



**Rialtas na hÉireann**  
Government of Ireland

**Memorandum of Understanding**  
**between**  
**the Irish Climate Change Advisory Council**  
**and**  
**all relevant Government Departments and**  
**Agencies**

**May 2021**

## 1. Introduction

The Climate Change Advisory Council is an independent, statutory body established under the Climate Action and Low Carbon Development Act 2015. Its role includes reviewing national climate policy, progress on the achievement of the national transition objective and progress towards international targets. Additionally, the Council provides advice to Government on national policy relating to climate change.

Action 5 under the Climate Action Plan 2019 commits to commence the process of forming carbon budgets for 2021 to 2025, 2026 to 2030 and 2031 to 2035 ahead of a new Climate Action and Low Carbon Development (Amendment) Bill being enacted. This commitment is now included in Section 6 of the Climate Action and Low Carbon Development (Amendment) Bill 2021.

Under the Climate Action Plan 2019, the Council was given responsibility for developing recommendations on suitable approach for preparation of multi-annual carbon budgets to inform preparation of drafting of legislation. The Climate Change Advisory Council recommendations on carbon budgeting were submitted to the Minister for Communications, Climate Action and Environment on 5 December and subsequently published on the Council's website at <http://www.climatecouncil.ie/>.

In December 2019, the Council wrote to the Minister for Communications, Climate Action and the Environment in relation to the Carbon Budget process<sup>1</sup>. In this letter, the Council outlined the necessity for access to information.

*“The Council advises that it will not be able to develop carbon budgets unless sufficient resources are made available, including access to all relevant government data, modelling and analysis, and dedicated resources for the Council including staffing and budget. To avoid ambiguity, access to the necessary data, analyses, and models should be covered by a memorandum of understanding covering all relevant Departments and outside agencies. This memorandum will need to be in place before the Council can begin work on carbon budgets.”*

Scenario modelling is an absolutely necessary tool to develop carbon budgets. This adds to the existing need for access to modelling to inform the ongoing work of the Council. Therefore:

- In order to develop carbon budgets, the Council needs to model emissions scenarios;
- In order for the Department of the Environment, Climate and Communications (“the Department”) to fully understand the budgets developed by Council, the scenarios employed by the Council should, where appropriate, be built using shared modelling tools and common assumptions; and
- In order for the Council to fully understand the approach taken by the Department in adopting or adjusting carbon budgets or policies and

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<https://www.climatecouncil.ie/media/climatechangeadvisorycouncil/contentassets/documents/news/WEB%20letter%20of%20Advice%20to%20DCCAE%20on%20approaches%20to%20carbon%20budgets.pdf>

measures, the Department should share the analysis, i.e. the modelling inputs, outputs and scenarios and assumptions on which its work is based.

In summary, the Council needs a process that will:

- Give the Council access to the modelling tools employed by Government Departments and Agencies;
- Give the Council access to the common assumptions employed by the relevant Government Departments and Agencies in developing scenarios;
- Allow the Council, if it chooses to do so, to develop scenarios using the common modelling tools and assumptions of relevant Government Departments and Agencies and variations thereof;
- Allow relevant Government Departments and Agencies to access the scenarios (including input assumptions, output results and initial analysis) developed by the Council; and
- Allow the Council access to the scenarios (including input assumptions and output results) developed by the relevant Government Departments and Agencies.

In order to ensure analysis undertaken on Climate Budgets is transparent and consistent, it would seem appropriate that Government Departments and Agencies share data, modelling and analysis with the Council and the Department. This will allow for a level of administrative streamlining and the avoidance of duplication of effort.

In order to better facilitate their role, the Council requires access to all relevant data and modelling to allow the Council fulfil its role as established under the Climate Action (Amendment) Bill.

Relevant data and modelling includes those employed in the production of official greenhouse gas inventories and projections by the EPA, other forecasting or projections of greenhouse gas emissions, energy demand or supply, commercial activity levels, farming and land use activity levels and transport demand.

## **2. Purpose of this MoU**

The primary aims of the Memorandum of Understanding (MoU) are to:

- a. Support the CCAC in its work, in providing recommendations to government for more evidence-based climate policy making, and particularly regarding the formation of economy-wide carbon budgets as established in the Climate Action Plan 2019 and as signalled in the Climate Action (Amendment) Bill 2021;
- b. Support the Department in its work, advising the Minister in developing climate action plans, a national long term climate action strategy, sectoral

emissions ceilings, meeting EU climate reporting requirements and other related matters;

- c. Avoid ambiguity in providing access to the necessary government data, analyses, and models in all relevant Departments and agencies where appropriate;
- d. In turn, provide access to the underlying sectoral data, assumptions and models utilised by the CCAC, in particular noting if or when these differ from those utilised by the departments and agencies, in finalising recommendations for government regarding economy-wide carbon budgets; and
- e. Promote transparency that allows for the interrogation of climate decision-making processes and provides for an accountable and collaborative climate crisis approach.

This MoU is entered into by and between the Climate Change Advisory Council (the Council) and the Government Departments and State Agency Bodies listed in Appendix 1.

The provisions within this MoU are to be implemented without prejudice to requirements outlined in the Climate Action and Low Carbon Development Act 2015 and any amendments thereof. They are intended to complement and not replace the normal interactions between the Council and the Department.

### **3. Framework of engagement**

#### *3.1. Overview*

In order to robustly underpin the work of the Council, it is necessary for the Council and the Department to be familiar with, and understand, the work of each of the relevant Departments. It is necessary to have a collective understanding between the Government and the Council of the assumptions on which greenhouse gas emissions analysis or climate relevant policy analysis is based and to avoid unnecessary duplication of efforts and expenditure.

In order for the Departments to gain a full understanding of the budgets developed by the Council and those adopted by the Oireachtas and/or Government, it will be vital that all participants are transparent and share the assumptions and variables used, and output results.

### 3.2. *Assumptions Underpinning analysis*

The principle under the MoU is to ensure there is an open communication of key assumptions and their impact on the model outputs. However, it is not envisaged that a complete shared set of assumptions will be agreed upon. For example, the Council may adopt a different set of assumptions.

It is envisaged that the process would provide sufficient transparency to allow assumptions to be understood by all parties. If a shared range of common assumptions is agreed upon across Departments and the Council, this should be clearly and transparently set out, while also noting any key assumptions which cannot be agreed and setting out the reasons why.

Any remaining heterogeneity could reflect differences in underlying views or priorities and may ultimately enhance robustness of analysis undertaken by subjecting different assumptions to increased scrutiny.

### 3.3. *Sharing of Information*

A preliminary list of the current models used from which analysis will be shared as part of this Memorandum is provided at Appendix 2. It is acknowledged that it may not be appropriate for all analysis to be shared e.g. due to commercial sensitivity or GDPR. Where this analysis is not being shared, the parties to this MOU will undertake to list the analysis and the reasons why. Where specific analysis has informed the development or implementation of a significant policy instrument or objective, all parties note that there will be increased need to share the analysis. The Department of Finance's macroeconomic projections underpinning the budgetary processes are already made publicly available in the Stability Programme Update and Budgetary documentation. Further clarification can be facilitated following publication of these documents.

Where possible, efforts will be made to allow the models to interact with each other. In the event that this is not possible, any inconsistencies will be flagged.

Parties shall inform each other of new commissioning of research and technical analysis to ensure transparency and avoid duplication of effort where appropriate. It is noted that the Department and the Council have respective particular roles in forming cross-sectoral climate perspectives, and remain free to do so, including in cases where there may appear to be some duplication of effort with more specific sectoral analysis being undertaken by other Departments and Agencies.

Technical and/or research reports arising out of the work shall be shared between parties along with associated data where relevant.

Where appropriate, the Council may request that Departmental or contracted researchers present findings or other topics as requested by the Council in order to assist in its deliberations. Similarly, the Council may be invited to participate in meetings at Departmental level, at the request of either party. The Council may delegate such participation to the secretariat, a committee or a member at its

discretion. Government Departments should copy the Department when sharing information with the Council.

This framework excludes the sharing of the deliberations and considerations by the Council. This framework also excludes deliberations, considerations and further policy development by the relevant Departments or Agencies informed by the technical analysis.

#### *3.4. Timing*

In the year following the setting of the first set of carbon budgets, the Parties to this MoU undertake to agree appropriate timelines for development of scenarios, sharing of data, analysis and modelling to inform the second set of carbon budgets, in order to ensure that the Council is in a position to carry out its formal function in an effective and timely fashion.

### **4. Working arrangements**

#### *4.1. Liaison Officers*

The Council (through the Secretariat) and the Department will nominate a point of contact for the Department, to ensure that information, invitations, meetings and all correspondence is channelled through one person. Similarly, each Department will nominate a relevant liaison officer, and provide a point of contact.

#### *4.2. Publication*

As an overriding principle, in acknowledgement of the importance of transparency and making information publically available, parties to this MOU will make efforts to publish as much of the analysis as possible.

Where data or analysis that is shared but has not been published by the owner, written permission from the owner to disseminate or publish must be received in advance before doing so. Due consideration will be given to FOI, AIE and GDPR requirements.

#### *4.3. Council requesting new or additional work*

The Council is permitted the opportunity to request new or additional work from individual Departments, Agencies or contracted bodies, building on existing data, scenarios or assumptions, subject to the Council's own budgetary constraints, and/ or bespoke arrangements agreed with Departments or Agencies which provide the

Council access to modelling resources. Such requests may be accepted, declined or modified subject to the resource constraint of the member.

The Council (through the Secretariat) must provide sufficient advance notice to the relevant Department, Agency or contracting body when commissioning any such work and address any follow up requests for data clarification and/or technical specifications that do not compromise the independence of the Council. The Council will inform the Department and all liaison officers of any such work being undertaken.

If appropriate, and agreed between parties, separate Terms of Reference (in line with principles for sharing information above) for each model will set out the working practices (including access privileges) which all relevant parties will have to adhere to.

It is acknowledged that all parties will continue to commission their own independent analytical research as required. Parties are requested to share information with regards to research in the spirit of this MoU, while respecting the independence of all parties.

#### *4.4. Resolution of issues*

Should a further clarification be required or a disagreement in approach be identified with no immediate resolution, the Chair of the Council and the relevant Departmental representative(s) will meet to resolve the issue.

### **5. Duration and Review**

This MoU will be published on the website of the relevant Departments and the Council's website.

This MoU will take effect from the day on which it is signed by all the parties. This MoU will be reviewed after its first year of enactment. Following this, prospect for review remains at least once every five years (to complement the period in office of each Council), or at the request of one of the parties. Outside of this timeframe, further amendments can be considered at the request of one of the parties and can be amended with the agreement of all the parties.

Should a Department or Agency wish to become a Party to this MoU a request in writing must be submitted/provided to the Secretary General of the Department of the Environment, Climate and Communications, specifying agreement to terms of the MoU.

Should any party wish to terminate this MoU, a notice in writing must be submitted Secretary General of the Department of Environment, Climate and Communications providing a minimum of three months' notice to terminate.

Signed,

*Secretaries General of Relevant Departments (also on behalf of agencies) and Chair of the CCAC:*



Mark Griffin,  
Secretary General of the Department of Environment, Climate and Communications



Dr Orlaigh Quinn,  
Secretary General of the Department of Enterprise, Trade and Employment



Brendan Gleeson,  
Secretary General of the Department of Agriculture, Food and the Marine



Derek Moran,  
Secretary General of the Department of Finance



Graham Doyle,  
Secretary General of the Department of Housing, Local Government and Heritage



David Moloney,  
Acting Secretary General of the Department of Public Expenditure and Reform



Ken Spratt,  
Secretary General of the Department of Transport



Marie Donnelly,  
Chair of the Climate Change Advisory Council



**Parties to this Memorandum of Understanding**

As provided for in Section 5, parties to this Memorandum may be added as required.

<b>Department</b>	<b>Agencies</b>
Department of Agriculture, Food and the Marine	Teagasc
Department of Environment, Climate and Communications	SEAI, EPA <u>Under contract as of March 2021:</u> EnvEcon, ESRI, UCC, UCD
	Climate Change Advisory Council
Department of Transport	NTA TII
Department of Housing, Local Government and Heritage	
	ESRI
Department of Enterprise, Trade and Employment	
Department of Finance	
Department of Public Expenditure and Reform	

### Overview of EPA's GHG projections work

The list of models and modelling groups subject to the MoU will be reviewed regularly, with flexibility inherent in the MoU to add other necessary and relevant models as they emerge.

Outlined below is an overview of the models currently used by the EPA in preparing the Green House Gas Projections Work.

Models used to produce the energy projections that underpin the majority of the EPA's energy related emissions projections include:

- COre Structural MOdel of the Irish economy (COSMO)
- Ireland Environment, Energy and Economy model (I3E)
- PLEXOS Integrated Energy Model
- Sustainable Energy Authority of Ireland Energy Scenario Tool
- Sustainable Energy Authority of Ireland Bioenergy and Heat Economic Analysis Tool

The following is the model used to produce the agriculture activity projections that underpin the majority of the EPA's agriculture emissions projections:

- FAPRI Ireland Model

### Overview of SEAI's Models

SEAI's National Energy Modelling Framework (NEMF) is a full national energy-economy model that assesses the impacts of packages of energy policies and measures (PaMs) on energy supply and demand. It combines several SEAI sectoral energy models with data from ESRI's macroeconomic CSOMO/I3E model to produce outlooks for the whole energy system based on packages of sustainable energy policies and measures.

Modules included within the NEMF:

- Energy Scenario Tool
- Bioenergy and Heat Economic Analysis Tool
- Transport Energy Tool
- Electricity systems model (based in PLEXOS)
- Energy Efficiency model
- An infrastructure module (under development)
- A CBA module (under development)

## **Overview of models by Parties providing modelling services to DECC**

*Note – DECC holds contracts for set periods with the following Parties. It will be important to ensure contractual arrangements can be respected and that overburdening of a limited resource is avoided.*

### ***EnvEcon Decision Support***

#### GAINS Ireland - Air and Climate Modelling

Given other modelling capacities in Ireland that are more focused on climate emissions alone, the GAINS Ireland model is primarily used to explore variants of the official national baseline scenario (as above) to explore the corresponding impacts on both air and climate emissions. This can be done with the focus on a single defined sector, or as a multi-sectoral analysis. The model is recognised internationally by key stakeholders such as the European Commission, and as such the alternative scenarios developed in this manner with GAINS Ireland can be used to support ongoing compliance discussions (e.g. back on track reporting) year to year with the Commission in regard to our major air (NECD) and climate targets (ESD/ESR).

#### FLEET Ireland- Road Transport Sector Modelling

The model is principally concerned with fleet structure change and activity (i.e. fuel use) changes in the road transport sector. It can be utilised to assess in a structured and systematic way a variety of scenarios relating to fleet structure change and vehicle activity change. This would include:

- Alternative electric or hybrid vehicle penetration rates.
- Changes in mileage averages for specific classes of vehicles.
- Emissions associated with either test cycle or real-world driving cycles.
- Revisions to speed limits on specific classes of road.
- Well to wheel assessments of emissions.
- Impact of early scrappage schemes.
- Biofuel shares in the fuel mix.

#### Spatial Analytics Methodology - Energy Poverty Risk

EnvEcon have an in-house spatial analytics methodology focused on the identification and dynamic assessment of energy poverty risk in Ireland.

#### Spatial Analytics Methodology - Working From Anywhere

EnvEcon are finalising an in-house spatial analytics methodology focused on the preference and feasibility for working from anywhere in Ireland.

## **ESRI: I3E MODEL**

Given the level of detail in the I3E model, based on the economic agents defined in the model, detailed **outputs** can be provided for all analysis, for instance:

- a) **Macroeconomic** (not exhaustive): real gross domestic product, trade balance and debt-stock, total capital stock, total investment, total domestic demand, total gross value-added, government revenues and expenditures, and income distribution indicators (income disparity within and between urban and rural areas).
- b) **Environmental**: CO<sub>2</sub> emissions (distinguished by total, total ETS and total non-ETS) and Air pollutants (e.g. ppms, SO<sub>2</sub> with 16 in total).
- c) **Sector** level for 32 production sectors: production, labour demand (by types of labour), investment, capital stock, intermediate input demand by commodities, profits, emissions (distinguished by total, ETS, and non-ETS), the cost of ETS, tax payments to the government (production tax).
- d) **Household** level for ten RHGs: real disposable income and its sub-items, consumption per commodities, savings, emissions (in the distinction of total and residential).
- e) **Commodity** level for 39 goods and services: exports, imports, total domestic demand and its sub-components, tax payments to the government (sales tax, carbon tax, export tax).
- f) **Enterprise** level: total sectoral profits, the total distributed dividends, corporate tax payments to the government.
- g) By **labour** type (low, middle, high skilled): total wage income, wage rate, unemployment, immigration, wage income tax payments to the government.

## **UCC**

### TIMES

The TIMES-Ireland Model (TIM) produces energy system pathways for energy supply and demand in Ireland consistent with either a carbon budget or a decarbonisation target.

TIM is the successor model to the Irish TIMES Model, which since 2010 has played a significant role in informing the evidence base of Irish climate target setting. TIM scenarios will explore future energy systems pathways for Ireland and generate least cost technology roadmaps to compare a range of national ambitions for energy efficiency, renewable energy and GHG (and transboundary gas) emissions reduction. It will facilitate exploration of pathways to reduce emissions by 7% p.a. for the period 2020-2030. It will also facilitate analysis of different carbon budget pathways. The focus will be on 2020, 2030 and 2050 and the results will be delivered to CAMG to use them in informing national policy decisions and Ireland's negotiating position with the European Commission.

## LEAP

The LEAP Ireland model is a simulation based model that includes all emission-generating sectors of the economy, i.e. energy (electricity, transport, services, residential & industry), agriculture, industry process emissions, and waste.

## PLEXOS

PLEXOS is a power system software used in UCC to model future energy systems. The PLEXOS model takes projections for annual power system capacity, annual electricity demand.

## **UCD**

### EMPowerER Models

UCD EMPowerER is a set of models of deep electrification of transport and heat sectors. It consists of three interacting modelling approaches:

- Agent-based microsimulations of technology uptake. These models are calibrated to Irish survey and historical data, and include the economic, social and risk-aversion (barrier) effects that influence individual consumer decisions.
- AC powerflow models of new load and distributed energy resource impacts on the distribution network, focusing on voltage stability constraints.
- Unit commitment simulation of the operation of the future power generation systems with high RES-E (using VTT/UCD *Backbone*), to obtain marginal costs and emissions.
- Mutual dependencies and feedbacks between the above.

### **D/HLGH Models**

Population and housing modelling carried out by ESRI on behalf of the Department should be considered and it may be useful to carry out TIMES and GAINS modelling runs using this work as input. Past runs of the TIMES model were informed by ESRI COSMO and HERMES model runs.

The outputs from the ESRI work include:

- a) Population by year of age
- b) Numbers of households by age of household reference person
- c) Required numbers of new dwellings arising from (a) and (b) and accounting for dwelling obsolescence
- d) House price and income projections

In respect of the first three these are available at county or local authority levels and the last ones on a more national basis.

There are four scenarios – a baseline, 50:50 city scenario, high migration and low migration. These might be particularly important in context of future transport, power generation and residential emissions modelling and there are other models which enable a lower level of granularity than TIMES and GAINS which tend to be national rather than regional.

### **DETE – Relevant Modelling & Analysis**

The Department of Enterprise, Trade and Employment commissioned an analysis with the objective of creating a potential suite of solutions at the operational level that are practicable for implementation in the Irish industrial environment and could contribute significantly to delivering national abatement targets. The scope of the project is confined to thermal energy (heating from manufacturing processes). DETE would be in a position to share this relevant analysis and modelling with the CCAC, including:

1. The model which outlines the technologies operational at a plant level;
2. The Report which outlines the findings of the analysis

### **Overview of NTA Models**

The NTA Regional Modelling System (RMS) provides a consistent framework for transport assessment and appraisal nationally.

The RMS has a hierarchical structure with three main components. These are the National Demand Forecasting Model (NDFM), the five Regional Multi-modal Models (RMMS) and the Appraisal Modules.

The NDFM produces 24-hour average weekday person demand split into 7 primary journey purposes, inter-urban travel, airport and port passenger travel and regional Heavy Goods Vehicle (HGV) travel. The NDFM uses detailed planning forecasts prepared at a Census Small Area (CSA) level (18,000) covering in excess of 100 variables to estimate travel demand. The NTA maintains an agreed set of forecasts base on the NPF for use in scheme assessments. The NDFM also estimates Car Ownership at a national level and Car Competition and Availability by trip purpose at a CSA level.

The RMMS are strategic multi-modal, network-based transport models that include all the main surface modes of travel. They are centred on the five main cities of Dublin, Cork, Galway, Limerick, and Waterford and cover the entire country in considerable detail. They estimate the mode, destination and route choice of the demand produced by the NDFM in response to changes in service provision (routes), infrastructure changes (new roads, traffic management (bus lanes, turn restrictions, signal etc.), cost changes (fares, toll, parking charges etc.) and travel time. The impact of parking

availability on travel choices is also included. The RMMS process 24-hour average weekday travel demand for 33 different journey purposes splitting it over 5 time periods. The models include all scheduled public transport services and infrastructure in Ireland. There is a detailed representation of the road network across the country with enhanced detail in the cities including signal times and phases, lane allocations, PT priority, traffic management restrictions etc.

The Appraisal Modules are a full suite of appraisal tools in line with national guidance for the transport sector provided by the Common Appraisal Framework (CAF). They interact with the RMMS to extract the necessary data required to appraise schemes, policies and strategies. They produce outputs for Economic (TUBA), Environment (Copert), Health (HEAT), Safety (COBALT) and Accessibility appraisals.

## **Overview of TII Model**

Transport Infrastructure Ireland (TII) has developed and maintained the TII National Transport Model (NTpM) over the last decade to support its strategic management of and planning for the national road network. The model contains information on the current and future national road networks and the traffic carried on those networks. It contains information on travel for a number of trip types between over 1,100 zones, including principal ports and airports. It contains information on the volume of light and heavy vehicles, and the speed at which they travel, for all links on the road networks. The model also represents inter-urban public transport travel on the heavy rail network and on regional bus services.

A base-year version of the model is developed from multiple data sources including CSO census information and TII's extensive network of roadside automatic traffic counters. The model is updated annually which gives insight into changes in annual vehicle kilometres of travel on a local and national basis for light and heavy vehicles. The future year model has similar outputs with the underlying travel demand based on population and employment forecasts from Project Ireland 2040's National Planning Framework. The NTpM also facilitates modelling of variable demand through incorporation of strategic national rail and bus models and the NTpM can be used to understand likely user response, in terms of changes to the number of trips, trip destination and transport mode, to changes in the cost of travel.

In order to improve its understanding of greenhouse and non-greenhouse gas emissions associated with vehicle travel on the national road network, in late 2020 TII commenced work on a new emissions modelling component of its NTpM. This involves development of a current and future year national fleet model, based on fleet classification, age and fleet projection information provided by other Irish public bodies, and emission rates from EU (COPERT) and UK (EFT) sources. TII is targeting completion of the core emissions module by mid-2021.

The addition of this fleet emissions module will facilitate an understanding of the emissions associated with changes in key high-level variables including the physical road network, road network speed limits, population and employment distributions, vehicle ownership, travel cost and changes to the vehicle fleet.

Further technical information around the model development can be found at <https://www.tii.ie/tii-library/strategic-planning/>.

In addition to assessing greenhouse gas emissions from vehicle travel on the network, TII developed its own country-specific carbon assessment calculation tool in 2018 to undertake carbon proofing of major projects. TII conducted a review on existing tools across EU member states and concluded that a bespoke tool was essential to accommodate TII objectives in relation to linear infrastructural development.

The devised tool is used for assessing both “embodied” and “operational carbon” and is required for all future national road and light rail projects.