



## Climate Change Advisory Council Meeting –Carbon Budgets Working Group

### Meeting 9

#### APPROVED MINUTES

**Date:** 15<sup>th</sup> December 2023

**Start time:** 13:30

**Venue:** EPA officers, Clonskeagh and Video Conference Meeting

**Present:** In person: Hannah Daly. On MS Teams: Emma Lynch, Yvonne Buckley, Kevin Hanrahan, James Murphy, David Styles, Jeanne Moore, Trevor Donnellan, Oliver Geden, Kian Mintz-Woo, Stephen Treacy, Mert Yakut, Niall McInerney

**Apologies:**

**Observers:** In person: John Fitzgerald. Online: Jillian Mahon

**Secretariat:** In person: George Hussey, Gina Kelly, Meabh Gallagher, Kieran Craven; Phillip O'Brien, Claire Camilleri. Online: Jodie Colgan

**External presenters:** Online: Frank McGovern (EPA), Vahid Aryanpur (UCC), Bakytzhan Suleimenov (UCC)

## 1. Opening of meeting

### 1.1. Adoption of Agenda

The agenda was adopted by the Carbon Budgets Working Group (CBWG).

### 1.2. Minutes for the Carbon Budgets Working Group Meeting

The minutes from the previous meeting were accepted by the CBWG.

### **1.3 Actions**

Action 9 was proposed closed by the Secretariat, but CB WG members are still welcomed to provide suggestions for additional thematic topics on an *ad hoc* basis. Feedback on inputs required for macroeconomic analysis has been received in relation to Action 10, and it was proposed by the Secretariat to close this action. Inputs to macroeconomic analysis will be returned to in the January meeting. There were no objections to the proposals for closing the actions.

## **2. COP28 – Global Stocktake**

Frank McGovern from the EPA gave a presentation on the outcome of the UNFCCC global stocktake at COP28. The background to the stocktake was presented with a focus on Paris Agreement, with temperature goal, resilience, and financial flows along with the two-phase stocktake process comprising of the initial technical information gathering, and following political phase. The overall stocktake outcome is that while progress has been made, and the 1.5 degrees target remains, parties are not on track to achieving the purpose of the Paris Agreement. COP28 agreements include tripling renewable energy by 2030, transitioning away from fossil fuels, and phasing out fossil fuel subsidies. The outcome was noted as being positive for the inclusion of fossil fuels within the negotiated agreement.

Following the presentation discussions included the scope for interpretation of “energy systems” in the agreement text as including all energy, and the importance of the language to capture the diversity of parties’ development points. The role of a Just Transition in fossil fuel subsidies was raised along with the ability to remain within 1.5 degrees and role of negative emission technologies in temperature stabilisation. The challenge for Ireland to transition away from fossil energy was outlined. Procedural elements of the COP process were discussed, with the positive impact of early agreement on some major points, and contributions from smaller states. The work programme on just transition, and Ireland’s contribution was raised, with potential and importance of mobilising innovative climate financing. The high level steps for the next Nationally Determined Contributions were outlined.

## **3. Presentation of the 1<sup>st</sup> iteration of Core Modelling Results**

Presentations were made from the three institutions that conducted the first iteration of modelling for the Carbon Budget Programme using the three core models.

Kevin Hanrahan from Teagasc presented on results from their FAPRI model and MACC analysis. The first iteration conducted was similar to the annual projections made by Teagasc for EPA emissions projections consisting of three scenarios: base case, low activity and high activity. Model variables were outlined including: agricultural activity levels, input and output prices, commodity supply and use balances, and economic accounts for agriculture. Two alternative adoption pathways were also included, consisting of ambitious and very ambitious implementation of MACC mitigation measures.

The initial results indicate Carbon Budgets 1 & 2 would not be met without implementation of mitigations measures. Based on the modelling, carbon budgets will only be met in both the

base case and low activity scenarios with very ambitious pathway implemented. At high activity levels, the carbon budgets will not be met regardless of MACC mitigation measures and their rate of adoption. The importance of early implementation of MACC measures and additional measures to remain within existing carbon budgets was outlined.

Key uncertainties were stated, including use of chemical fertilisers and their dependence on gas price, and farming practices. Remaining uncertainties include refining base scenarios, macroeconomic projections, gas projections, and global agricultural commodity markets. The similarity of the modelling to the 2023 MACC analysis was noted with recent initiation of additional preliminary modelling out to 2050 by Teagasc was raised to the CB WG. The challenges the sector will likely face in meeting net zero emissions by 2050 was stated.

David Styles from University of Galway presented on results of the GOBLIN model with scenarios modelled towards 2050. Model inputs and outputs were outlined for agriculture; including herd variables, grass utilisation rate, crop production and land use. The impacts of water table management, anaerobic digestion and forestry were noted. Mitigation measures were excluded from analysis due to high associated uncertainties, including Carbon Capture and Storage. Over 25 scenarios were run, with some main differences including changes to animal numbers and forestry.

Initial results include the importance of afforestation for balancing GHG emissions. The difficulty of achieving net zero AFOLU GHG emissions (based on GWP<sub>100</sub>) by 2050 without significant animal number reductions was outlined, even with the inclusion of extremely ambitious land use and forestry changes, with very high afforestation rates and water table management required to reach net zero. It was noted that anaerobic digestion does not generate a net CO<sub>2</sub> sink, with limited GHG mitigation in energy sector and significant NH<sub>3</sub> pollution risks. The requirement for longer term modelling out towards 2100 for the agriculture sector was noted to better observe the impacts of carbon sinks.

Hannah Daly and Vahid Aryanpur from UCC presented on results from the Times Ireland Model focussing on energy systems. Two IPCC Working group 3 global carbon budgets, were downscaled to Ireland: 400Mt CO<sub>2</sub>eq, 300 Mt scenario. Two energy demand projections (Business as Usual [BaU] and low energy demand [LED]) were modelled for each carbon budget, providing four primary model scenarios. Supply side and demand side variables are prescribed with constraints for the model which finds the lowest cost for meeting these demands.

Initial results indicate that to remain within a 400 Mt CO<sub>2</sub>eq budget for the BaU scenario, full decarbonisation of energy by 2040 is required with electricity decarbonisation in early 2030s and deployment of carbon dioxide removal (CDR) techniques. The LED scenario remains within carbon budgets without the requirement of CDR. Neither scenario remains within a 300 Mt carbon budget. In all scenarios, higher overshoot requires increased CDR.

Model scenarios require different levels of investment, timing of monetary and non-monetary benefits of energy transition. Overshoot of SECs creates risks for stranded assets and/or carbon lock in. It was outlined there is a significant gap between current policies and what is required to remain within either the 300 Mt or 400 Mt budgets, with no remaining budget for additional fossil fuel combustion and CDR required to offset early overshoot of GHG

emissions, with significant risk and trade-offs. Next steps for modelling include: refining carbon budget scenario; planned model developments (industrial heat, bioenergy, DACs, key costs, international aviation & shipping); peer-review and consultation on the model process. The link to model data was shared: <https://epmg.netlify.app/TIM-Carbon-Budget-2023/results/overview/emissions-and-cost> .

Following presentations, discussions were had on all three model results. The possibility for Council to provide guidelines on carbon budget constraints and objectives was raised. The importance of outlining the costs of mitigation measures (capital and ongoing), quantifying the impact of government policy controls, and the impact of stranded assets were discussed. The usefulness of understanding post-2050 impacts in all three models was highlighted, and the need for increasing energy efficiency to remain within carbon budgets. The sectoral impact of carbon savings was raised and need to prevent double counting. The role of post-hoc analysis on these results in providing insight to government policy was highlighted.

For TIM, model assumptions and constraints were raised regarding planned post-hoc analysis. The impact to emissions of changes in cement production (including viability of CCS), data centre electricity usage, and grid costs were raised. For GOBLIN, assumptions for animal numbers, afforestation rates and anaerobic digestion were discussed including land area use and fugitive gas leakage, along with the potential benefits of biogas. Land use requirements for carbon dioxide removal and extended value chains were raised. For FAPRI, the status of methane-reducing feed additives to livestock were raised along with nitrogen use and the impact of global growth in dairy product demand. The potential need for incentives in agriculture to encourage uptake of mitigation measures was noted. The time horizon for forestry benefits to be realised was raised, along with the impact to animal numbers of land-use change. Uncertainties in the model related to costs were outlined, with plans to address these in future model iterations.

The Secretariat outlined that meetings will occur in January and February between the Council and the Secretariat to present the initial carbon budget model findings.

**New Action:** modelling groups to provide emission projection data for temperature analysis

#### **4. Irish Carbon Budgets: Some Moral Considerations**

Kian Mintz-Woo from UCC presented on his paper on moral considerations of Irish Carbon Budgets for discussion within the CB WG. This paper was based on previous presentations made by KMW to the CB WG and included the importance of moral evaluation, assumptions of Paris Agreement, CB reference year and equity principles. It was outlined that while most of the assumptions are philosophically plausible, many are not philosophically robust. A primary outcome is that carbon budgets should be considered as upper limits for emission.

Discussions included the scope of justice and obligations of nation states to populations within and outside national jurisdictions. The importance of reference year and grandfathering were raised in the context of the industrialisation stage of countries. The ethical approach applied, views of the public, and the ability to implement ethical considerations in the carbon budget process were raised.

## **5. Carbon Budgets Work Plan**

The thematic topics for the CB WG were outlined with those already conducted, and proposed future topics, with remaining availability for any additional thematic topics to be considered with feedback from the CB WG.

The remaining timelines of the Carbon Budgets Workplan were outlined, with warming impact analysis from selected core scenarios and post-hoc analysis from SEAI's NEMF presented in January along with planned discussion of economic and macroeconomic implications of the first iteration of modelling results. The next key step is the submission of results from the first iteration of core modelling for the warming impact analysis.

## **6. Next Steps and Agenda for next meeting**

In January the meeting will include thematic discussion of the IEA update on Net Zero Roadmap 2050 from and the warming impacts from selected CB WG core model scenarios, along with input from SEAI on post-hoc testing on core model results, and economic and macroeconomic considerations.

The February meeting will include a presentation on quantitative approaches to carbon budgeting for Parties to the Paris Agreement by Malte Meinshausen from the University of Melbourne, Paul Deane from UCC will present on energy and power systems modelling, and thematic discussion on ESAB scientific advice for the determination of an EU-wide 2040 climate target and GHG budget for 2030-2050. This meeting will be scheduled 30 min longer than normal to facilitate the greater number of invited speakers.

## **7. AOB**

The Secretariat outlined that Sadhbh O'Neils paper on international Carbon Budgets, presented at a previous meeting was now published on the CCAC website and available for consultation. Planned procurement by the Secretariat for studies that will include biodiversity and just transition methodologies related to carbon budgets were raised.

Two upcoming planned briefings on carbon budget outputs between the Secretariat and the Council were outlined. These include core model results briefing in January and warming implications briefing in February. An upcoming meeting of the Just Transition Taskforce was highlighted.

Presenters and participants were thanked for their contributions. Next meeting will be on the 18<sup>th</sup> January.

## 8. CB WG Actions Log

Action Number	Date Raised	Description	Owner	Due	Status
9	19/10/23	CBWG members to provide feedback and/or suggestions on the proposed topics for consideration in 2024 as outlined in the Meeting No. 7 presentation	CB WG Members	Nov 2023	Closed  CB WG Members still welcome to provide suggestions for additional thematic topics on adhoc basis.
10	19/10/23	Secretariat to share a note on the inputs required for macroeconomic analysis and a template regarding the temperature impact analysis with the core modelling teams for review and feedback	CCAC Secretariat/ CB WG Members	Nov 2023	Closed:
11	15/12/23	Modelling groups to provide projected GHG emission data for temperature analysis	CBWG core modelling groups	Dec 2023	Modelling groups provided data by 18/12/23 and shared with Joe Wheatly for temperature impact analysis