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Thank you for your response to the Airports Commission's recent consultation emphasising the importance of keeping aviation emissions to 2005 levels in 2050 and of incorporating this planning assumption into our assessment of the case and options for expansion[1]. As we publish our Final Report, I thought it would be helpful to write setting out how we have done this.

The CCC's planning assumption requires aviation emissions in 2050 to be limited to 37.5Mt CO_2. In order to understand the implications of this for future aviation demand, the Commission team developed a new approach to forecasting, which treats carbon emissions as a constraint, rather than as an output of the model. These forecasts show unconstrained demand growth consistent with the planning assumption of 61% over 2005 levels by 2050.

That new forecasting approach demonstrated that runway capacity would be stretched to its limits in the South East of England over the next fifteen years, even with policies in place to manage the growth of aviation emissions, and formed the core of the assessment in our Interim Report that one net additional runway would be needed in the South East by 2030.

We have incorporated the carbon-capped approach to forecasting into our assessment of the three shortlisted schemes for new runway capacity. This has included our assessments of the enhanced capacity and connectivity provided by each option, the benefits from reduced delays, their noise impacts and their commercial viability.

As your letter notes, incorporating the planning assumption into our economic analysis presented a number of technical challenges, and we were not able to complete this work prior to consultation. For that reason, the economic analysis presented for consultation was based on our carbon-traded forecasts, which applied the DECC central carbon price to aviation emissions.

[1] http://www.theccc.org.uk/wp-content/uploads/2015/02/CCC-AC-consultation-response.pdf

Since then, we have developed and tested a number of approaches to gain a better understanding of the implications of the CCC's planning assumption for each scheme's economic case.

First, we have looked at the effect of reducing underlying demand to a level at which overall UK aviation emissions with expansion would not exceed 37.5MtCO_2. Whilst conceptually this would be consistent with UK aviation being subject to some form of international trading scheme, in line with the view in the CCC's 2012 report on international aviation and shipping, no trading or purchase of offsets has been included to allow UK aviation emissions to rise above 37.5MtCO_2.

On this basis, the monetised transport economic efficiency and wider economic benefits of expansion in the carbon capped (CC) scenario are reduced by just over 40% per cent compared to the carbon traded (CT) ones. This is shown in the table below for the three runway options: Gatwick; Heathrow North West (NW) Runway; Heathrow Extended Northern (ExN) Runway. (It should be noted that the table shows just the benefits and not the costs of the schemes.)

Appraisal results (£bn)	**Gatwick**		**Heathrow-NW**		**Heathrow-ExN**	
	CT	**CC**	**CT**	**CC**	**CT**	**CC**
Transport economic efficiency	7.8	3.5	18.3	9.7	16.4	8.5
Wider economic impacts	8.1	5.5	11.5	7.7	10.0	6.6
TOTAL	**15.9**	**9.0**	**29.8**	**17.4**	**26.4**	**15.1**

Second, we have identified an indicative set of policies that could enable aviation emissions for each shortlisted scheme to be restricted to a level consistent with the planning assumption, and carried out a sensitivity test to calculate the transport economic efficiency benefits on this basis. This approach responds to criticisms made by some environmental NGOs that it is not enough simply to assert that emissions will be restricted to 37.5MtCO_2 in 2050 and that it is important also to demonstrate how this might be achieved.

For the Gatwick option, the changes required are modest, an increase in the carbon price (to around £330 per tonne in 2050) and a level of biofuels usage below the CCC baseline are sufficient to constrain emissions to 37.5MtCO_2. For the two Heathrow schemes, a more significant package of measures would be needed, for example including the same carbon price and significantly higher biofuels usage, plus a range of operational efficiency improvements.

This approach produces higher transport economic efficiency benefits, but the costs of the policy measures adopted need to be offset against these. The net results are £4.5bn for Gatwick and £8.9-10.2bn for the two Heathrow schemes. This approach also generates higher wider economic impacts.

Finally, we have endeavoured to assess the case for each scheme in a context in which emissions reach 37.5MtCO_2 in 2050 both in the baseline and with expansion.

The benefits calculation tools available to us were primarily designed to identify and value impacts associated with increasing levels of air travel and do not have the functionality accurately to assess benefits arising as a result of changes in the types of journey made. The analysis has been challenging and it has not resulted in estimates that we think can be relied on.

We have therefore sought to consider whether there would be a case for expansion even if the modelled transport economic efficiency element of the benefits were reduced to zero. Even with this extreme assumption, expansion would still be commercially viable and would deliver improved reliability and resilience and enhanced competition in the London airports system. It would improve access to London's strong international connectivity from the English regions and from Scotland and Northern Ireland. Crucially, it would also enable the UK airport system to provide higher levels of long-haul capacity, which will be increasingly important to the UK's long-term prosperity as the world's economic centre of gravity shifts eastwards.

So even in this extreme scenario the Commission's judgement is that the strategic case would justify proceeding.

In the Commission's view, the more that aviation's 'carbon budget' is constrained, the more important it will become to enable that budget to be used as effectively as possible. To achieve this, capacity has to be available where it is most needed. As the effects of stronger carbon policies begin to be felt across the economy, alternatives to aviation will become more attractive, but many trips will still need to be made by air.

I hope that this summary of the work that the Commission has done in the light of your correspondence, and the conclusions that we have reached as a result, is helpful.

Yours Sincerely

Sir Howard Davies, Chair