# A submission to the Oireachtas Joint Committee on Climate Action

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4th November 2020

## Introduction

As a consequence of earlier commitments and the subsequent late scheduling of my contribution to this Committee, this written submission is very much a work in progress. Nevertheless, I hope it provides a useful framework within which I will situate my evidence. I would like to emphasise that whilst I have no direct expertise in the detail of Ireland's emissions, I have spent three decades working on issues of mitigation, with a particular focus on energy demand and supply within wealthier nations.

This submission builds on a recent peer-reviewed paper: A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris- compliant pathways.The analysis within the paper was the first to explicitly downscale the temperature and equity commitments enshrined in the Paris Agreement to *"developed"* and *"developing country parties"* and subsequently to the UK and Sweden. An accompanying article was published in the Ecologist: Beyond a climate of comfortable ignorance.

In developing this submission:

- I take Ireland's temperature and equity commitments enshrined in the Paris Agreement at face value
- I base my analysis on IPCC science and the UNFCCC framing of equity
- I am disinterested in political and economic sensibilities, but recognise the key role of politics & economics in delivering on Irelands' mitigation commitments

Such a context imposes a far more challenging mitigation agenda than most other analysis.

## Headline recommendations

To be Paris-compliant, Ireland needs:

- to maintain its total $CO_2$ emissions to under 300Mt$CO_2$
- to deliver an annual mitigation rate of over 12% year on year
- to achieve an 80% cut in its $CO_2$ emissions by 2030 (compared with 2018)
- to reach full decarbonisation of its entire energy system by 2035-40
- to cut total agricultural methane and nitrous oxide emissions by at least 3% year on year

## Setting the scene

Let's be clear, the Paris Agreement is unjust. Holding to 2°C or 1.5°C will still see a significant rise in climate-related deaths and suffering across those poorer communities living within climate-vulnerable parts of the world. Those suffering will primarily be people of colour, and initially the burden will fall disproportionately on women and children. These are impacts that we, in the wealthy high-emitting nations, have chosen to impose upon poor and low-emitting communities by preferring rhetoric and unfounded optimism over genuine action to cut emissions. In Ireland's case, emissions of $CO_2$ from energy have increased by around 18% since the first IPCC report in 1990 [1]. When aviation and shipping emissions are included this is likely to be nearer a 20% rise.

For the record, using a consumption-based inventory, the emissions of a typical Irish citizen were, in 2018, over 50% higher than those of their Chinese counterparts, almost twice the global mean and over eight times that of the average African.

In 2020, my judgement is that holding to 2°C is now the best outcome that can be achieved. However, taking account of the Paris and UNFCCC equity criteria (as captured in the concept of 'Common but Differentiated Responsibilities and Respective Capabilities' – CBDR-RC) even 2°C implies rates of mitigation for *"developed country parties"* far beyond those currently countenanced.

## Analysis *(based on the Factor of Two paper cited earlier)*

In their AR5 and SR1.5 reports the IPCC make clear that:

> *… it is carbon budgets, and not long-term targets, that link to temperature rise …*

The analysis in both our recent paper and underpinning this submission is premised on the IPCC's latest (SR1.5) headline carbon budget that aligns with "pursuing … 1.5°C" and staying "well below 2°C". This budget is subsequently updated to the start of 2020 and makes allowances for emissions from deforestation and industrial processes (particularly cement manufacture), giving a global energy-only carbon budget of around 660 billions tonnes of $CO_2$. This is from 2020 out to and beyond 2100.

- **Global Paris-compliant carbon budget is in the region of 660Gt$CO_2$** (from 2020 onwards)

This analysis makes no allowance for highly speculative 'negative emission technologies' increasing the budget, nor does it reduce the budget for similarly uncertain earth system feedbacks not yet included in the climate models. In essence it offers a conservative reading of the IPCC's analysis.

Taking seriously the Paris steer on equity, informed by CBDR-RC, gives an EU carbon budget of 21-27 billion tonnes of $CO_2$ (from 2020 to 2100 and beyond) [2].

Very provisional work suggests this translates to an Irish carbon budget range of 230 to 300 million tonnes of $CO_2$ (i.e. 230-300MtCO2).

- **A very provisional assessment of Ireland's Paris-compliant carbon budget is 230 to 300Mt$CO_2$**

Even at the higher budget value of 300Mt$CO_2$, this equates to an annual mitigation rate in excess of 12% p.a., starting January 2020.

- **As a minimum Ireland needs to reduce its emissions of $CO_2$ by 12% year on year**

Given the policy and socio-economic inertia in delivering such mitigation rates, and considering the cumulative nature of emissions, this suggests that to deliver on Paris requires something approaching an 80% cut in Ireland's energy-based $CO_2$ emissions by 2030, and complete decarbonisation of Ireland's entire energy system (including aviation and shipping) by 2035-2040.

- **To be Paris-compliant Ireland needs to deliver real-zero $CO_2$ by 2035-40**

## Why so different to other analysis *(with reference to the UK's CCC 'net zero' by 2050 report)*

These notes were drafted following a recent meeting with three key members of the CCC's secretariat (those leading on science, budgets and modelling/scenarios). The meeting explored the different approach and conclusions of the CCC's analysis and that we used in our recent paper,

1) In its analysis underpinning the Net-Zero Report (hereafter NZR) the CCC does not have an explicit global carbon budget, or one for the UK. This is significant departure from its earlier 80% analysis, in which it carefully argued for an explicit global and UK carbon budget linked to a particular probability range of exceeding 2°C.

2) The NZR does not analyse what is necessary for Paris, or explicitly relate to 1.5 or 2°C. Consequently, and based on my reading of the two letters from Claire Perry (the then minister) requesting the CCC advise the Government on what is necessary for 1.5°C , the CCC has failed to provide the requested information, but has successfully avoided this being pointed out, including by the (new) minister, academics, NGOs and journalists. Through a process of misleading comments and convenient silences, the NZR has typically come to be thought of as the CCC's assessment of what the UK needs to do to deliver on Paris. This interpretation continues to seriously undermine a quantitatively robust evaluation of what is necessary and how such change could be delivered. The NZR has become the de facto framing of RCUK and other calls, reinforcing the (inappropriate) legitimacy of the CCC's analysis in relation to Paris.

3) The CCC is only now undertaking an explicit (post-hoc) budget and pathway analysis. Its (pre-analysis) 'conclusion' (from private conversations with the CCC) is that it can reconcile the UK's fair contribution to delivering on 1.5°C with a scenario that is politically feasible within the current socio-economic paradigm. Such 'back-engineering' is deeply problematic for guiding policy, and in normal circumstances should invoke strong criticism from across the academic climate-change community. Instead, that same community has either remained silent, or worse still has simply accepted (and often promoted) the CCC's analysis and conclusions as sacrosanct.

4) The CCC's equity position is overly simplistic/not well thought through. It has considered a number of equity regimes, and then chosen one that requires the UK to be (net) zero emissions by 2050[1]. However, it has not worked this back to understand the implications for poorer nations. Indeed, it does not appear to have given much/any thought to the implications of the Paris "developed" and "developing country parties" framing or the wider UNFCCC framing of CBDR. It makes no allowance for cement and deforestation in its equity framing. In this regard our approach was not new to the CCC, as I discussed it at length with CCC members several years ago, and it was something they were going to consider. Despite this, there is no evidence that the CCC has given cement emissions and their significant implications for equity (and hence the UK budget) any further thought.

5) The NZR assumes that future generations will deploy negative emissions technology at planetary scale (to counteract the choice by current generations not to deliver higher levels of mitigation in the near term). Pro-rated, and based on technical data provided on request by the CCC, their analysis assumes, globally, somewhere around 0.5 trillion tonnes of $CO_2$ removal post 2050. For context, annually this approaches the total additional absorption of $CO_2$ each year by global flora (i.e. ~10Gt$CO_2$). While such an heroic assumption, if it came to pass, might limit warming to 2°C, it can hardly be considered either safe or fair. Moreover, even if NETs do prove viable, they will be required to compensate for the ongoing warming of residual non-$CO_2$ emissions ($CH_4$ and $N_2O$) that cannot be eliminated from the agricultural system. Tyndall colleagues and I previously estimated this at around 7.5Gt$CO_{2e}$ per year, with the CCC later adopting 6Gt$CO_{2e}$. Given this, it is inappropriate, as the CCC does, to rely on future and speculative negative emission technologies to compensate for energy-related emissions that through technology and demand management could be eliminated.

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[1] *there is a risk that when referring to the Greenhouse Development Rights (now Fair-shares) as providing the most ambitious equity regime, the CCC risks misleading users, as the Fair-share framework produces a range of outcomes. It was not clear which one the CCC has adopted but going by its 2030 mitigation level it looks as if it has chosen one with relatively low ambition. Moreover, the newer Fair-shares analysis does not provide a 2050 value, whereas the earlier Greenhouse Development Rights did extend to 2050, but is based on old/outdated analysis.*

## Implications and recommendations for Ireland's (Amendment) Bill 2020

1) The National Climate Objective (NCO) needs to be urgently revised to reflect Ireland's temperature and equity commitments as enshrined in the Paris Agreement and informed by the concept of CBDR-RC.

2) For the NCO to have legitimacy it must provide a transparent and cogent downscaling of the Paris commitments (through the scientific framing of the IPCC's carbon budgets) and subsequently provide an explicit Paris-compliant carbon budget for Ireland. This must take full account of Ireland's international aviation and shipping emissions and provide a clear account of how Ireland interprets CBDR-RC and the consequent carbon budget implications for *"developing country parties"*.

3) It must deliver the reductions in emissions without recourse to offsetting or other accountancy ruses.

4) In relation to its $CO_2$ emissions from energy, the reductions must be delivered through policies driving conservation (consuming less energy services), efficiency (consuming energy more efficiently) and the rapid and complete switch from fossil fuels to low/zero carbon alternatives. It must not rely on speculative negative emission technologies (NETs) or wider 'carbon dioxide removal (CDR)' options.***** Similarly, it must not assume the large-scale uptake of carbon capture and storage (CCS) applied to fossil-fuelled power stations. Even when CCS is used with natural gas, cradle-to-grave lifecycle emissions are estimated to range from 100-300g$CO_{2e}$ [3]. Such rates are far higher than genuinely low-to-zero emission technologies, particularly wind (under 25g$CO_{2e}$/kWh) and are too high to align with Paris-compliant emission pathways for *"developed country parties"*. However, CCS may have an important role in decarbonising the process emissions from cement and steel production.

5) ****** *Ireland should contribute to the development and potential deployment of CDR options, but these will ultimately be required to compensate for residual emissions of methane and nitrous oxide that cannot be eliminated from global agriculture. Relying on the future deployment at scale of such speculative approaches is a moral hazard par excellence, with today's wealthier generations passing the burden on to both today's poorer communities and future generations.*

6) Ireland needs to complement deep and rapid cuts in its energy-based $CO_2$ emissions with similar efforts to cut its methane and nitrous oxide emissions from its agriculture sector. Borrowing from earlier analysis [4] of Scotland's non-$CO_2$ emissions from agriculture (approximately 25% of Scotland's total GHG emissions), Ireland's agricultural sector should be reducing its emissions by around 3% year on year (this is an absolute reduction not an intensity target). This would have to work alongside a programme of forestry management and reforestation, otherwise the annual reduction rate would need to be higher still.

[1] See the Global Carbon Project data base http://globalcarbonatlas.org/en/CO2-emissions

[2] A Paris-compliant energy-only carbon budget for the EU 27 https://kevinanderson.info/blog/a-paris-compliant-energy-only-carbon-budget-for-the-eu27/

[3] Thomas Gibon et al. (2017) Lifecycle assessment demonstrates co-benefits and trade-offs of low-carbon electricity supply options. Renewable and Sustainable Energy Reviews. 76 Elsevier https://www.sciencedirect.com/science/article/abs/pii/S1364032117304215

[4] Kuriakose, J., Anderson, K., & Mclachlan, C. (2018). Quantifying the implications of the Paris Agreement: What role for Scotland? Tyndall Centre report.