Building a zero carbon economy - CCC Call for evidence 2018

10:10 Climate Action response

The Committee on Climate Change – Call for Evidence
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Background

10:10 is a national climate change charity based in North London that brings people together to take positive practical action on climate change. Our first campaign in 2010 asked everyone to reduce their carbon emissions by 10%, and gave us our name. We engage citizens and communities in ending carbon pollution from fossil fuels, and building an energy system run by renewable energy. We also help people use less energy in their daily lives, particularly at home.

10:10 supports the campaign for a frequent flyer levy by Fellow Travellers, which was set up independently by one of our directors, Leo Murray, and this should be considered a joint submission from both organisations.

Responses

We welcome the opportunity to provide evidence in support of moving the UK to a net-zero emissions target. With more time and capacity we would have prepared a more comprehensive submission to this important call; our responses here are limited to questions 6 and 9,

specifically with respect to emissions from aviation.

Question 6 (Hard-to-reduce sectors): Previous CCC analysis has identified aviation, agriculture and industry as sectors where it will be particularly hard to reduce emissions to close to zero, potentially alongside some hard-to-treat buildings. Through both low-carbon technologies and behaviour change, how can emissions be reduced to close to zero in these sectors? What risks are there that broader technological developments or social trends act to increase emissions that are hard to eliminate?

ANSWER:
Fellow Travellers have just completed an analysis of the carbon mitigation potential of electrified flight in the UK air travel market, which we will also send to CCC analysts once the final draft has been reviewed. The key constraint for electric flight using known technology is range; as battery technology improves, range increases. We found that fully electric aircraft currently under development for market entry within the next decade would be suitable for decarbonising domestic air travel and some short haul international routes.

In total, electric planes on these routes have the technical potential to mitigate around 13% of UK aviation emissions if fuel electricity is derived from zero carbon sources. The practical potential will be lower, and the economic potential lower still under the present market conditions. The technology readiness levels of these prospective aircraft designs remains low, while the development status of many of them is uncertain and timeframes speculative. Fleet turnover is also slow in the civil aviation sector, and accelerating this would require substantial market intervention.

Replacing all aircraft flying from UK airports on routes of under 1000km with fully electric planes would yield a saving of around 8% of UK aviation emissions, and we regard this as a realistic policy goal. Doubling this range to 2000km, well beyond the ambitions of any electric aircraft developer, would still save just 22% of total UK aviation CO_2 emissions. Fundamental engineering constraints come into play at higher ranges, but even electric aircraft capable of travelling almost 4500km on a single charge, flying every suitable route from UK airports, could only mitigate some 35% of total UK aviation emissions.

We agree with the CCC that scope for biofuels to mitigate aviation emissions is extremely limited; 10% may be a reasonable upper bound for fuel mix in 2050, but the experience with the RTFO to date is not promising for securing genuine life cycle emissions reductions via this approach, and policy design and enforcement will need to be much more careful to ensure aviation biofuels do not have the perverse outcome of increasing emissions. European NGO Transport & Environment recently published a 'Roadmap to decarbonising

european aviation' which includes an analysis of the mitigation potential for liquid electrofuels[1]. We agree with T&E that this is appears to be the only feasible technological method of full scale decarbonisation of long distance air travel, but costs - at between three and six times the price of untaxed kerosene, equivalent to a 59% increase in ticket prices - appear prohibitive. There are practical considerations around the requisite volume of renewable power supply to meet demand for synthetic jet fuel in 2050 too, estimated to be equivalent to 95% of all renewable electricity supply in Europe in 2015.

In addition to radical improvements in technology and operational efficiency, also key to the T&E 'roadmap' is reduction in projected demand growth, and this is a key feature of other contemporary net-zero scenario analyses such as the Energy Transition Commission's 'Mission: Possible'[2] paper, WWF's 'Keeping it cool' report[3] and the Centre for Alternative Technology's Zero Carbon Britain work[4]. All these strategies imply a two pronged approach that inevitably increases the cost of flying, which is required to both cover the additional marginal abatement cost of technological improvements and also to reduce passenger demand against a business as usual scenario.

Irrespective of vague and contradictory technological optimism expressed by figures such as Sir John Armitt of the National Infrastructure Commission, there are no credible assessments showing how it is possible to meet current UK climate goals without deliberate policies to limit air passenger demand to below its unconstrained level, and this will become an urgent imperative if the UK adopts a net-zero emissions target. Effective demand management through fiscal measures such as ticket taxes is politically challenging due to the low price elasticity of demand for air travel, which we discuss further in our response to question 9.

For clarity, we do not consider carbon offsetting to be a legitimate approach to mitigating emissions from international air travel, and it is not within the scope of this question.

Question 9 (Behaviour change): How far can people's behaviours and decisions change over time in a way that will reduce emissions, within a supportive policy environment and sustained global effort to tackle climate change?

ANSWER:
The choice architecture for long distance travel currently steers people towards flying.

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[1] https://www.transportenvironment.org/sites/te/files/publications/2018_10_Aviation_decarbonisation_paper_final.pdf

[2] http://www.energy-transitions.org/mission-possible

[3] https://www.wwf.org.uk/sites/default/files/2018-11/NetZeroReportART.pdf

[4] http://www.zerocarbonbritain.org/images/pdfs/ZCBrtflo-res.pdf

Price signals to consumers are not reflective of social and environmental costs; the air travel industry successfully externalises these, distorting individual transport and leisure decisions towards air travel, even for relatively short distances such as between UK cities. Kerosene remains untaxed, and plane parts, repairs and tickets are all zero rated for VAT alongside items like wheelchairs and baby clothes. APD rates are not set high enough to materially affect passenger demand. Meanwhile rail fares in Britain have risen by 42% since 2008, and are set to rise by another ~3.5% in 2019.

It is also the case that many types of journey are impractical to make by any means other than air travel, and these journeys are often regarded as essential by those who make them. The price elasticity of demand for long haul leisure travel is consequently very low; but long haul flights account for around 72% of UK aviation emissions. ONS Travel Trends statistics show that 2017 saw record numbers of air passengers at UK airports, both in terms of overseas visits by UK residents, and visits to the UK by overseas residents. The long term trend is one of increasing passenger numbers for inbound and outbound leisure flights, alongside increasing emissions.

The reverse is true for the business travel market however, which has been in long term gradual decline as a proportion of all flights since 2000, due largely to structural trends and information technology taking market share from air travel for business connectivity. Long haul business flights are highly price inelastic, which suggests that the most effective policies to accelerate this ongoing trend of modal shift away from long haul flights may be those which incentivise alternative ways of doing business internationally. Domestic and short haul business flights are much more amenable to modal shift, and demand is more susceptible to changes in price.

Attenuating demand growth in leisure air travel is essential, but policy to achieve this end must be approached from both the principle of social justice and from the tactical perspective of what could be publicly acceptable and therefore politically deliverable. Fellow Travellers and 10:10 Climate Action (amongst other NGOs, think tanks and unions) have proposed replacing APD with a frequent flyer levy. Under this framework, passengers at UK airports would be allowed one tax-free flight during each 12 month period, with an incrementally rising levy for each additional flight thereafter during the same period.

This is potentially an effective approach to demand management because it would impact a much smaller number of stakeholders than a blanket rise in the price of plane tickets, but would concentrate demand attenuation on the group that is responsible for the majority of the climate change impacts of UK aviation. Our best estimates from available survey data are that around 70% of all flights by UK residents are taken by just 15% of the population - frequent flyers. Membership of this group is heavily dominated by households near the top of the income spectrum. The two strongest corollaries of frequent flyer status are household income of £115,000 or more, and ownership of a second home abroad. The greatest beneficiaries of aviation's generous tax treatment in

the UK are therefore those who could most easily afford to pay more for plane tickets.

By contrast, around half of UK residents do not fly in any given year, while around one fifth say they never fly / have never been on a plane. Normal international travel behaviour for the British public is typically zero, one or two return flights per year. Because these flights account for such a low proportion of UK aviation's climate impacts, but are highly prized by those who take them (eg the annual family holiday in the sun), we would argue that policy to attenuate demand growth should seek to avoid targeting these flights in order to secure the widest possible public consent.

Conversely, low price elasticity means that demand levels will be unresponsive to fiscal measures to increase the cost of flying, unless prices rise beyond a threshold that will disproportionately affect access to air travel for those on lower incomes. This would effectively do what the aviation lobby have always accused advocates of climate action of wanting to do, ie "price the poor out of the skies". These socio-political dynamics are why we prefer a frequent flyer levy over other options to reduce demand growth and make the price of air travel cover a greater share of the environmental costs it currently externalises. These dynamics are also, we would contend, the reason why politicians have up to now considered policies to manage demand for air travel to be undeliverable.

The New Economics Foundation modelled the effect of a frequent flyer levy for us, under a scenario in which the rates of the levy are calibrated to deliver the CCC's planning assumption for aviation emissions in 2050. This would roughly double the tax revenue from UK air travel to 2050 relative to a counterfactual in which APD is maintained, and would lead to a steep reduction in demand growth amongst those in the top income quintile of the UK population, versus a concomitant slight increase in demand growth amongst households in the bottom income quintile. The result would be a more equal distribution of flights across the income spectrum, against an absolute level of demand that is consistent with our current climate change targets.

A proportion of this additional tax revenue could be reinvested in decarbonising air travel through making modal shift to rail more attractive for domestic and some short haul routes; through subsidising mandatory fleet electrification for Highlands and Islands and similar routes; and R&D spend on improving the EROI in electrolysis processes, establishing hydrogen feedstock supply chains and building domestic refineries for synthetic electro-fuels to progressively replace kerosene in planes flying from UK airports.

10:10 commissioned a YouGov survey of UK adults in November to assess the effect of a variety of factors on public support for policies to tackle aviation's climate change impacts in general, and a frequent flyer levy in particular. We have sent the full survey results to CCC analysts, but discuss some of the key findings here.

Around half of respondents say they would be willing to reduce the amount they fly in

order to protect the environment, against around 30% who would be unwilling to do so. The corresponding figures amongst those who say who say they are concerned about climate change are 61% willing / 24% unwilling - but this changes to 69%/21% if a modifier is added: "if you knew other people were also reducing the amount they fly". This implies that the more concerned the general population is about climate change, the more willing they may be to accept policies to curtail demand.

However, the group most willing to reduce the amount they fly are those who report taking no flights in the past year, while those who report having taken seven or more flights are the least willing, even in the context in which they know others are reducing flying (36% willing / 59% unwilling). This likely reflects both entrenched patterns of behaviour (eg second home ownership abroad) and cognitive bias around loss aversion. The implication for policymakers is that acting sooner to head off people adopting unsustainable lifestyle choices will be more effective and easier than attempting to reverse such choices after they have been made.

Nearly half (47%) of respondents agreed that 'people should be allowed to take as many flights as they want', with only 17% disagreeing with this statement. Adding the modifier 'even if this means Britain cannot meet targets to protect the environment for future generations' alters the balance to 31% agreeing and 33% disagreeing. This modifier almost certainly reflects the objective situation the UK faces, so it is not encouraging that the public seem evenly split on this. Amongst those concerned about climate change, only 23% agree while 42% disagree. Only a quarter of frequent flyers (3+ flights) disagree with unlimited flying even if this makes climate targets unattainable, with nearly 45% agreeing.

Similarly, 32% of respondents agree that "The price of a plane ticket should reflect the environmental damage that flying causes, even if this makes air travel more expensive", while 49% believe air travel should not be taxed more. Even those who are concerned about climate change are evenly split on this question, at 41%/43%.

Conversely, 43% agree that "The government should do more to tackle environmental damage caused by air travel", with just 28% believing that "The government is doing all it reasonably can to tackle environmental damage caused by air travel". A substantial 30% responded that they do not know, which illustrates the low public awareness of the environmental impacts of air travel and measures to address it.

When asked to choose which policy options (from a list) would help tackle environmental damage caused by air travel, a frequent flyer levy is the most popular choice by a large margin, selected by 36% of respondents, ahead of taxing aviation fuel, adding VAT to tickets or constraining air traffic at airports through planning restrictions. It is also more popular than 'none of these', which polled 20%, or 'don't know' at 23%. A frequent flyer levy remains the most popular choice for all passenger groups except those taking seven or more flights, for whom 'none of these' is the most popular response at 36%. Even

amongst these very frequent flyers, a FFL is still the most popular policy option, with 22%.

Most people (57-60%) say they would be more likely to support increasing overall taxes on air travel if the additional revenue went towards good causes, but there is little difference in support for spending on either other forms of transport such as rail; R&D to develop more sustainable air travel; or general public spending on eg NHS or education.

A majority of respondents - 56% - feel that replacing APD with a frequent flyer levy would be a fair policy approach, with just 26% feeling it would be unfair. Even amongst frequent (3+) flyers, 50% agree this would be fair, with 36% disagreeing; only amongst very frequent (7+) flyers do a larger proportion (50%) think a FFL would be unfair - but even here, 42% agree this would be fair. Amongst those concerned about climate change, 64% agree a FFL would be fair, against 21% who feel it would be unfair.

This is a significant finding, because perceived fairness has been explicitly identified as the critical factor for public acceptability of mitigation policies in the IPCC's Special Report on 1.5ºC[5]. This will be particularly crucial for politically and socially fraught areas such as managing air passenger demand within safe limits.

Asked whether a FFL would be effective, people are much less certain, with 31% stating it would effective against 35% stating it would not be effective - alongside 34% stating that they do not know. Very frequent (7+) flyers are predominantly of the view that a FFL would not be effective (58% stated this position against 20% effective).

This is reflective of a much broader public ignorance around the relative effectiveness of different actions an individual can take to reduce their carbon footprint. Asked to choose which of up to two options from a list of nine actions would have the biggest impact on reducing emissions, 37% correctly identify 'go car free'; this is the most popular answer by a large margin. However, the next most popular response is 'recycle all household waste', chosen by 30% of respondents, ranked far ahead of taking one less transatlantic flight (15%) or going vegetarian or vegan for a year (12%). But recycling only has the potential to reduce household emissions by ~0.3tCO2e, whereas adopting a plant-based diet and avoiding one transatlantic flight would reduce emissions by around 0.8 and 1.6tCO2e respectively[6]. It is clear that the public are in general not well enough informed to be able

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https://www.researchgate.net/profile/Priyadarshi_Shukla/publication/328190559_GLOBAL_WARMING_OF_15_C_-_an_IPCC_special_report_on_the_impacts_of_global_warming_of_15_C_above_pre-industrial_levels_and_related_global_greenhouse_gas_emission_pathways_in_the_context_of_strengthening/links/5bbdbce292851c4efd534021/GLOBAL-WARMING-OF-15-C-an-IPCC-special-report-on-the-impacts-of-global-warming-of-15-C-above-pre-industrial-levels-and-related-global-greenhouse-gas-emission-pathways-in-the-context-of-strengthenin.pdf

[6] Seth Wynes and Kimberly A Nicholas (2017) Environ. Res. Lett. 12 074024

to accurately differentiate between high and low impact actions, and in particular, are ignorant of the relative carbon impact of air travel.

We can infer that confirmation bias is also playing a role here, as only 10% of frequent and very frequent flyers select 'take on less transatlantic flight' from the options, despite being far more likely than other respondents to have actually taken a transatlantic flights in the past 12 months. Both groups rank 'upgrade to energy efficient light bulbs' ahead of reducing air travel, but this action has only a fraction of the mitigation potential, at less than 0.2tCO2e.

There are some important corollaries in our survey. Those who accurately select reducing air travel from our list as one of the two most effective actions to reduce personal carbon footprints are significantly more likely to believe the price of a flight should reflect environmental impact (47.7% compared to 31.27%), and even more likely to believe the government should do more to tackle climate change caused by air travel (62.7% compared to 41.5%). This suggests that raising public awareness about the relatively extreme climate impacts of air travel could be an effective way to build support for mitigation policies that raise costs and/or constrain demand. This group also, on average, fly less frequently than others and are more likely to be concerned about climate change.

Another striking correlation is between those who say they or someone they know has reduced the amount they fly to help the environment. This group are more than twice as likely to believe that the price of a plane ticket should reflect environmental impact (65.3% compared to 30.4%), and much more likely to believe the government should be doing more about these impacts (75% compared to 41.5%). There may be a causal relationship here; this would be consistent with recent research demonstrating that around half of people who know someone that has given up flying because of climate change choose to fly less themselves as a consequence[7].

Other recent evidence on the public acceptability of aviation climate mitigation policy includes a study on Swedish public attitudes towards a carbon-based flight tax[8]. This found that people's willingness to pay is higher for mandatory taxation than voluntary fees, (eg carbon offsets), and such a policy could attain majority public support; but also that willingness to pay reduces for long-haul, higher price scenarios. Their finding that frequent flyers are less willing to pay than others mirrors the findings of our survey. Unlike our

[7]Westlake, Steve (2018) *"A counter-narrative to carbon supremacy: Do leaders who give up flying because of climate change influence the attitudes and behaviour of others?"*

[8] Jonas Sonnenschein & Nora Smedby (2018) *Designing air ticket taxes for climate change mitigation: insights from a Swedish valuation study*, Climate Policy, DOI: 10.1080/14693062.2018.1547678

survey, the Swedish study found a strong preference for hypothecation of additional revenue.

BSA 2017 (table ATT0323) also found that more people are unwilling (34%) than willing (22%) to reduce air flights to combat climate change (although 5% state they already do this and 18% say they never fly). BSA 2017 found that support for unlimited flying stands at harms the environment, support stands at just 19% (ATT0326) - a much lower proportion than we found in our survey. 45% also agreed that the price of a plane ticket should reflect the environmental damage that flying causes, even if this makes air travel more expensive (ATT0327), with only 23% disagreeing.

Meeting an overall net-zero target requires deliberate policy to effect mass behaviour change in hard to decarbonise sectors such as air travel, but this must be pursued with due regard to principles of social equity, and perceived fairness will be a vital factor in securing public consent for such policies. We believe replacing Air Passenger Duty with a frequent flyer levy would be an effective and politically viable way to control UK aviation emissions within safe limits, while maintaining access to air travel for all members of British society.

One group of passengers in which demand could be reduced with limited impacts on utility and social value of air travel for UK residents is international transfer passengers.

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