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Evaluating Ireland's Climate Policy Performance

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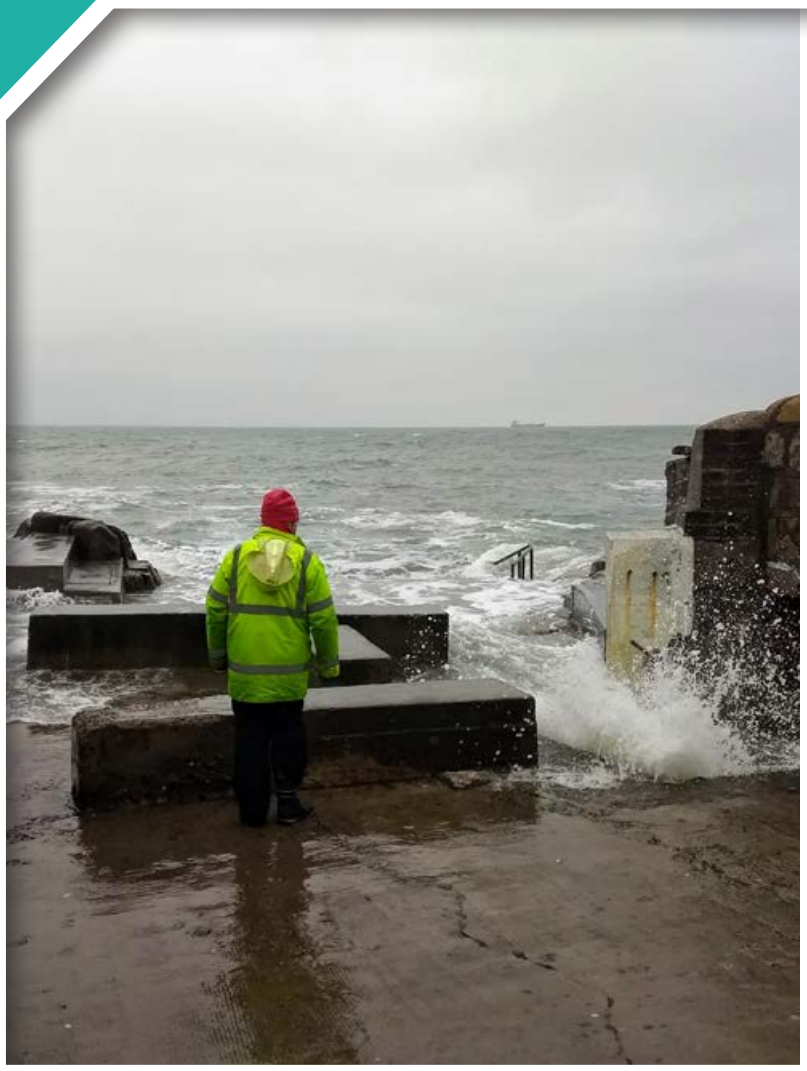

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Rialtas na hÉireann
Government of Ireland

ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency (EPA) is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

Regulation: *We implement effective regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.*

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Advocacy: *We work with others to advocate for a clean, productive and well protected environment and for sustainable environmental behaviour.*

Our Responsibilities

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We regulate the following activities so that they do not endanger human health or harm the environment:

- waste facilities *(e.g. landfills, incinerators, waste transfer stations)*;
- large scale industrial activities (*e.g. pharmaceutical, cement manufacturing, power plants)*;
- intensive agriculture *(e.g. pigs, poultry)*;
- the contained use and controlled release of Genetically Modified Organisms *(GMOs)*;
- sources of ionising radiation *(e.g. x-ray and radiotherapy equipment, industrial sources)*;
- large petrol storage facilities;
- waste water discharges;
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- Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
- Promoting radon testing in homes and workplaces and encouraging remediation where necessary.

Management and structure of the EPA

The EPA is managed by a full time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet regularly to discuss issues of concern and provide advice to the Board.

EPA RESEARCH PROGRAMME 2014–2020

Evaluating Ireland's Climate Policy Performance

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EPA Research Report

Prepared for the Environmental Protection Agency

by

Dublin City University

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DISCLAIMER

This report is based on research carried out/data from February 2018 to February 2020. More recent data may have become available since the research was completed.

The EPA Research Programme addresses the need for research in Ireland to inform policymakers and other stakeholders on a range of questions in relation to environmental protection. These reports are intended as contributions to the necessary debate on the protection of the environment.

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Executive Summary

Despite a clear need for regular monitoring and review of national climate change policies, both *ex ante* and *ex post* policy evaluation systems for climate change policy are underdeveloped across the European Union (EU). The central objectives of the Irish Climate Policy Evaluation (ICPE) project were to construct a climate change policy evaluation framework that builds upon but also extends the standard EU evaluation framework, and to undertake evaluations of climate change policies across relevant sectors using the framework, with a specific focus on key policies in place at the commencement of the project (mid-2018).

The project research was divided into five sectoral work packages. Some of our core findings are as follows.

Transport

No sectoral emissions pathway was set out for the transport sector for the period to 2020, making overall evaluation challenging, but we can evaluate against intermediate goals. Modal share patterns have been largely stable, with a heavy dominance of private car-based transport, and the state is likely to fall short of its RES-T (renewable energy source – transport) target of a 10% contribution of renewable energy in final consumption of energy in transport by 2020. Policies have predominantly dealt with passenger transport and have neglected freight. Because of the low price elasticity of transport demand, demand management policies have distributional consequences. Governance of the transport sector is inherently complex and fragmented, characterised by contestation between institutional priorities.

Built environment

Under the Better Energy Warmer Homes Scheme, approximately 135,000 households have been upgraded. Between 2009 and August 2018, approximately 10% of the housing stock was renovated under the scheme. Households with financial means to undertake energy efficiency upgrades are well placed to do so, while low-income households avail themselves of the scheme. Households with incomes that do not fall into either category are not catered for by either programme. There is a growing call for greenhouse gases to be measured based on actual energy consumption, which in the context of the built environment is challenging but would highlight areas where there is a deficit of policy actions and measures.

Agriculture, forestry and land use

Current policy actions focus on farm-level action to reduce emissions from agricultural activities. Existing policies focus more on the economic growth of the agri-food sector than on addressing growing income disparities at farm level, or their social and environmental impacts. Climate change mitigation and sectoral growth policies are focused on the dairy and beef cattle sectors. Insufficient attention has been given to the vulnerability of the tillage farming sector, which will be the most sensitive to climate change impacts. It is important to include all relevant voices, particularly farmers, in designing policy that causes no harm and leaves no one behind.

Electricity generation

Policy supports have been instrumental in facilitating deployment of renewable electricity generating capacity. The changing fuel mix has had a significant impact on the CO_2 emissions intensity of electricity over the period since 1990. Over the medium term, decarbonisation of Ireland's electricity system cannot feasibly rely on a single technology, namely onshore wind energy, especially in the light of the societal resistance that onshore wind energy has increasingly faced. The effects of the shifting balance of electricity cost between the Public Service Obligation and electricity cost components will have differential impacts on different segments of consumers, potentially exacerbating energy poverty.

Adaptation and resilience

Ten sectoral plans and 29 local authority plans were completed by September 2019. A challenge for evaluating adaptation plans currently in place is their relative newness. It is evident that consideration was given to the coherence and relevance of the plans

to each other, as well as to their coherence with other legislation and policies. In addition, effective governance was a key criterion in the development of the plans, as demonstrated by the creation of the National Adaptation Steering Committee and the climate action regional offices.

The evaluations conducted as part of the ICPE project are a beginning rather than the end of the story. Future research ought to delve much more deeply into each of the sectors. It is to be hoped that capacity for *ex post* policy evaluation will be strengthened as part of the new governance arrangements being developed under the 2019 Climate Action Plan.

1 Introduction

Despite a clear need for regular monitoring and review of national climate change policies, both *ex ante* and *ex post* policy evaluation systems for climate change policy are underdeveloped across the European Union (EU). Hildén and colleagues note that EU Member States are far from developing a "culture" of policy evaluation, and monitoring of climate policies is significantly less developed than monitoring of emissions (Hildén *et al*., 2014). The Irish Climate Policy Evaluation (ICPE) project aimed to begin to address this gap by undertaking an *ex post* evaluation of Ireland's policy responses to climate change across relevant sectors since 1996.

A number of non-state initiatives, including some developed by academics, have attempted to produce measures of climate change performance. Most prominent among these is the Climate Change Performance Index (CCPI), a collaboration between Climate Action Network Europe, Germanwatch and the New Climate Institute (Burck *et al*., 2019). From a policy evaluation perspective, however, 80% of the index is driven by a country's performance on greenhouse gas (GHG) emissions, energy use and renewable energy deployment. Just 20% of the CCPI is accounted for by an assessment of climate change *policy*, a score that is generated from an expert survey. Taking a different approach, Schaffrin and colleagues (2015) developed a comparative measure of climate policy output, the Index of Climate Policy Activity, comprised of policy density and intensity. Nonetheless, the focus of their efforts is on measurement rather than evaluation.

Past Environmental Protection Agency (EPA)-funded research has sought to identify climate change policy challenges and opportunities or model least-cost pathways for a low-carbon transition (Ó Gallachóir *et al*., 2012; O'Reilly *et al*., 2012). Other research has sought to address policy and governance challenges and opportunities (Devaney and Torney, 2019; Little and Torney, 2017; NESC, 2012; Ó Broin and Kirby, 2015; Robbins *et al*., 2020; Torney, 2018). Published climate change policy evaluations focusing on Ireland have been sporadic rather than comprehensive (e.g. Diffney *et al*., 2013). Although the Organisation for Economic Co-operation and Development (OECD) has conducted two Environmental Performance Reviews focused on Ireland (OECD, 2000, 2010), these peer-reviews, conducted by experts from other OECD member countries, were broad-ranging and had little focus on climate change.

The lack of attention to *ex post* evaluation of climate change policies in Ireland to date is, in fact, characteristic of the broader policy process in Ireland. Not only has there been little *ex post* analysis of climate change policies in Ireland to date, there has also been a relative paucity of *ex post* analysis of public policy in general (Ferris, 2015). The creation of the Irish Government Economic and Evaluation Service (IGEES) in 2012 has sought to build capacity in this area, but Boyle (2014) has argued that the system of – particularly *ex post* – policy evaluation in Ireland remains underdeveloped. It is within this context that the ICPE project was proposed and undertaken.

This report provides an overview of the project and its results. The next chapter outlines the project's core objectives. Chapter 3 locates the project within the broader context of the literature on environmental policy evaluation. Chapter 4 discusses the project's methods, while Chapter 5 provides an overview of key findings. Further detail regarding our findings is available in a number of sectoral papers that are published alongside this report, available at https://diarmuidtorney.org/icpe/

2 Approaches to Climate Change Policy Evaluation

A common definition of policy evaluation is a "careful, retrospective assessment of merit, worth, and value of the administration, output and outcome of government interventions, which is intended to play a role in future practical action situations" (Vedung, 2005: 13). Standard government guidelines for evaluations tend to converge around a set of well-established criteria that conform broadly to the rationalist mode of evaluation. European Commission guidelines define *ex post* evaluation as an evidence-based judgement of the extent to which an intervention has (1) been effective and efficient, (2) been relevant given the needs and its objectives, (3) been coherent both internally and with other EU policy interventions and (4) achieved EU added-value (EC, 2017: chap. VI). The Irish government's Public Spending Code sets out guidelines for "value for money" reviews, specifying the criteria of rationale, economy/efficiency, effectiveness, impact and continued relevance (IGEES, 2018). The UK Treasury's guidance for policy evaluation, the so-called *Magenta Book*, identifies process evaluation, impact evaluation and economic evaluation as the principal modes of evaluation (HM Treasury, 2011).

Evaluating climate and environmental policies is not simple. Certain key characteristics of environmental problems make them less amenable to standard evaluation criteria (Mickwitz, 2003). First, environmental problems are typically characterised by very high complexity. More often than not, there may be a complex causal chain between policy intervention and the ultimate outcome or impact desired, with other intervening factors at play. Establishing causality (or otherwise) can be challenging, as can identifying a strong baseline or counterfactual. This makes it difficult to conduct an absolute quantitative analysis. Qualitative, reasoned, and evidence-based arguments may be developed about the likely contribution of a policy intervention to the changes observed, through triangulation of data sources. Simple impact evaluation that focuses solely on goal attainment can fail to capture side effects and unanticipated consequences – this being another feature that is particularly prevalent in the field of environmental policy evaluation (Mickwitz, 2003). Furthermore, the purpose of policies may be unclear or imprecisely formulated, or may be several steps removed from the ultimate objective, for example combating climate change. This may be ameliorated to some extent by distinguishing between goals, objectives and targets (EEA, 2016a), and interrogating whether the specific targets set meet the broader objectives and goals that motivate policies. This is of particular relevance in the context of climate change policy, a branch of environmental policy that is the focus of this project.

Second, environmental problems are often characterised by uncertainty and can play out over long – often very long – time frames. These characteristics pose particular challenges for economic appraisal of policy interventions (Mickwitz, 2003). Uncertainty can make economic evaluation through standard cost–benefit analysis challenging. Many environmental outcomes are not valued by markets, and it can be difficult to capture co-benefits. This can be overcome through a range of valuation methods, such as willingness-to-pay and willingness-to-accept. However, these approaches pose their own difficulties (Bullock *et al*., 2015). Choosing an appropriate discount rate is also fraught with challenges, particularly in relation to time scales. An alternative is to use cost-effectiveness analysis, which can be preferable to cost–benefit analysis because it estimates the cost per unit of outcome and does not require economic valuation of non-market benefits (IPCC, 2014).

Third, environmental problems are closely related to questions of equity, in terms of both the consequences of environmental degradation and the consequences of policy interventions. This is most strikingly true in terms of equity between countries, but intra-country equity considerations are also important. This calls for broadening the evaluation criteria to capture these dimensions. The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report identifies "distributional and social impacts" as an evaluation criterion (IPCC, 2014: 1009). Key questions of distributional equity are at stake both in climate change and the policy responses put in place to address it. A growing concern in climate policy development, driven in particular by the focus of trade unions on the

notion of “just transition” (ITUC, 2015), is the sharing of the benefits and costs equitably across society. These dimensions are not central to standard formal evaluations but should be given proper attention.

Finally, environmental policymaking is characterised by significant societal conflict, with different stakeholders (e.g. business, civil society) adhering to different value systems and objectives. Mickwitz advocates using evaluation criteria relevant to functioning of democracy, including legitimacy, transparency and equity (Mickwitz, 2003). Weiland and Tröltzsch (n.d.) identify inclusion of stakeholders in the policymaking process as an evaluation criterion. The IPCC Fifth Assessment Report (IPCC, 2014: 237–238) identifies “political feasibility” as an important *ex ante* evaluation criterion, which links to questions concerning ease of implementation and also *ex post* criteria such as acceptability and legitimacy.

These characteristics pose challenges with respect to evaluation of climate change mitigation policies and measures, with many being more pronounced in the case of climate change adaptation policies (EEA, 2015). In addition to uncertainties around climate change impacts, adaptation is also characterised by uncertainties regarding social and economic drivers of adaptive responses. Establishing baselines and counterfactuals is particularly difficult for adaptation interventions because of the dynamic context within which adaptation takes place. Furthermore, in contrast to mitigation policies, the impact of which may be measured in terms of the universal unit of carbon dioxide equivalent, there is no similarly clear universal objective against which climate change adaptation policies can be measured. More fundamentally, the fact that the concept of adaptation can be understood as an action, a process, or an outcome (EEA, 2015) makes evaluation difficult. Lastly, most of adaptation is still *ex ante*. Some *ex post* evaluations may be feasible concerning extreme weather events, for example, but long-term adaptation is not really possible to explore *ex post* yet.

The challenging characteristics of environmental problems from an evaluation perspective are compounded by the multi-layered nature of contemporary climate change policymaking, which cuts horizontally across sectoral boundaries and vertically across levels of governance. Irish policymaking as it pertains to climate change encompasses sub-national, national, EU and international levels and is deeply embedded in an EU context, particularly the 2020 climate and energy package and, from 2021 onwards, the 2030 climate and energy framework.

This speaks to the importance of and need for clear evaluation criteria and a reflective approach to evaluation, in which a variety of criteria, methods and data are used. There is a wide range of evaluation criteria and methodologies that may be applied in the evaluation of environmental policies (Crabbé and Leroy, 2008). Given the distinctive challenges that characterise the field of climate change policy, it is important to employ adaptive and tailored evaluation techniques for climate policies and to avoid a one-size-fits-all approach (Hildén *et al*., 2014). Climate policy evaluation should be capable of acknowledging and handling the inherent complexity of climate policymaking, open to challenging both the means and the goals of policy, and participatory in nature (Huitema *et al*., 2011: 181). This philosophy underpinned the ICPE research project.

3 Objectives and Methods

The central objectives of the ICPE project were to construct a climate change policy evaluation framework that builds on but also extends the standard EU evaluation framework, and to undertake evaluations of climate change policies across all sectors using the framework, with a specific focus on key policies. A further aim of the project was to ensure wide dissemination of the project's lessons. This final report constitutes one channel for dissemination. Alongside this final report, we are publishing two-page summaries for each sector that frame recommendations for future climate change-related policies in Ireland, as well as sectoral papers that detail our research findings for each of the sectors. These are available at https://diarmuidtorney.org/icpe/

The ICPE project technical description identified "National Environmental policies as these relate to climate goals and adaptation", and required the project to focus on "specific policies (including Plans, Statute, Awareness Campaigns, Reviews, and Regulation)". We divided our research into five sectoral work packages. The first four focused on climate change mitigation and were structured around the sectoral areas identified in both the 2014 National Policy Position on Climate Action and Low Carbon Development and the 2017 National Mitigation Plan (NMP): (1) electricity generation; (2) the built environment; (3) transport; and (4) agriculture and land use (DCCAE, 2017; Government of Ireland, 2014). The fifth work package focused on climate change adaptation, with a cross-sectoral focus as set out in the National Adaptation Framework (NAF) (DCCAE, 2018a).

It is important to note that, as an exercise in *ex post* evaluation, the ICPE project focused on policies and measures already in place at the commencement of the project. Our first ports of call were the NMP, the NAF and data submitted by Ireland under the EU's Monitoring Mechanism Regulation [(EU) No. 525/2013/EU], which requires Member States to report on policies and measures they have adopted to reduce GHG emissions. Those policies listed as planned or implemented only in 2017 or 2018 in the NMP were excluded from our analysis. Moreover, policies and measures announced as part of the National Development Plan or the Climate Action Plan fell outside the scope of our analysis.

The project technical description called for an evaluation of "effectiveness, efficiency, coherence and relevance. The evaluation framework utilised should align with standard evaluation criteria and procedures used in *ex-post* evaluations of EU policies". Accordingly, the ICPE project incorporated the standard criteria of effectiveness, efficiency, coherence and relevance, but added two additional criteria: governance and distributional impact. Because of the diverse set of criteria that spans both process and outcome dimensions, the project drew on a diverse set of qualitative and quantitative data and sought to triangulate from multiple sources where possible.

For each of the five work packages, our research commenced with a comprehensive mapping exercise drawing on a wide range of data sources. This was used to produce a sectoral overview that detailed policies in place and undertook an initial evaluation according to the six criteria above. This overview was then presented at a workshop of invited sectoral stakeholders: policymakers from across relevant government departments and public bodies, business, civil society and academia. Input and feedback were sought at these workshops on the research to date as well as on areas suitable for further research. On the basis of the feedback received, further research was undertaken, including more detailed evaluation of specific policies and measures. The next chapter provides an overview of our findings.

4 Overview of Findings

This section provides an overview of headline findings for each of the five sectoral work packages. Full details of each sectoral analysis can be found in background sectoral papers available at https://diarmuidtorney.org/icpe/

4.1 Transport

Ireland's transport emissions remain coupled to economic activity. Between 1990 and 2018, GHG emissions from transport increased by 137.1% (EPA, 2019). Road transport accounts for the majority of CO_2 emissions from the transport sector (DTTAS, 2019). Within this, private car use accounted for 51% in 2017, while goods vehicles accounted for 27%. Fuel tourism accounted for 10% of transport emissions in 2016 (DTTAS, 2018). Aviation and maritime emissions are not a central focus of this study because these emission sources are dealt with through other EU and/or global policy mechanisms. Emissions from aviation within the European Economic Area are covered under the EU Emissions Trading System (ETS), while other international aviation emissions are covered under a recent global agreement concluded within the framework of the International Civil Aviation Organization. Maritime emissions are being addressed within a process under the auspices of the International Maritime Organization.

4.1.1 Policies and measures in place

Smarter Travel – A Sustainable Transport Future is the most recent overarching government transport policy document (DTTAS, 2009). Published in 2009, it set out a vision for transport to 2020 centred on the following key goals: (1) to reduce overall travel demand; (2) to maximise the efficiency of the transport network; (3) to reduce reliance on fossil fuels; (4) to reduce transport emissions; and (5) to improve accessibility to transport. Policy instruments in the sector can be divided into the categories of regulation, economic and fiscal instruments, information and education, and investment.

Regulation

The principal regulatory measures employed in the transport sector include EU regulations that govern average emission performance of vehicles. EU Regulation (EC) No. 443/2009 set CO_2 emission performance standards for new passenger cars. In April 2019, the Council of Ministers and European Parliament agreed new CO_2 emission standards for vehicles for the period to 2030. Under these new standards, emissions from new cars are required to be 37.5% lower than 2021 levels by 2030, and emissions from new vans are required to be 31% lower (EC, 2019).

The Biofuels Obligation Scheme (BOS) aims to progressively increase the share of biofuels in the fuel mix. The BOS requires road transport fuel suppliers to ensure that biofuels represent a certain percentage of the motor fuel they place on the market. The obligation was increased on 1 January 2019 from 8.695% to 11.111% by volume.

Economic and fiscal instruments

The carbon tax was introduced in December 2009. Initially applied only to motor fuels, it was extended to other non-solid fuels in 2010, and to solid fuels in 2013 and 2014. At the time the analysis was undertaken it was €26/tonne CO_2. It was increased in Budget 2020 to €26/tonne CO_2 and in Budget 2021 to €33.50/tonne CO_2.

In 2008, the vehicle registration tax (VRT) and motor tax regimes were reconfigured to support reducing CO_2 emissions. Budget 2019 introduced a 1% surcharge on VRT to be levied on all new diesel cars, as well as diesel cars imported into the country. Budget 2020 replaced this 1% levy with a nitrogen oxide (NO_X) emissions-based charge from January 2020.

Consumers are incentivised to purchase electric vehicles (EVs) through grants as well as favourable treatment through the VRT and motor tax regimes. The EV grant scheme, administered by the Sustainable Energy Authority of Ireland (SEAI), provides

consumers with a grant of up to €5000 towards the purchase of a new EV. EVs also qualify for €5000 relief from VRT. Up to the end of July 2019, total expenditure by SEAI on EV purchase grants amounted to €35.1 million (Kevaney, 2019). In 2018, a €600 grant was made available to home owners to install a home charging point, which is available to purchasers of both new and second-hand EVs. A total of €1.37 million was spent on the scheme up to the end of June 2019, supporting the installation of 2290 chargers (Kevaney, 2019).

Information and education

A range of programmes has been established to promote low-carbon and sustainable travel through education programmes. These include the Green School Travel Programme, the Smarter Travel Workplaces Programme and the Smarter Travel Campus Programme. Other initiatives such as the Smarter Travel Areas pilot programme include an education/behaviour change component as part of the overall programme, although most of the funding was targeted at infrastructure investment.

Investment

Between 2005 and 2019, roads expenditure accounted for an average of 60% of expenditure by the Department of Transport, Tourism and Sport on land transport, with public transport accounting for 37%. This gap has narrowed in recent years, but this took place in the context of a sharp decline in overall expenditure on land transport. In 2018, the spending allocation was 55% on roads and 42% on public transport and the Public Service Obligations (PSOs) (DTTAS, 2019: 4). ESB ecars, run by the Electricity Supply Board, has rolled out a national charging infrastructure for EVs through its ecars programme. A Green Public Transport Fund of €2.5 million was established in 2017 to support pilot demonstrations of emerging low-emission technologies, particularly hybrid buses and electrification of the taxi fleet.

4.1.2 Evaluation of policies and measures

Effectiveness and efficiency

No sectoral emissions pathway was set out for the transport sector (or any other sector) for the period to 2020, although the 2019 Climate Action Plan identified a sectoral reduction target for transport of 45–50% relative to 2017 levels on the basis of marginal abatement cost curve analysis (DCCAE, 2019: 33). An alternative is to evaluate effectiveness against an intermediate policy goal such as modal shift. The 2009 *Smarter Travel – A Sustainable Transport Future* strategy set a target to increase alternative modes such as walking, cycling and public transport to 55% (DTTAS, 2009). Modal share patterns have been largely stable, with a heavy dominance of private car-based transport. Walking remains the second most popular mode of transport at 14.6% of all journeys in 2016. Cycling increased slightly from 1.2% in 2012 to 1.7% in 2016. Another intermediate target against which to measure progress is the RES-T (renewable energy source – transport) target under the 2009 EU Renewable Energy Directive (2009/28/EC), which set a target of 10% contribution of renewable energy in final consumption of energy in transport by 2020. This figure stood at 7.2% in 2018, and in fact the share of renewables in transport actually decreased by 0.2% between 2017 and 2018 (SEAI, 2019). Nonetheless, the BOS has been effective in displacing a limited quantity of fossil fuels in transport. Recalibration of the VRT and motor tax regimes brought about a significant shift in consumer behaviour. There has been a steady and significant increase in the development of the EV fleet over recent years, albeit starting from a very low base. Total new car licences for EVs (both battery electric and plug-in hybrid) increased from 882 in 2017 to 1937 in 2018 and 4764 in 2019. The trend line for 2020 was above that of 2019 up to April, but is likely to be affected by the Covid-19 pandemic (CSO, 2020). If it were possible to quantify the effects and costs of the range of policies implemented in the transport sector, then we could develop a sector-wide assessment of the relative efficiency of different measures within the overall policy mix. However, that task is outside the scope of the current project, although it could be undertaken in future research.

Relevance and coherence

Policies have predominantly dealt with passenger transport and have neglected freight. While passenger transport accounts for a majority of GHG emissions from the sector, the freight transport sector has grown once again during the economic recovery, and emissions from freight transport increased by

7.5% in 2016. Although some policy measures, such as the BOS, apply equally to passenger and freight, the relevance of the overall policy mix could be enhanced. There is a tension between climate change and air quality objectives in terms of incentivising diesel-fuelled car ownership. Increasing use of biofuels in the transport sector may also lead to incoherence between climate mitigation and other policy goals such as air quality, biodiversity protection and food production, if not managed carefully. Efforts have been made to increase the coherence and integration between different transport modes, most notably through the introduction of the Leap card system. This could be enhanced through the development of multi-modal transport hubs (Devaney and Torney, 2019).

Distributional impacts

Across the income spectrum, there is relative consistency in terms of expenditure on transport. Transport demand is relatively price inelastic, particularly where people live long distances from their place of work or education and in areas that are poorly served by public transport. In this context, price-based incentives to reduce travel, such as the carbon tax, are likely to increase costs for those who commute long distances and have few alternatives, rather than reducing demand, unless adequate alternatives are provided. Measures to support the deployment of EVs are particularly prone to concerns over distributional impacts. Even taking into account the incentives for EV purchase, a price differential between EVs and internal combustion engine vehicles persists. While we lack good data on the characteristics of EV owners, it can be assumed that the typical EV owner earns a higher than average income. Moreover, because grants are funded from Exchequer sources, all tax payers fund the grants. As a result, the EV grant scheme can result in a regressive redistribution of wealth.

Governance

Recent research commissioned by the National Economic and Social Council (NESC) (Devaney and Torney, 2019) identified three key challenges in governance of the transport sector. First, the sector is inherently complex, with tensions between public and private, and rural and urban, and complex external interactions with planning, health and education systems. Second, contestation between institutional priorities has shaped the development of a carbon-intensive transport system to date. Third, the governance landscape is fragmented.

4.1.3 Recommendations

Low-carbon transport vision

A first key step is to elaborate a low-carbon transport vision that aligns fully with best international practice, including fully embedding the “avoid, shift, improve” hierarchy of policy goals (EEA, 2016b). Given stark warnings from climate science, Ireland’s transport vision ought to align with a zero-carbon transport future as part of an economy- and society-wide decarbonisation trajectory.

Top-down direction from government

High-level signalling from government is critical to facilitating transition. It provides certainty to investors and confidence to society. This includes leadership from the Department of Transport, Tourism and Sport to guide the plethora of transport institutions that operate under its remit. It should be underpinned by a whole-of-government approach and enhanced policy coordination that prioritises climate action, and the civil and public services should lead by example in promoting sustainable transport modes.

Bottom-up experimentation and peer learning

Peer learning between Irish villages, towns and cities will be imperative to scale up innovative low-carbon transport solutions. This would introduce a much-needed level of reflexivity into the system and allow low-carbon transport innovations to be tested, compared and revised accordingly in local conditions. Dedicated resources, communication channels and engagement fora will be important for success.

4.2 Built Environment

The NMP defines the built environment as Ireland’s building stock, meaning residential housing, commercial buildings, industrial buildings and public buildings.

The building stock in Ireland consists of 2,003,645 residential dwellings (CSO, 2017), 109,000 commercial buildings (SEAI, 2015) and public buildings, which include approximately 3700 schools and 45 hospitals. Provisional emissions arising from the built environment for 2018 were as follows: 6.197 million tonnes carbon dioxide equivalent ($MtCO_2eq$) for residential and 0.980 $MtCO_2eq$ for public services (EPA, 2019).

4.2.1 Policies and measures in place

The majority of policies introduced to address emissions by way of reducing energy consumption in existing buildings and setting standards for new buildings have been introduced since 2009. The policy measures developed are of a financial, legislative or informative/educational nature. They have been administered through the SEAI, energy agencies (e.g. Codema, Tipperary Energy Agency, Three Counties Energy Agency) and local authorities.

Local authorities (some with assistance from energy agencies located within their boundaries) have implemented policies and measures that are focused on reducing emissions from social housing and buildings owned and operated by the councils (i.e. leisure centres, libraries and fire stations). The NMP contains 28 actions and 23 measures related to the built environment that are concerned with reducing GHG emissions from the building stock and improving energy efficiency. There are few measures that focus on behaviour change. Furthermore, there are no measures that address GHG emissions stemming from consumption of goods and services and other day-to-day activities.

A wide range of policies and measures have been introduced, including: Better Energy Homes; Better Energy Warmer Homes; Better Energy Communities; Social Housing Upgrades; Guidelines on Quality Housing and Sustainable Energy Communities; Green Public Procurement; Accelerated Capital Allowance; Building Energy Rating (BER) Certificates; Part L of the Building Regulations; the Energy Efficiency Obligation Scheme; the Large Industry Energy Network & SME Support; Qualibuild; the Public Sector Energy Efficiency Strategy; the House of Tomorrow & Low Carbon Homes Scheme; the Power of One information campaign; and the Home Heating Appliances Register of Performance/Boiler Efficiency information campaign.

4.2.2 Evaluation of policies and measures

Effectiveness and efficiency

The availability or otherwise of baseline data for the various measures presents challenges in measuring effectiveness and efficiency. Under the Better Energy Warmer Homes Scheme, approximately 135,000 households have been upgraded at no cost to residents. Between 2009 and August 2018, 219,988 homes were upgraded under the scheme, representing approximately 10% of the housing stock. The *Annual Report 2017 on Public Sector Energy Efficiency Performance* from SEAI shows that, in 2017, the total primary energy use for the public sector was 9375 GWh, amounting to €563 million in energy costs. Compared with 2016, energy consumption was reduced by 2336 GWh, achieving savings of €133 million, which has resulted in 520,000 tonnes of CO_2 being saved. Public sector entities can use ISO 50001 to achieve their energy efficiency objectives or can work with energy agencies to undertake projects. The breadth of actions undertaken by public sector bodies includes lighting upgrades, heating, building fabric and awareness campaigns. It was not possible for the purposes of this research to identify the exact measures undertaken by each public sector body and to examine the costs to each body of achieving their individual CO_2 savings.

Coherence and relevance

The actions and measures currently in place respond to directives from the EU with regard to energy efficiency. The actions and measures are narrowly focused in terms of instrument and target group, as well as in terms of the options for achieving emissions reduction. There is a tendency for actions and measures to be directly linked to a measure of energy from which to calculate GHG savings. This ignores the bigger picture and the interaction of the actions and measures in the broader system, most prominently the cost of housing. While there are measures that aim to increase energy awareness by requiring sellers of homes and landlords to advertise BERs, this has had little effect in the midst of an affordability crisis when

demand is high and supply is low. BER registration has dropped in the last few years (it peaked in 2014 with 110,173 assessments recorded; in 2017 only 97,263 were recorded). Meanwhile, house prices and rent have increased by approximately 56% and 75%, respectively, and vacancy has decreased by 20.3% from 2011.

There is a growing call for GHGs to be measured based on actual energy consumption, which in the context of the built environment is challenging, but would highlight areas where there is a deficit of policy actions and measures. Although a better BER rating may be a worthwhile objective, there is still a need to address consumption behaviour, because energy efficiency might lead to induced demand for energy, by way of encouraging individuals to be less concerned about how much they are using by leaving the lights on. This could be mitigated by information campaigns similar to the Power of One.

Distributional impacts

Understanding the impact of actions and measures geographically, socially and economically is valuable in assessing the outcomes and, critically, provides a means for holistically evaluating an action or measure. For the built environment, data are readily available on the housing stock in Ireland by county. It is possible to evaluate the impact of energy efficiency and retrofit programmes on the physical housing stock in terms of geography. However, in terms of behaviour, it is more challenging to obtain relevant data such as energy use per household and household income, which may provide a more detailed assessment of the social and economic impacts of actions and measures. Households with financial means to undertake energy efficiency upgrades are well placed do so, while low-income households avail themselves of the Better Energy Warmer Homes Scheme as described above. Households with incomes that do not fall into either category are not catered for by either programme. However, it is not known if these households have undertaken retrofits or not.

Governance

The breadth and depth of stakeholders involved in addressing emissions from the built environment in Ireland is complex and we have attempted to synthesise a simplified stakeholder map, which can be found in the sectoral report (available at https://diarmuidtorney.org/icpe/). We have included in this the actions and measures for which specific stakeholders are responsible.

4.2.3 Recommendations

At a sector-wide level, the actions and measures currently in place need to be strengthened. Further actions and measures, and their evaluation, would benefit from the following:

- **Data:** the data that are available of a quantitative nature are focused on the cost of an action. Data should be broadened to include aspects of what was done, who was affected, and other qualitative factors. This could be done by the Department of Housing, Planning and Local Government (DHPLG) and SEAI in partnership with the Irish Green Building Council (IGBC). This would enable a deeper understanding of an action's impact and could guide future actions.
- **Better tracking of buildings:** data need to be collected on how many dwellings construction firms/workers have retrofitted and/or constructed in a given year, as well as the type of dwelling and its BER rating and location. This could be done by DHPLG and SEAI in partnership with IGBC. This could help to capture households that are undertaking retrofits outside of the Better Energy Programme. This would serve as a form of quality assurance that may spur further retrofits by homeowners.
- **Smart metering:** this will enable householders to better manage their energy use and will provide data on progress towards targets, although smart meters alone may not achieve significant behaviour change and may need to be combined with other behaviour change measures. In the roll-out of smart meters it will be important to pay due attention to concerns about data privacy.
- **Options for financing:** it is evident that, while a grant is beneficial in undertaking retrofits, having to pay for the upfront costs of the upgrades is a barrier. It would be advisable to explore the potential of alternative financing mechanisms to align with the financial capacity of households, such as green energy bonds, energy efficient mortgages and low-interest loans. A final

recommendation is made with regard to landlords. From the available data, it is evident that landlords do not participate in the Better Energy Homes Scheme even though they are eligible to do so. Furthermore, tenants are also eligible to apply for upgrades, but they do not. The government is proposing to provide assistance to landlords to undertake upgrades. Acknowledging the existing housing crisis, specifically the rising costs and demands for housing in the rental market, careful consideration should be given to the design and implementation of policies targeting landlords.

4.3 Agriculture, Forestry and Land Use

Agriculture, forestry and land use present a unique challenge in climate change mitigation. The IPCC Fifth Assessment Report notes that agriculture, forestry and land use are responsible for 25% of global GHG emissions (IPCC, 2014). Agriculture accounted for 34% (20.597 Mt CO_2eq) of Ireland's provisional GHG emissions in 2018 (EPA, 2019). The majority of these emissions came from ruminants via enteric fermentation (over 50%). The composition of GHG emissions in the agriculture sector is dominated by methane (CH_4) at 64%, with 80% of this attributable to ruminants, and the remainder to manure. The use of fertiliser, manure and animal excreta releases nitrous oxide (N_2O), comprising 30.7% of emissions. The remaining emissions (5.3%) are CO_2 stemming from liming and urea application to land, and fuel. Agriculture represents 1.6% of gross value added (GVA) to the Irish economy. The broader agri-food sector represents 5.5% of GVA. There are 137,500 farms in Ireland. The agriculture sector provides 112,500 jobs, while the agri-food sector provides 174,400 jobs (DAFM, 2018).

Climate change will add to the sector's vulnerability by creating greater risks and uncertainty due to changes in weather patterns, temperature and rainfall. These changes will affect the growth of crops on which the sector is dependent both globally and in Ireland. Calls by the IPCC (2018) and the EAT Lancet Commission (2019), among others, to adopt flexitarian, vegetarian and vegan diets as an action to mitigate climate change are likely to affect demand for meat and dairy products globally.

Currently in Ireland there are 770,020 hectares of forests (11% of total land area). This is significantly less than the European average of 30%. The government has set a target for forest cover of 17% by 2030 and 18% by 2046. Efforts to increase forest coverage have been ongoing since 1991. Approximately 49.2% of planted trees have been planted by private individuals with the assistance of grant aid from the government. The remaining 50.8% are publicly owned, primarily by Coillte. According to the National Forest Inventory, approximately 50% of the trees planted are less than 20 years old.

4.3.1 Policies and measures in place

Broadly, the Department of Agriculture, Forestry and Marine (DAFM) has focused on three categories of mitigation actions: (1) agricultural mitigation – measures with reduced agricultural GHG (i.e. directly reduce methane and nitrous oxide); (2) land use mitigation – measures that enhance CO_2 removal from the atmosphere in terms of land management or land use and land use change in forestry; and (3) energy mitigation – reductions from displacement of fossil fuels via energy saving, enhanced cultivation of biomass and/or adoption of anaerobic digestion. A key driver of policy in the agriculture sector is the EU's Common Agriculture Policy (CAP). The CAP, launched in 1962, "is a partnership between agriculture and society, and between Europe and its farmers" (European Parliament, 2019).

Broadly, the actions and measures aimed at reducing GHG emissions in the agriculture, forestry and land use sector are targeted primarily at individuals and public sector/semi-state bodies. Monitoring of progress is the responsibility of DAFM, which is also responsible for ensuring compliance with EU directives, and Teagasc, which is responsible for agricultural development via research and knowledge transfer. Instrument types are primarily legislative, with financial incentives for compliance. The primary financial incentive is receipt of CAP payments. Information and education campaigns have been developed by DAFM and Bord Bia to build awareness around the sustainability of Irish agricultural products and the agri-food sector. These have been focused on the population as a whole. Other programmes that are stated in the NMP – such as the farmer-led SmartFarming programme – are

focused on knowledge transfer to facilitate efficiency and innovation.

4.3.2 Evaluation of policies and measures

Effectiveness and efficiency

Considering the connection of the actions to EU regulations and therefore eligibility for basic payments, uptake of policies is effective. In total, 53,174 farmers have been approved for participation in the Green Low Carbon Agri-environment Scheme (GLAS), resulting in actions being undertaken on 943,332 hectares of farmland. Of the farmers participating in the programme, 4600 are using low-emission spreading techniques. Furthermore, the programme has resulted in 12,000 km of new hedgerows, 1100 orchards and 5000 groves of native trees being planted. The latter amounts to approximately 900 tonnes of CO_2 being sequestered every year.

Coherence

Agriculture policy in Ireland is driven to a significant extent by EU policy, particularly the CAP. In reviewing the various policies, it is evident that current active policies such as GLAS and Food Wise 2025 have been developed with consideration given to the lessons from their predecessors. As such, policies and programmes are coherent, in that they do not contradict each other and are referenced consistently in overarching policy documents. When the internal coherence of the actions stated in Origin Green, Food Wise 2025 and the Rural Development Plan is considered, challenges emerge regarding the focus of policies. Current policy actions focus on farm-level action to reduce emissions from agricultural activities, yet the objectives of the policies are broader, with a heavy focus on growth via increasing Ireland's export market. This suggests that, while policies such as Food Wise 2025 state that the three pillars of sustainability are equally important, those policies focus more on economic growth of the agri-food sector than on addressing growing income disparities at farm level, or their social and environmental impacts. It seems that responsibility for the environmental pillar is the responsibility of the agriculture sector, while agri-food is concerned with the economic pillar, and emphasis on the social pillar is tokenistic.

Relevance

While the policies in this sector may be coherent and aligned with each other, delivering a clear message that Ireland's agriculture and broader agri-food sectors place sustainability at their core, the relevance of policies is in question. Policies in place to address climate change focus on reduction of methane emissions from agricultural activities. There is an absence of actions in the broader agri-food sector relating to the emissions that stem from the production of food.

The focus of forestry policy is primarily on the economic opportunities presented by the sector rather than on the environmental and social benefits. Viewing forestry as an income source and encouraging farmers to convert agricultural land to biomass farms potentially disregards the connection of farmers to the land. Forestry policy presents an opportunity to address the social pillar of sustainability by viewing forests as a public amenity of which farmers are paid caretakers, but this will not be without challenges.

Distributional impacts

Understanding the impact of actions and measures geographically, socially and economically is valuable in assessing the outcomes and provides a means for holistically evaluating an action or measure. Climate change mitigation and sectoral growth policies are focused on the dairy and beef cattle sectors. Insufficient attention has been given to the vulnerability of the tillage farming sector, which will be the most sensitive to climate change impacts. Recent weather events have demonstrated the vulnerability not only of farmers' livelihoods but also of Ireland as a whole to climate change. The dependence on imports to meet food and nutritional needs has not been addressed adequately by current policy. This has had negative social and economic impacts.

Governance

From the project workshop and interviews with key stakeholders, it is evident that the development of policy in the agriculture sector tends to be top-down in its design, development and implementation. Interviewees raised concern regarding the power of vested interests in policy development. Critically, giving consideration to calls for a just transition by the Joint

Oireachtas Committee on Climate Action (Houses of the Oireachtas, 2019), it is important to include all relevant voices, including farmers, in designing policy that causes no harm and leaves no one behind. The onus is therefore on DAFM and Teagasc to develop policy that aligns the needs of Irish farmers and citizens, and with EU policy.

4.3.3 Recommendations

To be a leader in the design and implementation of innovative climate policy in agriculture, policymakers need to embed long-term planning into policy.

- **Knowledge exchange:** farmers need to be actively engaged to understand what they are doing, what they have done and what they know will work. The existing focus on knowledge transfer needs to be replaced with a focus on knowledge exchange.
- **Indicators:** given the complexity of the sector, policy success cannot be demarcated by a single indicator of GHG emissions. Additional quantitative indicators are needed to capture factors such as air pollution, water quality and soil health. Further, monitoring will require the development of qualitative indicators that consider the distributional impacts of policy, for example indicators pertaining to quality of life, especially in rural Ireland.
- **Circular economy:** policies in the agri-food sector need to account for risks and opportunities. For example, there is an opportunity with the circular economy, namely farm-to-fork programmes and SmartFarming, to address farmers' incomes, food security and climate change.
- **Systems approach:** research and policy need to consider how the agri-food sector can respond and be climate resilient, considering the vulnerability of global trade to climate change, as it is a symbiotic relationship.

4.4 Electricity Generation

In 2018, electricity generation accounted for 31% of primary energy use in Ireland (SEAI, 2019: 26). The share of electricity generation in total primary energy use was largely similar to the 2005 share, which was 32% (SEAI, 2018). However, the fuel mix for electricity generation has changed significantly since 1990. Oil use has declined significantly, while coal use has been relatively stable in absolute terms, although it has declined as a share of total electricity generation. Natural gas's share has increased significantly, displacing oil and coal and accounting for much of the increase in total electricity generation over this period. The trend in final electricity demand by sector was broadly stable between 2005 and 2018, but with variation within that period coupled to the economic cycle. Final electricity demand reached a peak in 2008 at 2294 ktoe (kilotonnes of oil equivalent), declined during the recession and began to grow again from 2014 onwards. In 2018, primary electricity demand exceeded the 2008 peak for the first time, increasing 4.4% in one year (SEAI, 2019: 23). Looking forward, EirGrid projects significant growth in electricity demand over the coming decade, driven largely by electricity demand from data centres (EirGrid, 2018).

4.4.1 Policies and measures in place

Fossil fuel electricity generation is covered by the EU ETS, with an EU-wide reduction target of 21% by 2020 relative to 2005. For much of the past decade, the carbon price delivered by the ETS remained below €10 per tonne as a result of a huge surplus of allowances. However, since 2018, the ETS carbon price has risen significantly, crossing the €20 threshold in August 2018 and remaining between €20 and €30 for nearly the entire period since then. Under the 2009 Renewable Energy Directive, Ireland has a binding renewable energy target of 16% by 2020. As set out in the National Renewable Energy Action Plan (NREAP), this overall target is broken down into component targets for electricity (40%), heat (12%) and transport (10%) (Government of Ireland, 2010).

A number of support schemes for renewable energy have been rolled out, including the Alternative Energy Requirement Scheme, introduced in 1996; the Renewable Energy Feed-in Tariff (REFIT) 1 scheme, introduced in 2005; and the REFIT 2 and REFIT 3 schemes, both introduced in 2012. A draft Bioenergy Plan was published in 2014 (DCENR, 2014) and was framed around three high-level goals: (1) harnessing the market opportunities presented by bioenergy in order to achieve economic development, growth and jobs; (2) increasing awareness of the value, opportunities and societal benefits of

developing bioenergy; and (3) ensuring that bioenergy developments do not adversely affect the environment and its living and non-living resources. Action 16 of the NMP committed to finalising the Bioenergy Plan. An Offshore Renewable Energy Development Plan was published by the (then) DCENR in 2014. The plan was framed around three high-level goals that bear an almost uncanny similarity to the high-level goals of the draft Bioenergy Plan, suggesting a lack of differentiation between approaches to diverse sub-sectors within Ireland's broader energy policy formation.

Grid development and interconnection has been another focus of policy. EirGrid's *Strategy 2020–25* set out a central goal to "lead the island's electricity sector on sustainability and decarbonisation" and committing to "prepare the electricity system for a future based almost entirely on renewable energy" (EirGrid, 2019: 9). It commits to "using innovative solutions as well as proven technologies" and to increasing the level of renewables in the system while minimising the addition of new infrastructure.

The 2016 Programme for a Partnership Government pledged that "the *National Dialogue on Climate Change* will identify, as soon as possible, the most suitable replacement low-carbon generation technology" (Government of Ireland, 2016: 125, emphasis added). The NMP committed to undertaking "a study to identify the most suitable replacement low carbon technology for the Moneypoint generation plant" (Action 23). The use of peat for electricity generation has been subsidised since 2001 through the PSO. This was introduced to promote energy security through use of indigenous fuels, but it has incentivised the degradation of an important carbon sink as well as the burning of a highly carbon-intensive fuel. It has also had detrimental effects on biodiversity. Bord na Móna stated previously that it would cease harvesting peat for electricity generation prior to 2030 and, in October 2018, announced that it was bringing forward that date to 2028 (DCCAE, 2017). In July 2019, An Bord Pleanála refused permission to ESB to co-fire peat with biomass at its Shannonbridge, Co. Offaly, plant beyond the end of 2020, when its current licence expires. In November 2019, ESB announced a decision to close its peat-burning power stations in Shannonbridge and in Lanesborough, Co. Longford.

4.4.2 Evaluation of policies and measures

Effectiveness and efficiency

Detailed evaluation of the effectiveness of a policy instrument requires the establishment of a plausible counterfactual scenario – what would have happened in the absence of the policy intervention. It has not been possible to undertake this to date. However, it seems reasonable to suggest that policy supports have been instrumental in facilitating deployment of renewable electricity generating capacity to date. Ireland's penetration rate for non-synchronous renewable energy is held up as world leading, largely due to the work of EirGrid.

Another metric against which effectiveness can be measured is the emissions intensity of electricity production. Two caveats are required in this regard. First, emissions from electricity generation are covered under the EU ETS rather than the Effort Sharing Decision (406/2009/EC), so Ireland does not face short-term policy incentives to reduce the emissions intensity of electricity generation. Second, the emissions intensity of electricity generation is driven by both the relative share of renewables and the fuel mix of fossil fuel generation, with gas being less emissions intensive than coal and peat. The changing fuel mix has had a significant impact on the CO_2 emissions intensity of electricity over the period since 1990, with a decline of 49% to 2014, from 896 g CO_2/kWh to a low of 455 g CO_2/kWh. It increased again in the period 2014–2016 but declined again in 2017.

Efficiency seeks to capture some measure of the cost of policy interventions, asking whether outcomes achieved through an intervention could have been achieved through less costly means. However, an overly narrow focus on least-cost decarbonisation may unnecessarily constrain the range of available policy options. Decarbonisation at "reasonable" or "acceptable" cost may widen the scope for policy interventions, although such concepts would need to be operationalised carefully (Torney, 2018). A somewhat unusual characteristic of the electricity sector is that the principal funding of the central policy instrument is paid through a levy on electricity customers rather than through Exchequer support. In 2016–17, support for peat generation accounted for €123.7 million, or 41% of total PSO support, but PSO support for peat expired at the end of 2019 (CER,

2016; CRU, 2019). This raises different questions, including those relating to distributional consequences.

Relevance

The principal focus of policy interventions over the past decade, most prominently the REFIT schemes, has been achievement of the 2020 40% RES-E (renewable energy source – electricity) target and, by extension, achievement of the overall RES target of 16%. The progress that has been achieved to date has been based predominantly on a particular technology – wind – and a particular approach to project development, which has been large scale and developer led. Viewed through the lens of relevance, the approach to date has been highly relevant to the narrow conception of the goal of achieving 40% RES-E by 2020 but less relevant to ancillary goals of achieving public support and buy-in for renewables development. This contrasts with the approach adopted in various other jurisdictions.

In addition, the existing approach to incentivising renewable energy has predominantly incentivised the development of onshore wind. Over the medium term, decarbonisation of Ireland's electricity system cannot feasibly rely on a single technology, namely onshore wind energy, especially in light of the societal resistance that onshore wind has increasingly faced. Reliance on a single technology, particularly an intermittent one such as wind, also has implications for Ireland's energy security. By adopting a technology-neutral approach on short-term cost grounds, policy may end up more costly in the medium term (Curtin, 2017).

Coherence

The set of policies in place to incentivise renewable electricity generation are not obviously characterised by problems of internal coherence. Decarbonisation of electricity is interconnected with the rest of the energy sector in a number of respects. First, significant decarbonisation of the heat and transport sectors is envisaged over the medium term, principally through heat pumps for space heating and EVs for passenger transport. Moreover, the projected very significant growth of the data centre sector will make decarbonising electricity more challenging as the overall demand for electricity will increase. Another area of tension in policymaking is between policies to incentivise renewable electricity generation and the planning system.

Distributional impacts

The Alternative Energy Requirement and REFIT schemes as well as the Renewable Electricity Support Scheme (RESS) scheme are all funded through the PSO, which is a flat charge applied to each customer's electricity bill, regardless of electricity consumption. Previous research has shown that PSO supports lowered the wholesale price of electricity, which more than offset the PSO cost (Clifford and Clancy, 2011; Di Cosmo and Valeri, 2018). While PSO support for renewables may not increase consumer electricity costs at the aggregate level, as the PSO level increases in the future, the effects of the shifting balance of electricity cost between the PSO and electricity cost components will have differential impacts on different segments of consumers, potentially exacerbating energy poverty. Another distributional dimension to the decarbonisation of electricity concerns the fate of workers employed in fossil fuel generation and upstream sectors such as peat harvesting. The just transition movement has sought to draw attention to this dimension of climate policy. In October 2018, Bord na Móna announced 430 redundancies as a result of the planned closure of 17 of 62 currently active bogs (Clarke and MacConnell, 2018) and, as noted above, ESB announced in November 2019 that it would close its peat-burning power stations in Shannonbridge, Co. Offaly, and Lanesborough, Co. Longford. Similar concerns are being raised with respect to the possible employment implications of the decision to be taken over the future of the Moneypoint coal power plant in County Clare (Clare Echo, 2019).

Governance

The governance landscape that pertains to decarbonisation of electricity in Ireland is fragmented. A range of actors are involved in different aspects of the policymaking and policy delivery process, including (but not limited to) the Department of Communications, Climate Action and Environment (DCCAE; now the Department of the Environment, Climate and Communications), SEAI, the Commission for Regulation of Utilities (CRU), EirGrid, ESB Networks,

An Bord Pleanála, EPA, and local authorities. This presents a complex system with which project developers, communities and the public at large must engage. Over recent years, the deployment of renewable energy and related infrastructure, particularly wind but also grid development, has faced increasing opposition from communities. A NESC report published in 2014 characterised this as "a sea change in social support for wind energy and related infrastructure" (NESC, 2014: 2). This has led to many proposed projects being challenged through the courts. There has been similar local opposition to proposed development of the high-voltage electricity grid, including the planned North South Interconnector. EirGrid has developed its capacity for community engagement in recent years, including by opening a number of offices and information centres in regions in which new grid infrastructure is planned.

4.4.3 Recommendations

In many ways, electricity generation has been among the more successful sectors in Ireland's response to climate change. Current data suggest that, if recent progress in renewables deployment is continued until the end of 2020, Ireland will meet its EU 2020 target for RES-E of 40%, and it has committed to an ambitious target of 70% in the 2019 Climate Action Plan. The following recommendations will be key to delivering on this increased ambition.

Distributional consequences

The primary means of financing state support for renewables supports has been through the PSO. Careful consideration should be given to the distributional consequences of such arrangements into the future, particularly where more affluent households are increasingly able to generate their own electricity through microgeneration.

Community engagement to secure buy-in

Significant community resistance to renewable energy and grid infrastructure was generated as a result of inadequate and often tokenistic attempts at community engagement. The design of the new RESS, including provisions for community ownership, are a step in the right direction. However, as Ireland moves towards large-scale deployment of offshore wind, new approaches to community engagement will be needed to avoid repeating mistakes of the past.

A just transition for workers and communities

Lessons are being learned from the experience of Bord na Móna in the Midlands. These will be beneficial to ensuring that Ireland's transition to a low-carbon future is just and leaves no one behind. The transition will affect workers and communities across all sectors. In the near term, a decision is to be made on the future of the Moneypoint coal-fired power station. This presents an opportunity to enable a just transition for affected workers and communities in an anticipatory fashion.

4.5 Adaptation and Resilience

Under the Climate Action and Low Carbon Development Act 2015, the government was required to produce a climate change adaptation framework. The NAF was published in February 2018 (DCCAE, 2018a). It sets out the "national strategy for the application of adaptation measures in different sectors and by local authorities" (DCCAE, 2018a: 9). Reducing vulnerability to climate change of the society and economy are central to the framework, as is realising the opportunities inherent in adaptation for innovation and green growth.

Under the 2015 Act, sectoral adaptation plans are required to be produced by relevant government ministers, which must have regard to the NAF. To assist in this process, DCCAE published sectoral adaptation guidelines in 2018 (DCCAE, 2018b). All relevant sectors (seafood, agriculture and forestry; biodiversity; built and archaeological heritage; transport infrastructure; electricity and gas networks; communications networks; flood risk management; water quality; water services infrastructure; and health) had developed their adaptation plans by September 2019. Prior to the NAF, the National Climate Change Adaptation Framework (NCCAF), published in 2012, was developed to enable climate change adaptation action to be undertaken, but was non-statutory (DECLG, 2012). Under the NCCAF, adaptation plans were developed for the electricity and gas networks, agriculture, flood risk and transport sectors. Local authorities also developed adaptation plans on the basis of guidelines published by DCCAE (DCCAE,

2018c) and with assistance from the four climate action regional offices (CAROs). All local authority adaptation plans have been completed.

Ireland has experienced a number of extreme weather events in recent years. In 2017 and 2018, extreme weather events in the forms of Storms Ophelia and Emma and the Beast from the East resulted in significant damage to infrastructure (water and energy), while the heatwave and drought in summer 2018 saw the introduction of water restrictions and farmers importing feed for herds. Based on research undertaken by Climate Ireland, it is anticipated that the frequency and intensity of extreme weather events will increase going forward (Dwyer, 2012). Responding to these increased risks is the focus of adaptation planning and this is challenged by the constantly shifting baseline for climate risks.

4.5.1 Policies and measures in place

Adaptation is a relatively new policy focus in Ireland and, as such, our analysis is limited to plans that have been developed to date. Four sectoral plans (electricity and gas networks, agriculture, flood risk and transport) were developed under the NCCAF, while all 10 have been developed under the NAF. All 31 local authority climate change adaptation plans were completed by September 2019.

A challenge with undertaking an evaluation of the plans currently in place is their relative newness. From the plans as they have been published, it is evident that consideration was given to the coherence and relevance of the plans to each other, as well as to their coherence with other legislation and policies. In addition, effective governance was a key criterion in the development of the plans, as demonstrated by the creation of the National Adaptation Steering Committee and the CAROs.

4.5.2 Progressing adaptation: NCCAF to NAF

The primary difference between the NCCAF and the NAF is that the latter is statutory. The NCCAF was developed in 2012 and established the call for the development of the climate information platform Climate Ireland. It is to be expected, therefore, that there would be differences between the NCCAF and NAF and the plans developed under each. One notable difference is the number of plans produced under each, as well as the sectoral categories. Under the NCCAF, only four plans were produced, while under the NAF all sectors have published draft plans at least. Only four of the sectors are the same under the NCCAF and NAF. The reasons for these changes in sectoral definitions is unclear. It is difficult to determine whether other factors influenced the capacity of government departments to develop plans under the NCCAF.

Although it is beyond the scope of this research project, it is possible that Ireland's economic recovery can explain differences between the NCCAF and NAF processes. The public sector was unable to hire new staff between 2008 and 2015, except in exceptional circumstances. The resources needed to develop baseline data and undertake research were potentially constrained in terms of both finances and human resources. This could be demonstrated by third-level institutions being tasked with undertaking the research, under the NCCAF in partnership with the Office of Public Works (OPW), Teagasc, EPA and Met Éireann. However, hiring resumed in the public sector by the time the NAF process was commenced. Nonetheless, the absence of adaptation targets at the EU level and the prioritisation of other factors, most prominently Brexit, in recent years may have constrained financing and human resources for climate change adaptation policy development. Future research could investigate the impacts of the economic downturn on the capacity of government to respond to climate change.

Another key difference between the NCCAF and NAF is the governance structure. Under the Climate Action and Low Carbon Development Act 2015, there is a somewhat stronger governance structure than existed previously, which supports greater accountability for action (or inaction) to achieve national, EU and international targets. Furthermore, while the NCCAF called for adaptation guidelines to be developed, it was only under the NAF that official Sectoral Adaptation Planning Guidelines and Local Authority Adaptation Guidelines were provided (DCCAE, 2018b,c).

4.5.3 Recommendations

The newness of adaptation policy in Ireland, in comparison with mitigation policy might suggest that there would be no lessons to be learned or recommendations emerging from this report. However,

analysis of the NCCAF and NAF through case studies has demonstrated that there are lessons and opportunities, namely with regard to the process and governance for adaptation planning, tools for collaboration and integration, and communication.

- **Governance:** our review of each plan shows that requiring sectors to develop actions to respond to climate risk in isolation does not foster the collaboration and cooperation necessary for climate adaptation. It would be beneficial for DCCAE or the Climate Action Unit in the Department of the Taoiseach to be designated as the entity to facilitate collaboration across sectors to develop one national adaptation plan, or one climate action plan that addresses both adaptation and mitigation.
- **Workshops:** an adaptation plan consisting of actions that require collaboration across departments and with other stakeholders will need tools to support collaborative development. Well-designed workshops are one tool that enable policymakers to come together and discuss issues and potential solutions.

5 Conclusions

In common with many other countries, Ireland has devoted insufficient attention and resources to *ex post* evaluation of climate change policies to date. This is not unique to climate change policies. While successful attempts have been made to improve the evaluation capacity of the Irish civil service in recent years through the creation of IGEES within the Department of Public Expenditure and Reform, attention has centred on *ex ante* evaluation of planned or proposed policies, rather than *ex post* evaluation of existing policies. For too long, there has been limited understanding of the successes and failures of current and past policies.

The ICPE project represented an attempt to begin to redress this shortcoming in existing research and policy. As a desk study with limited resources but an expansive canvas, our analysis has been necessarily selective and limited. We have attempted to contribute to the understanding of Ireland's existing climate policies across a diverse range of consequential policy areas. Within each of the sectors covered, we have provided both a broad-brush overview and a more focused evaluation of a particular policy or sub-sector. This final report has drawn attention to some of our most important findings.

The project used an evaluation framework that built upon standard EU evaluation criteria but also included two additional criteria, namely distributional impact and governance. The addition of these elements to our study helped to shine a light on important aspects of climate change policy that might otherwise be neglected. In applying the evaluation framework, it is evident that performance on certain criteria is better than others. In particular, the deficits in coherence, relevance, distributional impacts and governance have drawn attention to the changes needed going forward. There is a need for robust and effective governance structures that will ensure that the design and implementation of policies to transition Ireland to a low-carbon future are not just cost effective but also coherent and relevant.

A systems approach is needed to address both mitigation of and adaptation to climate change. There is a recognition by the stakeholders who participated in our project workshops that responding to climate change is no longer about either mitigation or adaptation, but that the two are interconnected, and that to respond to both requires collaboration across all sectors and levels of government. Furthermore, a systems approach is essential to avoid adverse distributional impacts such as public transport being too costly for those who need it.

A narrow focus on effectiveness and efficiency has come at a cost to society and the broader environment, especially as effectiveness has primarily been measured with respect to CO_2 abatement. Societal and broader environmental impacts are not captured in this indicator, which focuses narrowly on GHG mitigation. This was most evident in the agricultural sector, where farm management practices also need to consider water quality, air quality and biodiversity gains, as well as adaptation, particularly to flood risk and changes in precipitation frequency and intensity. It will be essential to broaden the scope of quantitative indicators and to include qualitative indicators to assess policies, in particular their distributional impacts.

Much remains to be done. The evaluations conducted as part of the ICPE project are a beginning rather than the end of the story. Future research ought to delve much more deeply into each of the sectors. Indeed, it is to be hoped that capacity for *ex post* policy evaluation will be strengthened as part of the new governance arrangements being developed under the 2019 Climate Action Plan (DCCAE, 2019). An enhanced Climate Change Advisory Council, if sufficiently resourced and staffed, seems well placed to undertake some of this work. We hope that our research as part of this project will have laid the groundwork for what is to come.

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Abbreviations

BER	Building Energy Rating
BOS	Biofuels Obligation Scheme
CAP	Common Agricultural Policy
CARO	Climate action regional office
CCPI	Climate Change Performance Index
DAFM	Department of Agriculture, Food and the Marine
DCCAE	Department of Communications, Climate Action and Environment
DHPLG	Department of Housing, Planning and Local Government
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
ETS	Emission Trading System
EU	European Union
EV	Electric vehicle
GHG	Greenhouse gas
GLAS	Green Low Carbon Agri-environment Scheme
GVA	Gross value added
ICPE	Irish Climate Policy Evaluation (project)
IGBC	Irish Green Building Council
IGEES	Irish Government Economic and Evaluation Service
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt-hour
Mt CO_2eq	Million tonnes carbon dioxide equivalent
NAF	National Adaptation Framework
NCCAF	National Climate Change Adaptation Framework
NESC	National Economic and Social Council
NMP	National Mitigation Plan
OECD	Organisation for Economic Co-operation and Development
PSO	Public Service Obligation
REFIT	Renewable Energy Feed-in Tariff (scheme)
RES	Renewable energy source
RES-E	Renewable energy source – electricity
RESS	Renewable Electricity Support Scheme
RES-T	Renewable energy source – transport
SEAI	Sustainable Energy Authority of Ireland
VRT	Vehicle registration tax

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL
Tá an Ghníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaol a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: *Déanaimid córais éifeachtacha rialaithe agus comhlíonta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.*

Eolas: *Soláthraímid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírithe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.*

Tacaíocht: *Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaol atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaol inbhuanaithe.*

Ár bhFreagrachtaí

Ceadúnú
Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaol:
- saoráidí dramhaíola *(m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola)*;
- gníomhaíochtaí tionsclaíocha ar scála mór *(m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta)*;
- an diantalmhaíocht *(m.sh. muca, éanlaith)*;
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe *(OGM)*;
- foinsí radaíochta ianúcháin *(m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha)*;
- áiseanna móra stórála peitril;
- scardadh dramhuisce;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil
- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhíriú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídíonn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

Bainistíocht Uisce
- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uiscí idirchriosacha agus cósta na hÉireann, agus screamhuiscí; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaol
- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil *(m.sh. tuairisciú tréimhsiúil ar staid Chomhshaol na hÉireann agus Tuarascálacha ar Tháscairí)*.

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn
- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis cheaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

Taighde agus Forbairt Comhshaoil
- Taighde comhshaoil a chistiú chun brúnna a shainaithint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta
- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaol in Éirinn *(m.sh. mórphleananna forbartha)*.

Cosaint Raideolaíoch
- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtadh mhuintir na hÉireann don radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas
- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaol ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaol *(m.sh. Timpeall an Tí, léarscáileanna radóin)*.
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosc agus a bhainistiú.

Múscailt Feasachta agus Athrú Iompraíochta
- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil
Tá an ghníomhaíocht á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:
- An Oifig um Inmharthanacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fianaise is Measúnú
- Oifig um Chosaint Radaíochta agus Monatóireachta Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

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Evaluating Ireland's Climate Policy Performance

Authors: Sabrina Dekker and Diarmuid Torney

Identify pressures

It is clear that, to date, Ireland's climate change policy response has not delivered sufficient progress. Despite a clear need for regular monitoring and review of national climate change policies, evaluation systems for climate policy based on both forecasts and actual results are underdeveloped. This has contributed to Ireland's inability to meet climate change goals.

Inform policy

The central objectives of the Irish Climate Policy Evaluation project were to construct a policy evaluation framework that builds on a standard EU evaluation framework and to undertake evaluations of climate change policies across all sectors using the framework, with a specific focus on key policies.

Develop solutions

Building on and extending existing frameworks, the project developed a results-based evaluation methodology that could be applied to other policy areas. The project also developed policy recommendations arising from evaluations of existing policies. These recommendations ought to be taken into account in developing future policies. Climate policymaking in Ireland would benefit from more systematic results-based analysis of policies in the future.

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