

DEFINING DANGEROUS CLIMATE CHANGE – A CALL FOR CONSISTENCY

How Government statements on dangerous climate change are often radically more challenging than those proposed by the Committee on Climate Change

Professor Kevin Anderson and Mr Richard Starkey, Tyndall Centre and the University of Manchester

Dr Alice Bows, Sustainable Consumption Institute and the Tyndall Centre, University of Manchester

Summary

Following on from the Committee on Climate Change's (CCC) recent announcement on aviation emissions, this Tyndall Briefing Note contrasts the CCC's position on dangerous climate change with that enshrined in much of the UK Government's climate change literature. It finds that whilst a perfunctory assessment of the two may suggest little difference, closer examination reveals a fundamental divergence in the rate at which emissions need to be reduced, with stark implications for the appropriateness or otherwise of low-carbon policies. This is clearly illustrated in the CCC's acceptance of significant emissions from aviation in 2050 being potentially compatible with 'avoiding dangerous climate change'; a position that cannot be reconciled with the interpretation of 'dangerous' forthcoming from Government.

Dangerous climate change

Whilst there is currently no global consensus on delineating dangerous from acceptable climate change, there is increasing momentum behind the view that a rise in mean global surface temperature of 2°C above pre-industrial levels is the most appropriate distinction. It is this position that the UK and EU have explicitly adopted and to which the US is now giving serious consideration.

The CCC and Aviation

On the 9th September 2009 the Committee on Climate Change (CCC) announced that other sectors of the UK economy would need to reduce their emissions by 90% by 2050 if the aviation industry was to be permitted to

maintain its emissions at 2005 levels.¹ Certainly this recognition of the central role of aviation in addressing climate change is to be welcomed, building as it does on earlier Tyndall Centre research.² However as this Briefing Note illustrates, the CCC's conclusion on aviation is not compatible with either the Government's recently published *The UK Low Carbon Transition Plan* or with the Secretary of State for Energy and Climate Change's briefing, *Copenhagen in the Balance* (8 Sept 2009). This would not necessarily be a problem if the difference between such Government statements and the CCC's position on 2°C were relatively small. However, the differences are substantial and have fundamental policy implications across all sectors, including aviation.

The CCC's position

In December 2008 the CCC published its first report on climate change, *Building a Low-Carbon Economy – the UK's Contribution to Tackling Climate Change*, in which it laid out the premise behind its position:³

Our conclusion is that ideally global policy should seek to avoid a mean global temperature rise of more than 2°C. Given emissions and concentration increases which have already occurred, and given the uncertain relationship between emission levels and temperature increases, however, it is not now possible to ensure with high likelihood that a temperature rise of more than 2°C is avoided. ... We therefore recommend that the objective should be to limit

¹ According to the CCC announcement, the UK will need to make an aggregate reduction in emissions across all sectors (excluding aviation) of 90% by 2050, relative to 1990 emissions; this compares with a 0% reduction from aviation by 2050 compared to 2005.

² Bows, A., and Anderson K., (2007), Policy clash: Can projected aviation growth be reconciled with the UK Government's 60% carbon reduction target? *Transport Policy*, 14 (2), 103-110.

Bows, A., Anderson, K. and Upham, P., (2006), *Contraction & Convergence: UK carbon emissions and the implications for UK air traffic*, Peer Reviewed Tyndall Centre Technical Report No. 40.

³ CCC, 2008, *Building a Low-Carbon Economy - the UK's Contribution to Tackling Climate Change*, The Stationery Office, London. p.16.

our central expectation of temperature rise to 2°C, or as close as possible.

The CCC proceeds to recommend that global emissions reductions fall within the bounds set by two emission trajectories. The more stringent, according to the CCC, giving a probability of exceeding 2°C of 56% and the less stringent a probability of 63%; with both assuming a global emissions peak of 2016.⁴ Subsequent policy recommendations from the CCC are premised on this high probability range of exceeding 2°C.

UK Government Position

Neither the Government nor the CCC is shying away from the challenge of substantially reducing the UK's emissions. However, whilst the Government has endorsed the CCC's trajectories and by association their high probability of exceeding 2°C, the language of many Government statements evidently suggests, if not a zero probability of exceeding 2°C, at least a very low one. For example, in July of this year, the Government published its *UK Low Carbon Transition Plan*, in which it explicitly stated that

*to avoid the most dangerous impacts of climate change, average global temperatures **must** rise no more than 2°C⁵* [emphasis added].

The EU's long-established position on climate change, robustly supported by the UK, also demonstrates commitment to the 2°C threshold, stating that

*the EU must adopt the necessary domestic measures ... to **ensure** that global average temperature increases **do not** exceed pre-industrial levels by more than 2°C⁶* [emphasis added].

Strongly reinforcing both these statements, the Secretary of State for Energy and Climate Change, Ed Miliband, made absolutely clear at his press briefing on the 8 September 09 that

*we should limit climate change to a **maximum** of two degrees⁷* [emphasis added].

As it stands, the Government's endorsement of the CCC's position cannot be reconciled with the language of 2°C enshrined in much of its own climate change literature. Furthermore, the emissions reductions implied by these Government statements are radically different to those considered by the CCC, as the following section makes clear.

Understanding the difference in the Government's and the CCC's statements on 2°C

Whilst the language often used in Government statements evidently suggests a zero to low probability of exceeding 2°C, the Government is not explicit in quantifying what probabilities underpin their statements. In the absence of such quantification, probabilities can be inferred based on the approach developed for the IPCC's reports on climate change, whereby a correlation is made between the language of likelihood and quantified probabilities.⁸ Following this logic even a conservative judgement would suggest that Government statements could reasonably be quantified as representing a 5% to 33% chance of exceeding 2°C.⁹ This is a significant departure from the 56% to 63% 'recommend[ed]' by the CCC.¹⁰ Converting these probabilities of exceeding 2°C into emission-reduction rates and therefore low-carbon policies illustrates the scale of divergence between the CCC's position and many Government statements on 2°C.

According to the CCC's analysis their 56% and 63% of exceeding 2°C corresponds with UK annual emission reduction rates of around 3% p.a. from 2008. Applying the CCC's analytical logic to the probabilities implied in the

⁴ Ibid. p.21.

⁵ HM Government, 2009, *The UK Low Carbon Transition Plan: National Strategy for Climate and Energy*, The Stationery Office, London.p.5.

⁶ European Commission, 2007, Com(2007) 2 Final, 10.1.2007, Brussels.

⁷ 08 Sept 2009 Copenhagen in the Balance, press briefing by David Miliband and Ed Miliband. http://www.decc.gov.uk/en/content/cms/news/cop15_balance/cop15_balance.aspx

⁸ Climate Change 2007. The Physical Science Basis. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change. p.23. Cambridge University Press 2007.

⁹ At the 'less likely' end of the spectrum, the IPCC categorises a 33% probability of missing or exceeding something as "unlikely"; 10% as "very unlikely" 5% as "extremely unlikely" and 1% as "exceptionally unlikely".

¹⁰ It should be noted that the CCC's 56% and 63% figures relate to two different cumulative values and associated emission trajectories. By contrast the 5% to 33% probability range corresponds to a single cumulative value.

Government's statements (i.e. 5% to 33% of exceeding 2°C), raises the emission reduction rate dramatically to at least 9% annually. As this also includes emissions related to food production, a significant proportion of which it is not possible to eliminate, the emission reduction rate for energy alone would likely be considerably higher still, if indeed any emission space for energy exists at all.¹¹

The implications of the different probabilities of 2°C are difficult to exaggerate. Applying the CCC's probabilities gives 2020 and 2050 emission reductions of 35/42%¹² and 80% respectively, relative to 1990. By contrast extrapolating the Government's oft-cited stance on not exceeding 2°C has reduction levels rise to almost 70% by 2020 and virtually 100% by 2050, again relative to 1990. This latter scale of reductions corresponds with rates proposed in earlier Tyndall research for emissions from all sectors¹³ and, as noted above, would likely be much higher for energy alone.

Implications for the Aviation sector

The disjuncture between many Government pronouncements and the CCC's position on 2°C are pertinent to all sectors and not just aviation. However, the CCC's statement on aviation does illustrate the scale of the disjuncture, both quantitatively by 2020 and 2050 and in terms of the appropriateness or otherwise of low-carbon policies. Consequently, whilst the CCC may be in a position to reconcile its emissions trajectories with a significant emissions burden from aviation in 2050, interpreting the Government's commitment to 2°C leaves no meaningful emissions space for aviation in 2030, let alone 2050. The policy

repercussions of this distinction are also significant. Depending on the ability and acceptance of other sectors to compensate for continued aviation emission, proceeding with a third runway at Heathrow would not necessarily conflict with the CCC's emissions trajectories. However, this is categorically not the case if the Government's commitment to 2°C is translated into emissions targets. In this case, the aviation sector, as with all other sectors, would essentially require zero-emission energy use by 2030.

To conclude...

The statement on aviation from the CCC illustrates the need for much greater transparency and understanding of the probabilities associated with meeting the 2°C target. Far from being a technical and nuanced issue, the disjuncture between many Government and the CCC's statements on 2°C has fundamental repercussions for the framing of carbon-reduction policies.

The CCC's position is to explicitly forgo any reasonable chance of staying below 2°C in favour of maintaining some emission space out to 2050 and hence a slower transition to a decarbonised society. By contrast, taking Government statements on 2°C to their logical conclusion implies a significant shift towards rapid and large scale mitigation leading to complete decarbonisation of the energy system by 2030. The difference between these two in terms of policy is stark. The CCC's approach has time and space for low-carbon technologies to penetrate the energy system, whilst the more stringent 2°C position embodied in many Government statements demands almost immediate behavioural adjustments alongside rapid penetration of low-carbon technologies.

Returning to the issue of aviation and other high carbon infrastructure investments, deciding on the appropriate probability of 2°C is, given the potential to lock-in high emission trajectories, pivotal to coherent decision making. Consequently, investment in such infrastructure, including airport expansion, new coal or gas fired powerstations, along with new ports, roads, should all be put on hold pending an unambiguous statement from Government on its preferred probabilities in relation to the 2°C threshold between acceptable and dangerous climate change.

¹¹ With emissions peaking in 2016 and given the cumulative emission budget associated with a 5%-30% probability range of exceeding 2°C there would likely be no emission space for energy post 2016 once food emissions were taken into account (even at the 6GtCO_{2e} annual food emissions proposed by the CCC). In other words complete decarbonisation of the energy system would be necessary by 2016

¹² The higher number is more closely aligned with the CCC's scientific analysis (intended pathway), whilst the lower value includes broader political and economic 'realities' (interim pathway).

¹³ Anderson, K. and Bows, A., 2008, Reframing the climate change challenge in light of post-2000 emission trends, *Philosophical Transactions A*, 366, 3863-3882.

Anderson, K., Bows, A., and Mander, S., 2008, From long-term targets to cumulative emission pathways; reframing the climate policy debate, *Energy Policy*, 36, 3714-3722.

Related reading from Tyndall:

Bows, A., Anderson, K., and Mander, S., 2009, Aviation in turbulent times, *Technology Analysis & Strategic Management*, 21, 17-37.

Randles, S., and Bows, A., 2009, Aviation, emissions and the climate change debate, *Technology Analysis & Strategic Management*, 21, 1-16.

Anderson, K. and Bows, A., 2008, Reframing the climate change challenge in light of post-2000 emission trends, *Philosophical Transactions A*, 366, 3863-3882.

Anderson, K., Bows, A., and Mander, S., 2008, From long-term targets to cumulative emission pathways; reframing the climate policy debate, *Energy Policy*, 36, 3714-3722.

Anderson, K., Bows, A., and Footitt, A., Aviation in a low-carbon EU, Research report for Friends of the Earth, July 2007.

Bows, A., and Anderson K., (2007), Policy clash: Can projected aviation growth be reconciled with the UK Government's 60% carbon reduction target? *Transport Policy*, 14 (2), 103-110.

Bows, A., Anderson, K. and Upham, P., (2006), *Contraction & Convergence: UK carbon emissions and the implications for UK air traffic*, Peer Reviewed Tyndall Centre Technical Report No. 40.

Book: Alice Bows with Kevin Anderson and Paul Upham, *Aviation and Climate Change, Lessons for European Policy*, Routledge Press (2008).

Bows, A., Calverley, D., Broderick, J., Anderson, K., Nichols, F., and Glynn, S., 2009 Making a climate commitment: analysis of the first report (2008) of the UK Committee on Climate Change, Tyndall Centre research report for Friends of the Earth.