

Decarbonising the UK: Reflections from 2005 to 2025

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During the Critical Decade for Climate Action Conference, hosted by the Tyndall Centre for Climate Change Research at the University of East Anglia (UEA), climate experts gathered to showcase evidence-based ideas and critically evaluate opportunities for climate action. This briefing note serves as a summary of Session 2 on Monday 8 September 2025.

On 21 Sept 2005, researchers at the Tyndall Centre at Manchester University published their seminal ‘Decarbonising the UK’ scenarios, drawing on energy system expertise from across UK universities, the first work of its kind. That morning, Elliot Morley, the Environment Minister of the UK Government, was on the BBC Radio 4 Today Programme, responding to the research’s clear conclusion that growth in aviation is incompatible with emissions reduction. In 2005, the UK’s ambition was a 60 per cent reduction in CO₂... Twenty years later and halfway through our critical decade for climate action, the team at Tyndall Centre Manchester has reviewed ‘Decarbonising the UK’ for a new report addressing reflections and constructive lessons, and if and how these scenarios have played out in the ensuing years. Can the 2005 approach be built upon to address the worsening climate crisis faced in 2025?

Introduction

In 2005, the Tyndall Centre published a report on ‘Decarbonising the UK’ which co-developed with stakeholders’ alternative pathways for achieving a 60% reduction in CO₂ emissions by 2050 which, based on science available at the time, was considered to be the UK’s fair role in not exceeding 2°C of warming (Anderson et al., 2005). Two decades on, with the world now in what is regarded as a critical decade for climate action, the Tyndall Centre has revisited this landmark work. The research considers how far the UK has come, whether and in what ways, the scenarios imagined then align with what has unfolded, and what lessons they offer for tackling today’s climate crisis.

During the Tyndall Centre’s ‘Our Critical Decade for Climate Action’ Conference at the University of East Anglia in 2025, a session was held to look back on developments over the past 20 years. The session was led by Prof. Alice Larkin and Dr Sarah Mander, with presentations from Prof. Kevin Anderson and Dr Gaurav Gharde from the University of Manchester, Prof. Catherine Mitchell from the University of Exeter, and Dr Sandra Bogelein from the Climate Change Committee (CCC).

Looking back – Scenarios and realities

Tyndall researchers (Kevin Anderson and Gaurav Gharde) reflected on the assumptions embedded in Tyndall’s 2005 scenarios. The original modelling, in retrospect¹, with its relatively weak 60% target, anticipated continued use of coal, in most cases with carbon capture and storage (CCS). But with significant increases in the levels of electrification, in sectors including land transport and heating, needed because of the incorporation of international aviation emissions in the system. The scenarios varied widely in terms of their levels of energy demand, with a span of reducing it by half, to growing twice as large. The researchers also reviewed others’ scenarios published around a similar time but based on different cost-optimised methods. When this wider portfolio was considered, most scenarios explored reducing energy demand. However, few considered scenarios with lower levels of demand than has emerged, or the transformative growth in renewable energy that followed – a tenfold expansion.

¹ Within a year of the ‘Decarbonising the UK’ publication, the team were working on their ‘Living in a Carbon Budget’ report, with a much more challenging rate of mitigation for the UK, still informed by 2°C of warming, but based on cumulative emissions rather than a long-term end-point target, i.e. 2050.

Since 2005, the emissions reduction challenge has intensified, driven by significant falls in the remaining carbon budget, both for the UK (Figure 1) and globally. Electrification has advanced more slowly than within the Tyndall's scenarios, representing a missed opportunity for emissions reductions. Questions were raised over the scenarios' relatively low emphasis on demand reduction, set against a greater focus on technological optimism. This was a key takeaway for thinking about future scenarios; energy pathways must be based on well-developed technologies, with transparent carbon and energy accounting, and be aligned with the scale and timeline of climate commitments (Bows et al., 2006).

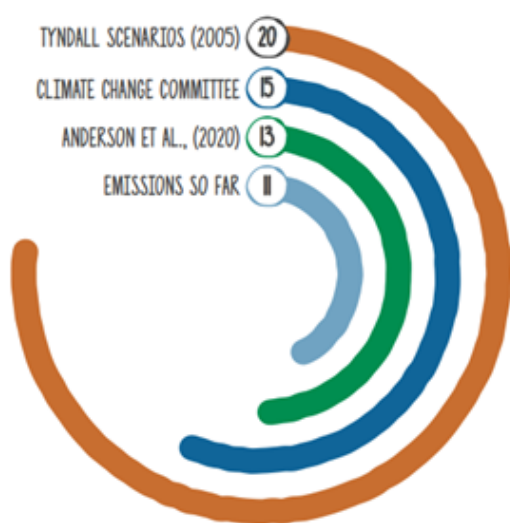


Figure 1. Carbon budgets for the UK under evolving climate targets in GtCO₂ (from Gharde et al., 2025)

Decision-making and governance

Catherine Mitchell focused on the governance systems that shape energy transitions. She described how UK decision-making has remained short-term, dominated by lobbying, and too often reliant on selective evidence. This tendency to delay and defend existing systems has slowed progress on phasing out oil and gas. She argued that academics must play a stronger role in speaking truth to power, even when inconvenient, if they are to maintain credibility and influence.

In presenting the CCC's Seventh Carbon Budget (CB7), Sandra Bogelein emphasised its focus on electrification through the uptake of low-carbon technologies as a key driver of emissions reductions across the economy (CCC, 2025). In discussion she also pointed to the key assumptions around demand reduction in the form of e.g. insulation of homes, modal shift, average reduction of meat and dairy consumption, aviation demand management, and a reduced reliance on carbon dioxide removal (CDR) compared to CB6. Household low-carbon choices are expected to be central and make up around a third of emissions reductions by 2040, the CB7 report includes novel

analysis on the impacts of a transition to Net Zero on households (including impacts on bills, distributional impacts, co-impacts and the findings from a deliberative and communication being essential for advice to shape real-world decisions.

What has changed?

The 2005 '*Decarbonising the UK*' project was pioneering in its scope and ambition. Revisiting it in 2025 highlights how far the UK has come, but also how much further it needs to go within the themes of politics, equity, and modelling. Some argued that the rapid expansion of renewables shows the value of technological optimism, while others cautioned that climate mitigation models, typically integrated assessment models (IAMs), are designed to minimise near-term costs. Such models fail to capture opportunities for transformative societal shifts with known technologies (for demand and supply), and can provide unrealistic scale-up of novel technologies (Vaughan & Gough, 2016).

Questions were also raised about the limited attention given to demand reduction (through behavioural and social change) in the modelling, despite its potential to save both energy and money² in the near-term. Presenters noted that one of the central challenges for government lies in managing the rapid transition from an entrenched, fossil-fuel based energy system to a zero-emission system. Within this, academics have a responsibility to act as trusted voices, unafraid to challenge dominant narratives or expose inconsistencies between stated ambitions and actual policy. While the mitigation challenge remains large, celebrating milestones such as halving territorial emissions since 1990 could build public awareness that some action on climate change is underway.

Key reflections

Two decades after the '*Decarbonising the UK*' report, progress on climate change has been patchy but insufficient. Despite renewables having expanded beyond many people's expectations, electrification has lagged and demand-side action remains underdeveloped. Governance remains a barrier, with decision-making processes shaped by short-termism and lobbying. There is a pressing need to embed equity and justice at the heart of pathways, and to ensure that modelling captures diverse voices and perspectives. Communication matters: sustaining political and public engagement depends on evidence-based, honest and transparent narratives. Accelerating electrification, embedding demand reduction, reforming governance, and foregrounding justice all remain critical steps.

² While recognising that in the absence of specific policies to redirect saved resources, the 'rebound effect' could see saved money used on other high carbon activities.

Further reading:

Anderson, K., Shackley, S., Mander, S., & Bows, A. (2005). Decarbonising the UK: Energy Scenarios for a Low Carbon Future. Tyndall Centre, University of Manchester. Available at: <https://tyndall.ac.uk/reports/decarbonising-the-uk-energy-in-a-climate-conscious-future/>

Anderson, K., Bows, A. and Mander, S., 2008. From long-term targets to cumulative mission pathways: reframing UK climate policy. *Energy Policy*, 36(10), pp.3714-3722. <https://doi.org/10.1016/j.enpol.2008.07.003>

Bows, A., Mander, S., Starkey, R., Bleda, M. and Anderson, K., 2006. Living within a carbon budget. *Report commissioned by Friends of the Earth and the Co-operative Bank*. Available at: https://policy.friendsoftheearth.uk/sites/default/files/documents/2019-02/living_carbon_budget.pdf

Climate Change Committee, 2025. The Seventh Carbon Budget: UK Government Advice for 2038-2042. Available at: <https://www.theccc.org.uk>

Gharde, G., Larkin, A., Mander, S., Jones, C., & McLachlan, C., Decarbonising the UK revisited: reflecting on 20 years of UK energy system scenarios and their policy implications, Tyndall Centre for Climate Change. Available at: <https://doi.org/10.71535/483973be-4477-4fe2-8adc-44cd21d392c6>

Vaughan, N.E. and Gough, C., 2016. Expert assessment concludes negative emissions scenarios may not deliver. *Environmental research letters*, 11(9), p.095003. <https://doi.org/10.1088/1748-9326/11/9/095003>