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(Please note that this letter will only be sent electronically)

Joint Committee on Climate, Environment, and Energy

Leinster House

Dublin 2

D02XR20

1st July 2025

Re: Climate Change Advisory Council Carbon Budget Proposal

CC: Minister Darragh O'Brien, Minister for Climate, Energy and the Environment

Dear Committee Members,

Firstly, I would like to thank you for the opportunity to attend the Joint Committee on Climate, Environment and Energy on the 25th of June 2025 and speak on the Climate Change Advisory Council's proposed amendments to Carbon Budget 3 (CB3: 2031-2035) and provisional proposal for Carbon Budget 4 (CB4: 2036- 2040). As agreed, please find a brief written response to the four points that were raised by the Chair of the Committee.

1. **Warming Impact Analysis and the 'Paris Test'**

In order to assess the consistency of proposed carbon budgets with legislated-for objectives of the UNFCCC and the Paris Agreement, the Council conducts a Warming Impact Analysis. The Council agreed that a Warming Impact Analysis using Reduced Complexity Climate Models superseded the 'Paris Test' employed for the first Carbon Budget proposal as one of the criteria by which the Council considered consistency with the National Climate Objective and the temperature goal of the Paris Agreement.

Paris Test

The legislative constraint on Carbon Budget 1 (CB1: 2021-2025) and Carbon Budget 2 (CB2: 2026- 2030) based on Article 6A (5) of the Act was a 51% reduction in emissions by 2030. The provisional Carbon Budget 3 (2031-2035) was a linear extrapolation to meet net zero in GWP100 by 2050. For Carbon Budget 1 and 2, the 'Paris Test' was used in order to provide insight into how a scenario for greenhouse gas emissions from Ireland might impact on global warming. The three steps in the 'Paris Test' included the following:

Step 1: Calculate the remaining gap to the 1.5ºC threshold relative to 2020. The IPCC Sixth Assessment Report estimates global warming to 2020 was 1.27ºC, within confidence limits of 1.18ºC and 1.36ºC. Therefore, the estimated additional warming allowed before

breeching the 1.5ºC threshold was 0.23ºC, within a lower bound of 0.14ºC and upper bound of 0.32ºC.

Step 2: Calculate the long-term temperature impact from Ireland's GHG emissions under a given scenario relative to 2020.

Step 3: Scale Ireland's long term GHG emissions contribution to warming to the global level on the basis the scaling factor used in the Paris Test, i.e., the ratio of Ireland population to Global Population.

As requested by the Committee, a 'Paris Test' analysis has now been prepared for the scenarios informing the Council's recent carbon budget proposal and provided in Table 1. Averaging the cumulative GHG emissions for the scenarios, which strictly comply with the 'Paris Test', would result in no change in the Council's carbon budget proposals given that rounding was applied to avoid undue precision.

Table 1: *The 'Paris Test' applied to the 15 shortlisted scenarios informing the proposal.*

	Scenario	Step 1	Step 2	Step 3	Maximum allowable GHG emissions under a given scenario	
		IPCC AR6 calculation of the remaining gap to the 1.5 ^{o}C threshold relative to 2020	The long term temperature impact from Ireland's GHG emissions under a given scenario relative to 2020	Ireland's long term GHG emissions contribution to warming upscaled to global level on the basis of the scaling factor used in the Paris Test	2031-2035	2036-2040
		^{o}C	x10^{-3} ^{o}C	^{o}C	Mt CO_2 eq	
1	300mt-led L4 S2_P2	0.23 (0.14-0.32)	0.10	0.15	156	114
2	300mt L4 S2_P2	0.23 (0.14-0.32)	0.10	0.16	151	111
3	300mt-lowbio L4 S2_P2	0.23 (0.14-0.32)	0.11	0.16	149	113
4	350mt-led L4 S2_P2	0.23 (0.14-0.32)	0.14	0.21	170	130
5	350mt L4 S2_P2	0.23 (0.14-0.32)	0.15	0.23	162	128
6	350mt-lowbio L4 S2_P2	0.23 (0.14-0.32)	0.17	0.25	162	128

7	300mt-led L4 S1_P2	0.23 (0.14-0.32)	0.18	0.28	162	122
8	300mt L4 S1_P2	0.23 (0.14-0.32)	0.19	0.29	156	119
9	300mt-lowbio L4 S1_P2	0.23 (0.14-0.32)	0.19	0.29	154	121
10	300mt-led L1 S2_P2	0.23 (0.14-0.32)	0.20	0.31	158	119
11	300mt L1 S2_P2	0.23 (0.14-0.32)	0.20	0.31	153	115
12	300mt-lowbio L1 S2_P2	0.23 (0.14-0.32)	0.21	0.32	150	118
13	350mt-led L1 S2_P2	0.23 (0.14-0.32)	0.24	0.37	171	134
14	350mt L1 S2_P2	0.23 (0.14-0.32)	0.25	0.39	163	132
15	350mt-lowbio L1 S2_P2	0.23 (0.14-0.32)	0.26	0.41	163	132
Average across all 15 shortlisted scenarios					159	123
Average 15 Scenarios (rounded to the nearest 10)					**160**	**120**

Reduced Complexity Climate Models:

As the legislative constraint on CB3 and provisional CB4 moves beyond 2030 i.e., achieving the National Climate Objective of climate neutrality by 2050, the Council analysed the warming impact of future emission scenarios using the more up to date Reduced Complexity Climate Models, which reflect the latest understanding of climate parameters, processes and uncertainties and were widely used in the IPCC AR6 assessment and thus reflect the best scientific practice. These included the temperature analysis using the FaIR Model framework which enables an assessment of national emissions scenarios in the context of global efforts towards the 1.5°C and 2.0°C Paris Agreement temperature goal. The approach permits explicit consideration of the dynamic response and trade-offs of changes in emissions of different greenhouse gases through time (important given Ireland's distinctive GHG emissions profile).

The Council has taken the goal to "pursue efforts to limit the temperature increase to 1.5ºC" as the appropriate level of ambition for Ireland. Taking the average across the 15 scenarios and rounding to the nearest 10, the proposal for CB3 (2031–2035) of 160 Mt CO_2 eq and a provisional proposal for CB4 (2036–2040) of 120 Mt CO_2 eq. is consistent with the objectives of the UNFCCC and the Paris Agreement, and the provisions of the 2021 Act.

2. The 15 Shortlisted Scenarios Informing the Carbon Budget Proposal

The FaIR Model framework was applied to assess the temperature impact of 1,196 national emissions scenarios in the context of global efforts towards the 1.5°C and 2.0°C Paris

Agreement long-term temperature goal. A long list of 522 scenarios was identified as being consistent with Ireland achieving temperature neutrality by 2050 when combined with the SSP1-2.6 global emissions pathway, that limits global warming to below 2°C. Under a more ambitious global shared socioeconomic pathway, SSP1-1.9 with emission reductions that limit global warming to below 1.5°C, just 377 of these scenarios are consistent with Ireland achieving temperature neutrality by 2050.

Energy scenario sensitivity cases ending in 'WEM' or 'WAM' that were constrained to the EPA projections analysis are not consistent with the National Climate Objective and were excluded by the Council from consideration for the carbon budget proposal. This reduced the number of scenarios considered from 377 to 203. In addition, while agricultural emissions were modelled by both the GOBLIN and FAPRI-Ireland models, and the results showed good alignment between the models, the Council decided to focus on the agriculture scenarios from FAPRI-Ireland in combination with land use scenarios from GOBLIN in its deliberations. As a result, the agriculture scenarios modelled by the GOBLIN model (scenarios a–e) were excluded from consideration in the carbon budget proposal and the number of scenarios were further reduced from 203 to 74.

The Council then excluded several energy and land use scenarios from consideration in the carbon budget proposal on the basis of feasibility and compatibility with the proposed EU 2040 target. Firstly, the Council ruled out the most stringent 250 Mt CO_2 eq scenario for the energy system due to significant emissions overshoot and associated higher abatement costs stemming from the requirement to invest in a backstop carbon removal technology under this level of ambition for the energy system. Secondly, the Council also ruled out the least stringent 400 Mt CO_2 eq and 450 Mt CO_2 eq energy system scenarios due to their failure to meet a 90% reduction in net GHG emissions by 2040 relative to 1990 levels when benchmarked against the European Commission's recommended 2040 target. This reduced the number of scenarios for consideration from 74 to 48. Finally, the Council also ruled out two of the four forestry scenarios (L2 and L3) that were based on a highly ambitious 25,000 ha per year afforestation rate, which the Council concluded were implausible. This resulted in a final reduction in the number of scenarios from 48 to the 15 shortlisted scenarios outlined in Table 1.

As a result, the Council identified a shortlist of 15 illustrative scenarios that are consistent with setting Ireland on an emissions trajectory that is compatible with the country's emissions contributing to no further global warming by 2050, against a backdrop of global efforts to limit global warming to 1.5°C in line with the Paris Agreement. A description of each of the scenarios is available in Section 4 of the Carbon Budgets Report and in the accompanying Carbon Budget Member Output Reports compiled by the modelling teams.

The Council has not chosen a preferred scenario combination. Instead, the Council used all 15 of the shortlisted scenarios to inform the carbon budget proposal by averaging the carbon budgets associated with each of the 15 scenarios to calculate the Council's carbon budget proposal. The 15 scenarios considered in calculating the Council's carbon budget proposal include trade-offs between the Energy and AFOLU sectors that will need to be considered when assigning levels of effort sharing between sectors within the limits of the carbon budget. These 15 scenarios outline possible pathways to achieving the emissions reductions necessary if Ireland is to achieve temperature neutrality by 2050, and they highlight the urgent need for ambitious action to deliver the National Climate Objective. It is rightly a choice of government as to how, precisely, to meet carbon budgets. The role of the

Council is to illustrate the broad policy context that would require to be implemented and to show that these are feasible within the stated remit in the amended Act.

3. The implied ambition for agriculture emissions reductions

The Council considered the significance of the agriculture sector in Ireland, in particular methane emissions resulting from livestock, and scientific advice regarding the distinct characteristics of biogenic methane in recognition of its behaviour as a short-lived climate forcer in its deliberations. In early 2024 the European Commission proposed that the EU aim collectively for a 90% reduction in net greenhouse gas emissions by 2040 relative to 1990. No legislative proposal for how this target would be allocated to sectors or Member States has yet been published but it is anticipated that a proposal will be brought forwards by the European Commission shortly. The scenarios on which the likely EU 2040 target proposal is based, generally achieve agriculture sector methane emissions reductions of 15-40% between 2019 and 2040. Analysis of the scenarios directly informing the Council's carbon budget proposal are within this range, achieving Agriculture sector methane emissions reductions of 22%–30% between 2018 and 2040. In addition, this range is also consistent with recent research which found that agricultural methane emissions reduce by the order 32% [6-52%] by 2050, where fossil and waste-based methane emissions reach effectively zero.

Achieving substantial reductions in agricultural GHG emissions by 2050 necessitates very ambitious adoption of mitigation measures in all the scenarios informing the Carbon Budget proposal. High levels of mitigation measure uptake would achieve the 25% reduction target for agriculture by 2030 and further reductions by 2050, with potential reductions in agricultural emissions of between 38% and 48% by 2050 relative to 2018, with the higher reductions in emissions being dependent on reduced livestock activity in addition to high levels of mitigation measure uptake.

There are implicit implications for trade-offs between the agriculture, energy, and land-use sectors inherent in the potential range of reductions in agricultural emissions by 2050. In the agricultural sector scenarios in which livestock agricultural activity is relatively stable (S1) or reduced (S2) are coupled with very ambitious adoption of mitigation measures (P2) in the underlying analysis. A wide range of GHG mitigation measures can contribute to reducing agricultural emissions, with no single measure providing a dominant share of the mitigation potential. Key contributors include reducing the age of cattle finishing, using feed and manure additives, protected urea fertilisers and improved breeding practices. Farmers will need to be financially supported to implement some of these measures.

4. Nature Restoration Plan

The Council is confident that achieving the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy can be achieved, provided Ireland stays within the carbon budgets and that climate action and biodiversity policies are aligned. Across all land use scenarios informing the carbon budget proposal, it is assumed that there will be ambitious levels of improved management of drained organic soils, including improved water table management, rewetting of peatlands and nature restoration where appropriate.

During the development of the evidence base for the carbon budget proposals a biodiversity expert was represented on the working group providing key insights from a biodiversity perspective which are set out in a report on Biodiversity Considerations for Carbon Budgets

2031-2040. This report highlighted that the interrelatedness of biodiversity loss and climate change issues is recognised in the EU Nature Restoration Law and that Ireland's Climate Action and Low Carbon Development Act (as amended) explicitly considers biodiversity as an integral part of national climate objectives. A key finding was that there is a clear need to ensure climate mitigation and adaptation plans, together with national nature restoration plans under the Nature Restoration Law are mutually compatible.

In addition, research was commissioned by the Council on an 'Assessment of biodiversity considerations in the carbon budget process' the results of which were considered during the development and finalisation of the carbon budgets proposals for CB3 and a provisional CB4. This research highlighted that policies to address climate change and biodiversity loss are not fully aligned and that the impacts of proposed climate actions on biodiversity are not adequately assessed. There is a clear need for improved policy alignment; need for land use change and systemic societal change to combat biodiversity and climate crises; the development of a national land use strategy underpinned by updated spatial data within a spatial planning framework to manage change is required; key uncertainties and knowledge gaps are recognised and increased knowledge generation and sharing is required; and there is a clear need to ensure that Ireland does not contribute to biodiversity loss and climate change internationally by offshoring our impacts through our resource exports and imports.

If you have any further queries, I will be happy to respond.

Yours sincerely,

Marie C. Donnelly
Chairperson, Climate Change Advisory Council