met Éireann	NUIM	Development and analysis of a long term, quality assured precipitation network for Ireland
SEAI	DTTAS	Trinity College Dublin	Mitigation of air pollution impacts of Irish heavy-duty vehicles (MAP-HDV)
SFI		University College Cork	Irish Atmospheric Simulation Chamber (IASC) Facility
SFI	NSF[11] (USA), DEL (N. Ireland)	University College Cork	Re-Wind

11 National Science Foundation

Appendix 5: Climate-related Horizon 2020 Projects 2017–2018

Successful Proposal title
Assessment of Cross(X)-sectoral climate Impacts and pathways for Sustainable transformation
Strengthening INternational Cooperation on climatE change REsearch
Observation-based system for monitoring and verification of greenhouse gases
BIMcert – 1. Construction skills, 2. Energy efficiency, 3. Regulating supply chains, 4. Tackling climate change
BIMcert – 1. Construction skills, 2. Energy efficiency, 3. Regulating supply chains, 4. Tackling climate change
OPEn-air laboRAtories for Nature baseD solUtions to Manage environmental risks
OPEn-air laboRAtories for Nature baseD solUtions to Manage environmental risks
Transition towards a more carbon and nutrient efficient agriculture in Europe
Predictive mOdelling Tools to evaluate the Effects of Climate change on food safeTy and spoilage
Predictive mOdelling Tools to evaluate the Effects of Climate change on food safeTy and spoilage
Excellence in Simulation of Weather and Climate in Europe, Phase 2
Monitoring Atmospheric Composition and Climate III
Advancing Resilience of historic areas against Climate-related and other Hazards
Southern Ocean Carbon and Heat Impact on Climate

12 CSA: Coordination Support Action; IA: Innovation Action; RIA: Research and Innovation Action; MSCA-ITN-ETN: Marie Skłodowska-Curie Innovative Training network - European Training Networks

	Proposal acronym	Number of applicants	Applicant role	Applicant short name	Applicant EU financial contribution	Proposal instrument/ funding scheme[12]
	AXIS	11	Partner	EPA	€147,761	ERA-NET-Cofund
	SINCERE	20	Partner	EPA	€54,375	CSA
	VERIFY	38	Partner	EPA	€5000	RIA
	BIMcert	9	Partner	Dublin Institute of Technology (DIT)	€83,531	CSA
	BIMcert	9	Partner	Future Analytics Consulting	€181,875	CSA
	OPERANDUM	27	Partner	University College Dublin (UCD)	€67,625	IA
	OPERANDUM	27	Partner	Dublin City Council	€123,906	IA
	Nutri2Cycle	19	Partner	Teagasc	€452,974	RIA
	PROTECT	14	Partner	Creme Software Ltd	€274,684	MSCA-ITN-ETN
	PROTECT	14	Coordinator	University College Dublin (UCD)	€274,684	MSCA-ITN-ETN
	ESiWACE2	20	Partner	NUI Galway	€51,923	RIA
	MACC-III	36	Partner	NUI Galway	€10,000	CSA
	ARCH		Partner	Research for Science, Art and Technology (RFSAT) Ltd	€395,156	RIA
	SO-CHIC		Partner	NUI Galway	€243,670	

Reporting Period
June 2017–December 2018

220 ONGOING RESEARCH PROJECTS, OF WHICH **104** WERE AWARDED DURING THE REPORTING PERIOD (c. **€25 million**)

€2.97 MILLION
DRAWDOWN UNDER **HORIZON 2020** WITH **14** SUCCESSFUL PROJECTS

COLLABORATION BETWEEN MEMBERS WAS EVIDENT THROUGH THE CO-FUNDING OF **19 NEW RESEARCH PROJECTS**

Climate Research Coordination Group

First Report on Activities:
June 2017 - December 2018

epaResearch
Climate - Water - Sustainability
Identifying pressures • Informing policy • Developing solutions

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