NexSys (Next Generation Energy Systems)

Submission to Public Consultation on Carbon Budgets (2025)

June 2025

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Introduction

NexSys (Next Generation Energy Systems) is an all-island, multidisciplinary energy research programme. Through this programme of research, 50 leading academics across 9 institutions are working in partnership with industry to tackle the challenges of energy system decarbonisation, developing evidence-based pathways for a net zero energy system.

NexSys is committed to engaging with national policy processes in order to provide evidence based research and policy insights in support of our net zero ambitions.

This submission is intended to provide feedback on aspects of the Climate Change Advisory Council's latest recommendations for the Carbon Budget periods 3 (2031 – 2035) and 4 (2036 – 2040).

How should effort be shared to meet the required emissions reductions by 2050 across the second two carbon budgets, 2031-2035 and 2036-2040?

- **Energy System:** Efforts should prioritise the transformation of the energy system. All compliant scenarios require net zero CO_2 emissions from the energy sector between 2039–2048. This will require:
    - The accelerated phasing out of fossil fuels.
    - Implementation of energy demand reduction measures, particularly in data centers and residential sectors
    - Assessing the impact of climate change in future especially in terms of degree days.
- **Cities:** Although cities occupy a very small proportion of the Earth's landscape, they are responsible for most greenhouse gas emissions, especially CO2 emissions. The International Panel on Climate Change (IPCC) reported that the total share of urban GHG emissions have increased in the last decade and is estimated to be around 70% of global emissions[1] and, in Ireland, urban areas are the dominant GHG source. Cities are complex systems where the drivers of carbon emissions (transport, buildings, and industry) are spatially interconnected, and opportunities for emissions management are greatest. This geographic concentration is ignored in the focus on a sectoral approach to reporting emissions. We need a special focus on the urban areas to achieve net zero carbon, and the current sectoral ceilings should include an overlapping urban theme. Moreover, we need independent observations of Carbon in the atmosphere over cities to identify emission sources and demonstrate the value of climate change policies[2].
- **Agriculture:** Agriculture is the largest source of methane and nitrous oxide, and will not reach net zero under current trajectories. While most of the focus is on CO_2 emissions more work is needed on these other significant GHGs. Areas of focus should include:
    - Introducing additional financial support schemes for farmers adopting emissions-reducing practices.
    - Incentives should be provided to ecological sustainable organic farming techniques such as relying on cover crops, nitrogen-fixing plants and manure rather than chemical fertilisers.
    - Enable livestock diversification and lower emissions practices via targeted subsidies and advisory services.
- **Land Use:** Land use should align planning with climate and biodiversity goals. Land use changes are necessary for both emissions reduction and biodiversity preservation. The role of natural vegetation and land use in the current emission inventories is neglected, and should be addressed. We recommend the development of an integrated national land use strategy (and emission inventory) with spatial planning to optimize for biodiversity, forestry, and emissions reductions.
- **Just Transition:** Transition risks exist for high-emitting sectors (e.g., agriculture, fossil fuel energy) which may lead to an unfair burden on individuals and communities. These risks can be mitigated by building on the work of the Just Transition Commission to:

[1] Climate Change 2022 - Mitigation of Climate Change | IPCC

- Establish training and reskilling programs in renewable energy, retrofit, forestry, and agri-tech.
- Launch place-based Just Transition initiatives targeting vulnerable regions and sectors.

NexSys observations on The CCAC Carbon Budget Proposal Report as published by the CCAC

- The National Climate Objective states that Ireland must achieve a climate neutral economy by 2025.
  - Current carbon budget scenario modelling avoids overreliance on CO2 removal technologies in an Irish context and considers European and international assessment of mitigation scenarios for various sectors.
  - One area of focus should be to boost Carbon Dioxide Removal (CDR) Readiness. The Carbon Budgets assume contributions from afforestation and other CDR measures, yet policy support is currently limited. Quantifying the extent to which these measures will actually work in the Irish context is needed. Measures that could be taken include:
    - Provision of financial incentives and R&D funding for CDR technologies such as integrated constructed wetlands (ICW), rewetting of peatlands, Urban greening and sustainable urban drainage and ecological solutions for farms.
    - Development of a national strategy for nature-based solutions (NBS, e.g., rewetting peatlands, afforestation)

Most of the CDR and NBS strategies are similar in Ireland. For example, Wetlands can mitigate climate change by sequestering CO2, improve water quality through filtration of pollutants and enhance biodiversity. Urban greening can reduce local temperatures, reduce GHG emissions, attenuate rainwater and provide cover during severe storms. These areas also increase biodiversity and provide social, economic, psychological, and health benefits[3].

Summary of Recommendations

1. Prioritise the transformation of the energy system, with a focus on energy demand reduction measures.
2. Recognise the particular geographic concentration of emissions that cities represent by including an overlapping urban theme alongside sectoral budgets.
3. Recognising the impact of methane and nitrous oxide on warming, provide additional support to farmers to reduce emissions from agriculture.
4. Develop an integrated national land use strategy.
5. Build on the work of the JTC by establishing targeted training programmes and place-based transition initiatives.
6. Boost Carbon Dioxide Removal (CDR) readiness through R&D funding and a national strategy for nature-based solutions.

References

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Contributors

NexSys research contributors to the preparation of this submission (in alphabetical order):

- Dr Ankur Sati, School of Geography, UCD
- Prof. Gerald Mills, School of Geography, UCD

NexSys is funded by Research Ireland Grant no. 21/SPP/3756 (NexSys partnership).

NexSys welcomes further engagement with the Department on this submission and related matters. Any information requests can be sent to john.doody@ucd.ie.