



Climate Change Advisory Council

Carbon Budgets Modelling Workshop Report

Summary

The Climate Change Advisory Council convened an online workshop on the 18th of October 2022. It was designed to provide an opportunity for experts and interested parties to discuss experience from the 1st Carbon Budgets Programme in 2021, and to facilitate conversations about planning the analytical process for the 2nd Carbon Budgets Programme to inform the Council's development of a final proposal for Carbon Budget 3 (CB3: 2031 – 2035) and a provisional proposal for the Carbon Budget 4 (CB4: 2036 – 2040), which will be due for submission to the Minister of Environment Climate and Communications by Q4 2024.

The aim of this workshop was to inform the work of the Council and provide insights on the evidence required and analytical tools available for the 2nd Carbon Budgets Programme. The objectives of this workshop were as follows;

1. Consider and review the evidence required and the analytical tools available for the 2nd Carbon Budget Programme;
2. Build capacity and knowledge in relation to a macroeconomic assessment of the impacts of the transition, and;
3. Provide a forum to discuss integration, networking and/or looser 'coupling' of models with relevant stakeholders.

This is a report of the workshop prepared by the Secretariat for the information of the Climate Change Advisory Council. It does not necessarily reflect the views of the Council.

The 60+ registered attendees included members of the Climate Change Advisory Council, Secretariat and previous Carbon Budgets Committee, Liaison Officers under the MoU¹ between the Council and Government Departments and Agencies, members of the Department of the Taoiseach's Research and Modelling Group, policy makers, representatives of key departments and of other relevant organisations, communities and researchers. The workshop agenda are provided in the Appendix and presentations are published on the website with this report.

Overview of Session 1 Panel Discussion and Presentations

Marie Donnelly, Chair of the Climate Change Advisory Council, opened the workshop by setting the scene in terms of the Council's role in the carbon budget process and how the work of the Council fits into the wider policy landscape. The Chair noted the timeliness off the

¹ [Memorandum of Understanding between the Irish Climate Change Advisory Council and all relevant Government Departments and Agencies](#)

workshop given the ongoing work with regards to the planning for the next carbon budgets programme, which will be due at the end of 2024.

Meabh Gallagher and Gina Kelly, Scientific Officers with the Council's Secretariat, presented an overview of the agenda and objectives for the workshop along with presenting a high level workplan for the 2nd Carbon Budgets Programme. Two icebreaker questions were posed to the workshop participants with participant's responses summarised below;

Question 1: What do you expect or want to get out of this workshop?

- An overview of the process and timeline for development of the next carbon budgets.
- Major issues to address, the evidence being considered and opportunities for input.
- Resources required to deliver the 2nd Carbon Budget Programme.

Question 2: If you had to summarise in one line, what are the most important inputs to carbon budgets?

- Combinations of emissions reductions and activity changes compatible with national carbon budgets.
- People with the necessary capacity, mandate, resources etc.
- Actual emissions against the first two budgets and the global trajectory of climate disruption.
- Interaction between carbon budgets and the socio-economy (as distinct from the macro-economy).
- Clear communications on the assumptions that underpin and specific actions required.

Dr. Cara Augustenborg, Prof. John FitzGerald, Prof. Peter Thorne and Patricia King, members of the Climate Change Advisory Council participated in a panel discussion that was moderated by **Marie Donnelly**, Chair of the Climate Change Advisory Council.

Patricia King noted the additional time available for the 2nd Carbon Budgets Programme and the opportunity to review areas for improvement and stressed the importance and value of using simple and accessible language when communicating. When questioned about the key modelling developments he would like to see, John Fitzgerald pointed to the additional time available to test modelling assumptions and noted the need to examine the coherence of carbon budgets for the macro economy. Cara Augustenborg spoke about the importance of transparency and clarity when communicating to not only the Council and Committee, but also to the public, as well as the need for more information on how we are meeting our Paris and climate justice commitments. Peter Thorne touched on scientific developments noting that uncertainties in Agriculture, Forest and Other Land Use emissions was the biggest challenge and that use of the GWP₁₀₀ metric will become more problematic as we go to net zero. Marie Donnelly moderated the panel discussion noting the diversity of the discussion at Council level and closed by looking forward to collaborating with Council members as they look for an outcome to the next carbon budget. A number of questions from workshop participants were also discussed.

The first invited speaker, **Paul Price**, Carbon Budget Fellow at Dublin City University, discussed potential improvements to the Paris Test for Ireland's second Carbon Budgeting programme. Paul explained the implications of choices with regards to setting a reference year. He pointed to potential refinements to the Council's 2021 Paris Test quantification with regards to the GWP* GHG metric, alignment with national GHG scenarios using CO₂ + N₂O + CH₄ and International Aviation and Shipping, noting that different choices resulted in only one or none of the 2021 scenarios passing the revised Paris Test and that methane mitigation is crucial to limit overshoot and reduce reliance on CO₂ removal.

The second invited speaker was **Andrew Smith**, Carbon Budget Fellow at University College Cork, who presented on recent TIMES-Ireland Model (TIM) developments. He discussed the

questions that TIM both can and cannot yet inform in the short term along with how the modelling team developed long-term scenarios and interacted with the Council's carbon budgeting process. Andrew pointed to the need to build capacity and incentivise collaboration with long term funding, noting the high uncertainty for researchers in the area and the expected decrease in current capacity within the TIM modelling team.

The third invited speaker, **Emma Lynch** of the Sustainable Energy Authority of Ireland, centred her talk on the SEAI's National Energy Modelling Framework (NEMF) and maximizing modelling impact in a carbon budget context. The cycle of innovation in NEMF development, NEMF applications, latest statistics and key insights were discussed.

The fourth and final invited speaker was **Kelly de Bruin** of the Economic and Social Research Institute who discussed the I3E Model and a broader economic assessment of the Carbon budgets. Kelly provided an overview of the I3E model and the development of a linkage to the TIM model as well as noting the cooperation with Department of Environment, Climate and Communications Climate Action Modelling Group as well as the Department of Taoiseach's Modelling Group subgroup on macro-economic modelling.

Summary of Breakout Group Discussions

The first breakout group discussion was focused on the sequencing of the programme of work for carbon budgets. The aim of the discussion was to consider the various elements mandated under the Act and Regulations, a review of the process to meet these requirements for the 1st programme of Carbon Budgets, the tools and approaches that should be used to assess each of these criteria for the 2nd Carbon Budget Programme and a mapping out of that process in terms of sequencing.

The second breakout group discussion was focused on model integration / coupling and the aim of the discussion was to consider the modelling carried out for the 1st Carbon Budget Programme, the development of common assumptions and scenarios in order to understand comparable model outputs where feasible, identification of practical next steps and areas for research and identification of steps to build capacity in this area.

Registered attendees were assigned to five breakout groups and background information packs for Breakout group discussions 1 and 2 were circulated to attendees in advance for review in preparation for the discussions. **Gina Kelly** presented a brief introduction to the two breakout discussions comprising Session 2 of the carbon budgets modelling workshop, which were facilitated by members of the Secretariat.

Key points raised during the breakout group discussions included the following:

- **Need for planning and use of time available for development of carbon budget programme.** It was remarked that the additional time for the second programme will allow us to can look into things we didn't have sufficient time for the last time round, such as macroeconomic analysis and the interactions between sectors. It was suggested to engage more closely with sectoral experts on what the carbon budgets mean on the ground. The importance of communicating the carbon budgets and their implications to local bodies and the public was raised. It was suggested that a broader approach is needed to avoid looking at sectoral impacts in isolation along with a greater focus on societal welfare.
- **Importance of the Paris Test.** The importance of sensitivity analysis for the various assumptions underpinning a Paris Test and the feasibility of different options was raised. The implications of the Paris Test for current and future carbon budgets was explored along with the timing of the Paris Test within the sequence of work for carbon budgets. It was suggested that the Paris Test should be conducted as early as possible

in the process so as to inform subsequent considerations for carbon budget proposals. The ability to report on Ireland's performance with regards to the Paris Test along with indicators of Ireland's progress towards emissions targets on a monthly basis was noted as a potential useful communication to the public.

- **Importance of National Climate Objective, EU developments and how these can be considered.** The implications of the National Climate objective and the EU Fit for 55 package were discussed. A recurring theme was the need for the earliest possible certainty around new National and EU targets, which will inform the modelling required. It was emphasised that the sequencing of the National Climate Action Plan and Carbon Budgets together needs to be considered carefully.
- **The use of EPA inventories and projections.** It was noted that progress on draft emissions inventories and earlier publication of projections is very useful to the carbon budget process, particularly for CB3 (2031 – 2035) when projections of progress against carbon budgets and the pathway to 2050 become more important. The sequencing of National Climate Action Plan updates and the incorporation of measures into the EPA projections were discussed, noting the importance of unallocated measures and how they inform carbon budget deliberations. The timeline for forestry development was discussed in the context of extending projections out to 2050, which may be challenging for the EPA.
- **Need to maximise employment.** It was noted that an assessment of employment effects of the carbon budgets should be improved and that a broader approach for economic analysis should be considered for the next programme. It was noted that TIM can model investment costs and be supportive of the question of how to maximise employment, but not necessarily answer that question. The question strongly relates to policy design and how we allocate resources across society and account for both direct and non-direct impacts on jobs. It was remarked that engineering scenarios are least cost focused and that we need to maximise the assessment of societal and distributional impacts.
- **Macro-economic and socioeconomic modelling of deep decarbonisation pathways.** The linking up of different models was identified as crucial to this assessment, with access to COSMO in addition to I3E noted as being potentially useful in this context. The discussions reflected that while economic factors are important, it was also important not to lose sight of wider societal well-being factors. The need to look at carbon budget proposals from a broader socioeconomic perspective, rather than just focusing on employment and investment impacts was raised. It was suggested that multiple economic models are needed to look beyond technological solutions and at wider societal impacts. The Dept. of Taoiseach's modelling group efforts to try and link up NEMF and TIM models to look at National Climate Action Plan measures along with COSMO and I3E were noted as having potential to feed into the carbon budgeting process.
- **Long term capacity building of modelling and broader expertise.** The need for long term and permanent funding for the continual development and resourcing of existing models was raised in many of the discussions. It was noted that research calls often focus on new model applications rather than maintaining existing modelling capacity. The need for coordination of structured collaboration and linking of existing models through shared assumptions was acknowledged as key. It was noted that the DECC Climate Action Modelling Group may provide a framework for collaboration between models that could feed into the carbon budget process. It was proposed that it is not possible (or wise) to attempt to build a fully integrated model but that a shared understanding of the input assumptions is critical, even where the different modelling

groups may choose to diverge from the “agreed” assumptions in order to answer a diverse range of questions. Provided there is full disclosure of the inputs, insights and comparisons can be valid. Early, and regular engagement of the modelling groups will be necessary to ensure an emergent, coherent narrative underpinning the carbon budgets.

Conclusion and Next Steps

Meabh Gallagher thanked workshop participants for their engagement and useful insights, noting the consistency of message around the need for long term investment in modelling capacity. Next steps were outlined, including the publication of the presentations and a post workshop report on the website as well as the establishment of a Carbon budgets Working Group. **Marie Donnelly** closed the workshop by thanking everyone for their participation and outlining that the Council will now take on board the discussions from the workshop in their development of a process and programme of work to develop the 2nd Carbon Budgets Programme.

The output from this workshop will be incorporated into a methodology and work programme for the 2nd Carbon Budgets Programme, which will draw on experience from the 1st Carbon Budgets Programme in 2021 to plan the analytical process of developing a final proposal for Carbon Budget 3 (2031 – 2035) and a provisional proposal for the Carbon Budget 4 (2036 – 2040).

Appendix 1: Carbon budgets Modelling Workshop Session 1 Agenda

Carbon Budgets Modelling Workshop Session 1 Agenda		
<p>Date: 18th October 2022 Time: 09:00 – 11:15 Venue: Online Event via Zoom</p>		
Session 1		
Time	Agenda Item	Description
08:45	Meeting Open	
09:00 – 9:10	<p>Welcome and Opening Remarks Climate Change Advisory Council Chair Marie Donnelly</p>	Opening Remarks
9:10 – 9:20	<p>Introduction Workshop Objectives, agenda, setting the scene</p> <p>Meabh Gallagher & Gina Kelly, Climate Change Advisory Council Secretariat</p> <p>Icebreaker Questions</p> <p>Question 1: What do you expect or want to get out of this workshop?</p> <p>Question 2: If you had to summarise in one line, what are the most important inputs to carbon budgets?</p>	5 min Presentation & 5 min Activity
9:20 – 9:50	<p>Climate Change Advisory Council Panel Discussion</p> <p>Carbon Budgets 1 & 2 and looking ahead to Carbon Budgets 3 & 4</p> <p>Panellists: Dr Cara Augustenborg, Professor John Fitzgerald, Professor Peter Thorne, Patricia King</p> <p>Moderator: Marie Donnelly</p>	30 min Panel Discussion
9:50 – 10.05	<p>Refining the "Paris Test" for Ireland's second Carbon Budgets Programme</p> <p>Paul Price, Carbon Budget Fellow DCU</p>	10 min Presentation 5 min Q&A

10:05 – 10:20	<p>TIM, time and tide wait for no one: long-term modelling in an environment of constant flux</p> <p>Andrew Smith, Carbon Budget Fellow UCC</p>	<p>10 min Presentation 5 min Q&A</p>
10:20 – 10:30	Coffee Break	
10:30 – 10:45	<p>SEAI National Energy Modelling Framework and Carbon Budgets</p> <p>Emma Lynch, Sustainable Energy Authority of Ireland</p>	<p>10 min Presentation 5 min Q&A</p>
10:45 – 11:00	<p>Macroeconomic Analysis & ESRI I3E Model Development</p> <p>Kelly de Bruin, Economic and Social Research Institute</p>	<p>10 min Presentation 5 min Q&A</p>
11:00-11:15	<p>Closing Summary for Session 1</p> <p>Meabh Gallagher & Gina Kelly, Climate Change Advisory Council Secretariat</p> <p>Marie Donnelly Climate Change Advisory Council Chair</p>	<p>5-10 min presentation</p> <p>5 min Closing Remarks</p>
11:15 –11:45	Break between Session 1 and Session 2	

Appendix 2: Carbon Budgets Modelling Workshop Session 2 Agenda

Carbon Budgets Modelling Workshop Session 2 Agenda		
Date: 18th October 2022 Time: 11:45– 13:35 Venue: Online Event via Zoom		
Session 2		
Time	Agenda Item	Description
11:45-12:00	Introduction to objectives and operation of Breakout Session 1 & 2 Meabh Gallagher & Gina Kelly, Climate Change Advisory Council Secretariat	15 min
12:00 – 12:45	Breakout Session 1: Sequencing of programme of work for carbon budgets Exploration of each of the elements mandated under the Act for consideration in terms of tools to be used and process mapping for the next programme of carbon budgets. <i>Presentation from each breakout group's rapporteur</i>	Breakout Groups 20 mins, Plenary report 5 mins per group c.a. 45 mins
12:45 – 13:30	Breakout Session 2: Model Integration / Coupling Exploration of integration, networking and/or looser 'coupling' of models. <i>Presentation from each breakout group's rapporteur</i>	Breakout Groups 20 mins, Plenary report 5 mins per group c.a. 45 mins
13:30	Operational Wrap Up Climate Change Advisory Council Secretariat	5 min
13:35	Meeting close	