Lords Environmental and Climate Change Committee on Mobilising action on climate change and environment: behaviour change

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Evidence submitted by Dr Noel Cass, Institute for Transport Studies, Leeds University on behalf of the Centre for Research into Energy Demand Solutions.

The full consultation response, as submitted, is below.

Written evidence from Centre for Research into Energy Demand Solutions (CEE0069)

This submission is based on our project on High Energy Consumers funded by the Centre for Research on Energy Demand Solutions[1]. The project investigated the potential for reduction of high-end domestic and travel-related (henceforth ''household') energy consumption to contribute to decarbonisation.

Summary:
- We confirm known drivers of high household energy consuming behaviour as home heating, car use and frequent flying.
- We identify that these and other energy consuming behaviours are normalised in high consuming households and are driven by social norms and expectations rather than behaviourist understandings of discrete, rational choices primarily based on information and attitudes.
- We provide evidence that deliberation reveals that even high consumers believe that strong government action is required to limit some choices and make others more viable, to achieve behaviour change that has not manifested voluntarily.
- We therefore advise that government investment in low carbon alternatives and restriction of high consumption infrastructures and devices is necessary to achieve behaviour change in line with Net Zero targets.

Our project had 3 phases of research: Quantitative area analyses identifying high household energy consumption; Qualitative interviews of 30 people sampled from these areas, to explore their high-consuming homes and lifestyles, and Deliberative workshops to explore the differential impacts, fairness, effectiveness and acceptability of different policy approaches to significantly reducing (particularly high) domestic and travel-related household energy consumption.

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[1] https://www.creds.ac.uk/high-energy-consumers/

Main author:
Dr Noel Cass, Research Fellow in Energy Demand Behaviour[a]
Contributors:
Prof Jillian Anable, Chair in Transport and Energy[a]
Prof Karen Lucas, Professor of Human Geography[b]
Dr Muhammad Adeel, ex-Research Fellow[a], currently Urban Planning Specialist, The Urban Unit, Government Administration, Lahore, Punjab, Pakistan.
Dr Milena Büchs, Associate Professor in Sustainability, Economics and Low Carbon Transitions[a]
Dr Robin Lovelace, Associate Professor of Transport Data Science[a]
Dr Malcolm Morgan, Research Fellow for Transport and Spatial Analysis[a]
Dr Caroline Mullen, Senior Research Fellow[a]

[a] Institute for Transport Studies, Leeds University.
[b] School of Environment, Education and Development, University of Manchester.

Possible lifestyle changes needed
A. Lifestyle changes most needed

Direct domestic emissions are largely produced by home gas space heating and car use, averages of which increase with household income (See Figure 1).

Domestic energy consumption is primarily driven by the number of rooms, size of a house, how well it is insulated, and by household income. Behaviour changes such as dressing warmly or zone heating (leaving unused space unheated) can reduce space heating, but our interviews revealed that household members often spend time in separate rooms, frequently using multiple ICT devices which leads to distributed space heating.

> *"Nobody spends any time together these days, right? Kids migrate to their rooms or online; the wife watches her TV upstairs and says it's too cold downstairs, and I'm downstairs, right? It's modern families."*

Therefore, insulation and electrification of heating along with behavioural measures should be prioritised within net zero strategies.

Car driving is often habitual and heavily influenced by the accessibility of locations such as education, work, shopping, visiting friends and family and leisure, framed by a context of a largely privatised, insufficient, inadequate, and costly 'public' transport system. Our deliberative workshops called for massive provision (and therefore investment in) public transport, to address car dependence, and to make it a viable alternative for many. Some agreed with restrictions on some unnecessary driving. Even some high consumers with high annual mileages agreed that their cars and car use should be taxed more to discourage their own high consumption.

> *"we live in … Macclesfield … there are plenty of Porsches and Lamborghinis and Ferraris around here, you know, they should pay 10*

times the amount of tax for the pleasure … say you drive a hybrid, you should pay a fraction of the tax … because you're trying to be more environmentally friendly"

Average household electricity use, particularly appliance use, more discretionary and amenable to behaviour change, similarly increases with income, but contributes less carbon impact.

Air travel and frequent flier emissions are another significant contribution in higher income households, who also contribute most in absolute terms to increases in frequent flying. We found this to be linked to jobs in sectors such as management and engineering, and to lifestyles involving regular foreign holidays, often to properties owned by interviewee's friends and family. Deliberations revealed that some frequent work fliers felt that their companies should be financially penalised for flights, to reduce their own flying.

> *"in one year, I did, like, 70 long distance flights … all on business, for business reasons. And you know, what we need to do is tax me and my business more … but not tax someone who's just taking a holiday a year or travelling to Edinburgh to see their grandparents, right?."*

Voluntary reductions in leisure flights were not mentioned, although it was seen as a fair target for rationing (e.g. annually, of air miles or flights), and car use was seen as difficult to reduce based on voluntary behaviour change rather than measures aimed at reducing choice – after investment in alternatives.
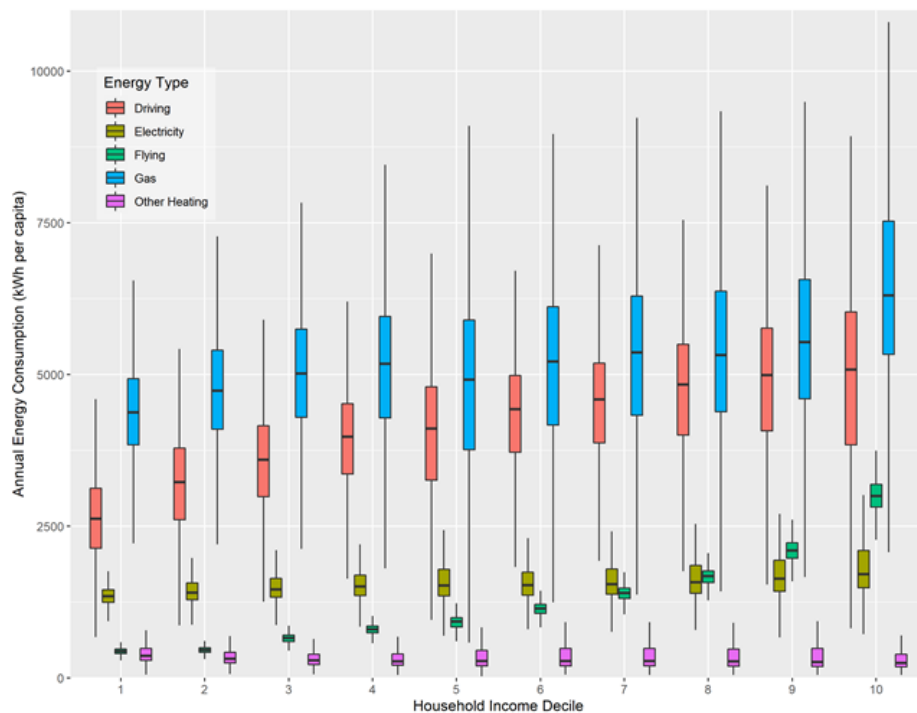

Figure 1: Energy consumption per capita in different household income deciles, 5 main household energy uses

Therefore, the 'lifestyle changes' with the most potential contribution to reducing emissions are insulating and changing to electric heating, reducing car use massively, changing to a vegetarian diet, and avoiding flights (see figure 2). Ivanova (2021)[2] review international studies on the carbon reduction potentials of different 'behaviour changes', for further information.
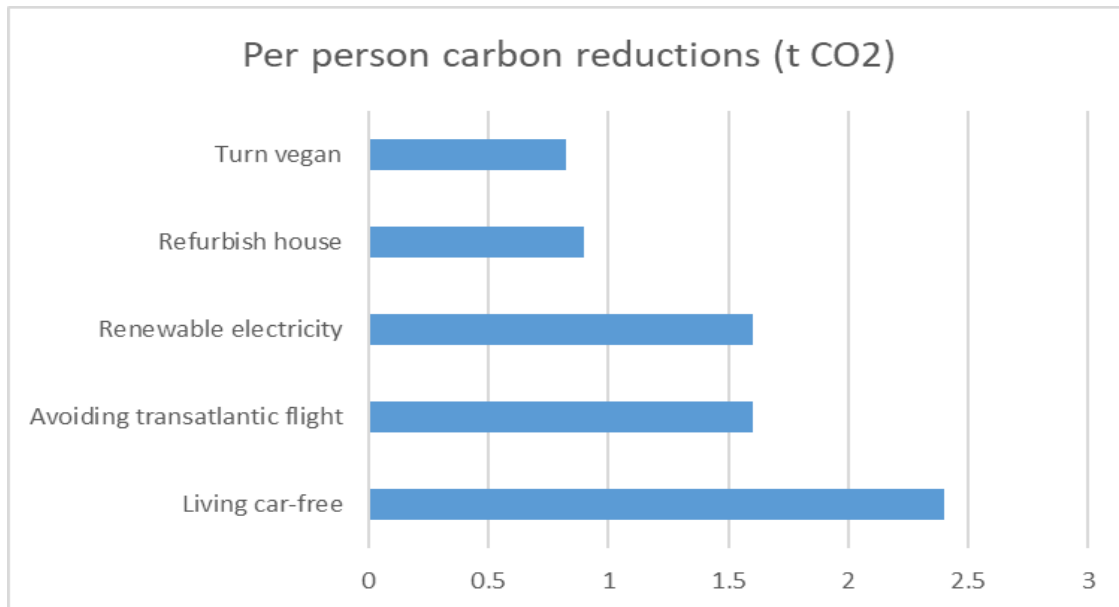

Figure 2: Most impactful lifestyle changes for carbon reductions. Image by Cass and Mullen, based on Ivanova et al. 2020: see original publication for error bars.

Public attitudes
B. UK public's level of concern

Climate change concern is higher than ever, IPSOS Mori and CAST[3] (Aug 2021, n=5,665) found 83% of UK adults polled are worried about climate change, 45% very or extremely. Internationally, Kantar Public (Sept 2021)[4] found 78% 'feel personally concerned' by climate change (9 developed countries including the UK, n=9,000). These surveys may reveal higher concern raised by the higher profile of climate change in the last months.

Environmental concern was less prominent in our own interviews with high consumers, despite the interviewees knowing the research was looking into energy use in the context of climate change policy.

- *Environment/eco-friendly* influences on interviewee's lifestyles and behaviour were only mentioned in 22/30 interviews
- The 43 mentions were ranked 15th in terms of numbers of mentions/coded segments in analysis, below 14 other influences, many clearly linked to consumerism (see table 1).

This suggests that concern about the environment and eco-friendliness is not a major influence on the behaviour and lifestyle choices of high consumption

[2] Ivanova, D., et al. (2020). https://10.1088/1748-9326/ab8589
[3] https://cast.ac.uk/wp-content/uploads/2021/10/CAST-Briefing-09.pdf
[4] https://kantar.turtl.co/story/public-journal-04/page/1

households. Rather than focussing on attitudes to climate change, the Committee might focus on attitudes towards potential policy responses, while not privileging this over effectiveness.

Influence sub-code	Number of interviews	Number of mentions	'Type' of Influence
Norms and expectations	30	154	Ratcheting norms
Routine	29	142	Ratcheting norms
Cost	28	139	Behavioural
Family and relationships	29	125	Structural
Upbringing	26	96	Biographical
Brands	27	71	Cultural
Convenience	23	66	Ratcheting norms
Efficiency	23	62	Behavioural
Exercise and health	22	60	Discursive
Consumer Choices	22	57	Behavioural
Technological possibilities	20	53	Structural
Novelty	23	51	Ratcheting norms
Media and online	23	46	Cultural
Restaurant	23	45	Cultural
Environmental eco friendly	22	43	Discursive
Competence	16	43	Biographical
Property market	19	42	Cultural
Privilege	17	39	Biographical
Comfort	19	38	Ratcheting norms
Own space	19	37	Structural
Office environment	13	35	Cultural
Dogs and cats	12	31	Structural
More space	18	31	Structural
Staff and services	18	31	Cultural
Speed	18	28	Behavioural
Frugality	10	15	Discursive
Experience	7	14	Ratcheting norms
Beauty	10	12	Cultural
Airport proximity	7	10	Structural

Table 1: Number of segments coded for different influences on lifestyles in interviews

C. UK public's appetite for the key lifestyle changes

In summary, a broad consensus in our public deliberators was for some form of ring-fenced green taxing (on carbon, or frequent flights, or car use) to (partially) fund major investment in alternatives, such as (ideally free) adequate public transport, renewable energy, insulation and electric heating, and cheap trains to replace internal and where possible international flights. There were convincing arguments that behaviour change is only likely and viable when systems of

provision, the market and infrastructure have been altered (in the right direction) by the state.

The national opinion polls mentioned above, and Climate Assembly UK, found that there is large public support for bans, subsidies, levies, and other strong government action to enforce behaviour change[5]. Our high consuming interviewees largely believed they had already made all the behaviour changes that they 'could': recycling, replacing lightbulbs with LEDs, keeping thermostats to 20 degrees, and avoiding packaging. These consumer understandings of climate action are limited, and to some extent reinforced by Government behaviour change messages, but are at the very lowest level of effectiveness[6]. The key lifestyle changes of lowering car use and flying were not seriously considered in interviews, but were taken seriously in deliberations, arguing for the importance of deliberation.

WORKSHOP 1: **High Mobility, High Domestic energy consumption – we have recruited.** 10 highest-consuming interviewees targeted for re-booking in Workshop 1.	WORKSHOP 2: **Low Mobility, High Domestic energy consumption** Min: 1 x no car AND less than one return flight a year, on average Min: 1 x <5,000 miles p.a. AND less than one return flight a year, on average. Min 1 x any mileage p.a. AND no flights in last 5 years, on average. All: energy bills > £120/month
WORKSHOP 3: **High Mobility, Low Domestic energy consumption** Every recruit fits at least one of: 3+ cars in household, 2+ cars personally, 15,000+ miles car travelled annually, or 2+ return flights All: energy bills < £80/month	WORKSHOP 4: **Low Mobility, Low Domestic energy consumption** Min: 1 x no car AND less than one return flight a year, on average Min: 1 x <5,000 miles p.a. AND less than one return flight a year, on average. Min 1 x any mileage p.a. AND no flights in last 5 years, on average. All: energy bills < £80/month

Table 2: Recruitment criteria for four Deliberative Workshops

Our deliberative workshops with recruited members of the general public[7] revealed complex responses to four broad policy approaches to reducing household and transport energy consumption, namely **Rationing, Structural Change, Economic (Dis)Incentives, and Behaviour Change**.

There was strong support for a focus on **Structural Change**, meaning the provision of alternatives, i.e.: good public transport; high quality, safe, active travel networks; reduction of road space for motor vehicles; cheaper renewable

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[5] https://demos.co.uk/wp-content/uploads/2021/09/Climate-Consensus.pdf

[6] Ivanova et al. (2020) are the best resource.

[7] See table 2.

energy; grants for electrifying heating, and; regulation removing high energy devices or homes. In other words, we found support for reducing consumer choices where they were responsible for high energy consumption, in contradiction to the UK Net Zero Strategy first principle of 'going with the grain of consumer choice':

At least some deliberative workshop participants wanted to have high energy choices taken away:

> *"you can buy a house with a low energy rating and do things to improve that energy rating; you can't buy a washing machine and improve the energy rating of it, same as you can't do that with a TV. So **why are we allowed** to buy things that are so poor in their energy rating in the first place?"*

> *"I think structural change is … fairer, because … if you **don't give people the option**, and that is their only, like, their only choice, then at least everyone's in the same playing field"*

Economic (Dis)Incentives such as frequent flier levies and higher tax on car use, had substantial support as a means to reduce energy consumption. It was acknowledged that such measures would impact low income people, requiring government support or subsidies from ring-fenced carbon taxes to avoid hardship. Tax and subsidy should work together:

> *"…we have to make inefficient carbon-emitting forms of transport prohibitive from a tax perspective and subsidise cleaner forms of transportation. And then people will make the choices themselves"*

Rationing of untradeable individual/family credits/budgets (of energy or carbon, preferably flexibly across different lifestyle behaviours) had less support and for some would only be considered as a 'last resort.' Yet it was considered *fair*, as it would apply to everyone equally:

> *"…if there's going to be some kind of restriction, it has to be even across the board if, you know, if we're trying to achieve a reduction in carbon, and it's everyone's responsibility, then everyone has to be cut off at the same point. It can't have this system where the super-rich travel because they can, and poor people don't."*

Participants argued that exemptions would have to apply, personal circumstances taken into consideration, and non-compliance 'policed' and sanctioned.

Behaviour Change (i.e. campaigns and information to influence voluntary choices) was seen as the least effective approach, essentially representing and reinforcing the *status quo*, as governments have largely relied on so-called 'nudge policies' in the beliefs that information changes behaviour.

This interview quote represents the dominant view in our high consuming interviewees (who almost all had them) that smart meters have no such effect:

> "…it's not giving you any information really, because you're not going to change your habits just because you're looking at a meter … it's pointless"

Instead, it was felt that the seriousness of climate change justifies challenging freedom and choice.

> "I think we've got to get into that mind-set that we all have to infringe our own liberties in order to make this work, because we've been given the freedom and look where we are"

> "Government has come along and said, "No, sorry, you can't do this." and we all have to just go with it, because we don't want the spread of Covid. Well it's sort of the same with the energy use…it's not really up to us anymore … look at the state that we're in. It's been up to us, and we've led to this point."

Our study revealed that in practice, people's lives are determined by the lives they feel they 'have to' lead to earn a living, and their perception of the viability of options available to them.

> "They need to have a structure in place where they can get on a bus, you know, if they didn't have the car, can they get on the bus, can they get to work within a reasonable time to do the job they are employed to do, to have an economical support so that they can support the rest of their family … You know, if you spell it out in a very simplistic way, that's what people want, they just want to be able to function on a daily basis with the amenities around them."

Change in behaviour was seen as a long-term or generational shift, for which there was not enough time to wait. In summary, key lifestyle changes such as reducing car use and space heating, and flying less, were viewed as difficult to achieve voluntarily in the current situation where markets often make high energy options cheaper and alternatives prohibitively exclusive.

Views of the acceptability of these different measures differed across our four groups, but not significantly. Low travel-related consumption groups, for instance, discussed subsidies more than legislation, whereas the overall high consumption group discussed tax more than other groups.

D. Learnngs from research into consumer attitudes

Empirical research has demonstrated for decades now that attitudes (especially pro-environmental attitudes) do not necessarily translate into behaviour change[8] . We know that this is particularly the case with flights for holidays, and holidays in general, where 'values' are suspended[9]. We even know that research has also

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[8] Blake (1999) https://doi.org/10.1080/13549839908725599, Kollmuss and Agyeman (2002) https://doi.org/10.1080/13504620220145401, Barr (2006) https://doi.org/10.1080/00167487.2006.12094149, Anable et al. (2006) https://webarchive.nationalarchives.gov.uk/ukgwa/+/http:/www.dft.gov.uk/pgr/sustainable/climatechange/iewofpublicattitudestocl5730.pdf

[9] Anciaux (2019) https://dx.doi.org/10.3390/su11174731

shown that climate change researchers fly more than other academics[10]. In terms of the high impact behaviours linked to travel, therefore, rising pro-environmental concern and attitude change is in no way guaranteed to change to behaviour change. As mentioned, some of our interviewees had invested in renewable energy, and smart heating control systems, but more of them complained that they would not see a return of investment with the end of the feed-in tariff support scheme. Workshops again called for financial support for everyone to be able to institute changes in the home and in e.g. purchasing an electric vehicle.

Behaviour change
E. Successful and unsuccessful behaviour change interventions by the UK Government

Our Workshops highlighted that the most effective influences on 'Behaviour Change' have been bans or mandatory legislation (smoking, light bulbs and seat belts), and financial costs (e.g. on plastic bags) rather than 'encouragement'. Outside of the scope of our research, behaviour change such as model shift has been accomplished by a combination of incentives for sustainable modes, expansion of public transport infrastructure, and disincentives for private cars, for example in Low Emission Zones or congestion charging.

F. Pros/cons and limitations of different frameworks and methods for promoting behaviour change

The above suggests that while successes of the Nudge Unit have highlighted the success of particular kinds of behaviour change interventions for particular kinds of behaviour, relying on voluntary behaviour change based on rational decision-making, in discrete decisions, is not appropriate for behaviour shifts at scale and across a suite of lifestyle components. Instead, as analysis of our interviews suggests, focus could be on some of the chief drivers of the most impactful behaviours: cheap flights, norms and expectations of foreign holidays, familiarity with international flying from work expectations, the job and housing insecurity that leads to car dependence, the poor housing infrastructure that leads to fuel poverty and so on. In the case of the ever-increasing flying of the wealthiest (which accounts for the vast majority of the increases in flying in absolute terms, rather than it extending to more people across society[11]), financial disincentives such as frequent flier taxes are obviously appropriate, but may not disincentivise if the fliers are wealthy enough, although they may generate revenue to develop alternatives to dissuade/dampen growth. As work on 'needs satisfaction escalation' suggests[12], as well as work on the associations between urban living and frequent flying, the availability of access to airports as well as increasing availability of flights and routes are all part of the 'systems of provision' which drive increases in frequent flying[13]. Halting airport expansion is a bare minimum in expecting 'behaviour change' to less flying, via suppressing demand.

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[10] Whitmarsh et al. (2020) https://doi.org/10.1016/j.gloenvcha.2020.102184

[11] Büchs, M. and G. Mattioli (2021) https://doi.org/10.1016/j.tbs.2021.05.008

[12] Cass (2021) https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2021/1-energy-consumption-and-wellbeing/social-and-material-cogs-of-the-needs-satisfier-escalator/2021/1-080-21_Cass.pdf/, for the model, see Brand-Correa et al. (2020) https://doi.org/10.1080/15487733.2020.1816026.

> *"the association between air travel and the size and proximity of airports could be interpreted as suggesting that air travel supply induces demand to some extent. This would provide support for a moratorium on airport expansion for the sake of the climate"* (Mattioli et al. 2021: 243)

Promoting behaviour change in a behaviourist model assumes that the key drivers are in individual psychology, rather than in the structural availability of e.g. cars and cheap flights, and the fact that people's living spaces are connected to existing gas heating infrastructure. Purchase of low carbon technology and retrofitting homes is simply not seen by our wealthy interviewees as 'worth it' for energy cost savings, in a context where many of them see houses as investments, and therefore investments with long pay-backs as not worthwhile.

A number of our interviewees stressed that they would be purchasing electric vehicles; one because of an expectation from their 'brainwashed' child, and another (a driving instructor) because of the inevitability signalled by the ICE ban. Such messages do prompt changes in how people view such low carbon investments. A similar message on gas heating, such as an announcement that gas central heating will be phased out or that properties cannot be rented with it, might have unimaginable effects on the market.

H. Key ethical considerations for Government policy focused on behaviour change

A key focus for our research was what 'excess' consumption consists of. The most important ethical consideration was how energy consumption can be reduced without anyone suffering harm and/or an inability to participate in society or to meet their basic needs. Energy poverty and transport/mobility poverty are concepts which already take into account that certain segments of society have heating and travel needs that would be harmed by reductions in their home heating and driving. This suggests that any attempts to accomplish behaviour change in an ethical way must first be supported/compensated by the provision of viable and adequate alternatives. One of our research team[14] has just produced the results of modelling how to make sure that measures to bring about a low carbon society, e.g. green taxes for public transport and green electricity provision, do not impact upon the least well off, and are effective while also decreasing energy and transport poverty. Per capita green vouchers were the most clearly effective and fairest measure.

Another ethical concern raised in our Workshops was a pragmatic concern that 'the rich' would ignore all measures and 'pay to pollute' unless government policy was specific designed to make sure this could not happen.

The key ethical concern for Government behaviour change policies, in our view, is the need to ensure a *socially just* transition, in time to avoid significant climate change, taking historical responsibility into account. In particular, it is

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[13] On these factors, see Mattioli, Morton and Scheiner (2021) https://doi.org/10.17645/up.v6i2.3983
[14] Büchs, Ivanova and Schnepf (2021) https://iopscience.iop.org/article/10.1088/1748-9326/ac2cb1

unfair to expect the poor and socially disadvantaged populations to institute reductions in high impact behaviours (driving, heating their homes, flying) first/at the same time as the wealthy, particularly if this requires personal financing. Generally, the wealthy *do* have the resources to reduce 'excess' consumption first, and they have contributed far more to emissions than poorer people in the first place.

I. Roles for considerations of fairness, individual freedoms and social responsibilities in the context of behaviour change

These questions were part of the deliberations in our workshops. To reiterate, it was felt that the fairest way of achieving behaviour change was through first instituting structural change (i.e. the provision of low carbon alternative such as cheap public transport, grants for necessary EVs, renewable energy, removing road space from cars). These structural measures should be complemented by using economic (dis)incentives to pay for this and to make sure that the polluters who could afford to pay, did, and those who could not afford to change were incentivised or subsidised, *in advance* of expecting behaviour change.

Mere exhortations, nudges, and the provision of information were seen as simply maintaining the status quo whilst simultaneously putting the responsibility on individuals who may not feel able or have the capacity or willingness to change. In other words, it was felt that national and local *government* have a responsibility to provide alternatives, and to manage the market to remove high energy devices and infrastructures, so that individuals could fulfil social responsibility by exercising individual choice in the limited number of behaviours that truly deserve to be called 'behaviour' in the ways that the 'behaviour change' model of policy means it.

In discussing forms of energy rationing in our workshops, it was proposed by workshop participants that the balance between individual freedom and necessity could be managed by offering individual carbon budgets in a form resembling wage sacrifice 'benefits packages' for employees. In other words, it could be expected that individuals commit to a certain amount of carbon reduction, but this could be achieved in different ways, selected from a package of measures. It was felt that these carbon budgets or 'credits' should *not* be tradeable, as this would again allow the rich to 'pay to pollute' by buying up budgets or credits. It is also hard to see how some (e.g. those in energy *and* transport poverty) could commit to reductions, even if offered in a 'flexible' manner. For these people, only support can achieve change.

J. How should the Government consider the balance between, or sequencing of, approaches to behaviour change focused on:
   ● *encouraging changes to individual behaviour;*
   ● *regulatory approaches focused on individuals and/or businesses which restrict or eliminate choices; and*
   ● *fiscal measures (including taxation)?*

The above responses have addressed the findings of our workshops regarding the efficacy, acceptability and fairness of four broad policy approaches, which highlighted that regulation/structural change would be the most appropriate and

popular approach, followed by economic (dis)incentives (with unfair distributional implications being addressed), and then behaviour change. However we note that whilst *Rationing* can be seen as a 'regulatory' approach, which our workshops felt could be fairly applied to specific behaviours, particularly flights, and particularly holidays, business travel, 'frivolous' flying and the air miles of food, *Structural Change* (i.e. major investments in public transport, insulation and renewables) is missing. The desired sequencing of measures has been commented upon, whilst the balance was felt to lie in applying different approaches to different areas of energy consuming lifestyles, as detailed above.

K. How should Government policy on behaviour change reflect the influence of monetary costs and the wider environment (e.g. the availability of transport infrastructure and services)?

Our collective response is that this question is badly worded. We think that it is suggesting that what is required (i.e. a comprehensive public transport system) is unaffordable. The following response cannot do justice to the issues. One thing that stood out in our workshops was the way that many were unable to conceive of making reductions in car use, because of the apparently taken-for-granted 'fact' that they or their family 'needed ' to use cars, simply because they do. Previous research (including by research team members) has highlighted that certain 'social practices' or habits are particularly car-dependent, such as infrequent household supermarket shopping depending on the car's 'cargo function', and difficulties managing combining commutes and school runs. Transport (including public transport) operating as a market incentivises high energy behaviour in a situation where many are denied choices. Car dependency is also based on job and housing insecurity[15].

Both our high consuming household interviewees and workshop members constantly reinforced that many, possibly the majority of people do not actually 'want' to drive in order to pursue well-being in society, but they are forced into it by a lack of viable alternatives[16]. Perhaps this 'reluctant' driving can be turned into active behaviour change in the form of modal shift, but without turning travel decisions into 'behaviour' into the form of reasoned choices between viable options, there is little chance. This is a matter of top level government policy, especially on funding for roads versus adequate local public transport and high quality safe provision for active travel. Also government have agency in ensuring that residential and workspaces do not have car dependency built into them from the outset by virtue of where they are situated or by not having the alternatives supplied at the outset.

L. Preferred focus of Government efforts on behaviour change

Many of our deliberative workshop participants kept stressing that the most successful behaviour change policies are regulatory, removing choices 'upstream', to make change easier for the public. The focus on behaviour change could therefore push on an open door by using legislation to shape the choices

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[15] Mullen et al. (2020) https://doi.org/10.1016/j.geoforum.2019.12.007
[16] Anable (2005) https://doi.org/10.1016/j.tranpol.2004.11.004

available directly, rather than assuming that the best 'point of leverage' is billions of individual choices in a choice environment that is preferential to high carbon activities and products. In addition, our research suggests that the focus should be on the energy consuming behaviours (i.e. car driving and frequent flying) of those most able to reduce them (i.e. the wealthy).

The role of Government and other actors

M. Learnings from change delivered by civil society including community groups, and businesses (including from actors based outside the UK)

Overall, evidence so far shows that action by civil society organisations and businesses only has limited impacts because it is voluntary or encourages voluntary behaviour change within the existing context. Without creating a level playing field through regulation, these actions are likely to have insufficient impact. As an example, our research on frequent flying[17] found that policy action in this area has not been included in climate change policy, and was delegated to the IATA, who have come up with no behaviour change-focused plans. Instead, in writing on possible policy responses, campaign groups such as Stay Grounded were relied upon, as their 2019 report produced chapters on carbon taxes, levies, limits on flights, moratoria on expansion and scaling-down airports, rail alternatives, travel policies, ICT, and other measures including accounting properly for impacts, limiting advertising and lobbying, banning state support, banning frequent flier programmes, regulating the regulator, divestment, un-insuring and more. The solutions are largely structural and are known, whereas the barriers are political.

N. Roles of different actors in delivering behaviour change, including Government, local authorities, businesses, civil society including community groups, and individuals and households

As stated above, the public themselves including high consumers see the responsibility as being on the Government first, and then producers and business, to shape a choice environment in which low carbon behaviour is cheaper and more convenient. Without assuming this responsibility, behaviour change will not happen.

O. Barriers faced by civil society, including community groups, and businesses when delivering change

Rather than barriers, which are part of the 'behaviour change' research and policy paradigm[18], our research suggests that the Government needs to think in terms of *constraining* high carbon 'systems of provision' (gas central heating, ever-extending airports), banning or taxing high carbon devices and technologies (ever-larger cars, inefficient appliances) and enabling civil society (for example, in changing planning law to allow low impact dwellings and lifestyles).

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[17] Cass, N (2021) https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2021/1-energy-consumption-and-wellbeing/social-and-material-cogs-of-the-needs-satisfier-escalator/

[18] See Shove (2010) https://doi.org/10.1068/a42282

P. How can Government best work with civil society, including community groups, to deliver behaviour change?

In an enabling role. There are a large number of sustainability experts in civil society, and many of the solutions to reducing carbon emissions are well known. Our research suggests that Government needs to proactively shape the choice environment of everyday life.

Q. Role for marketing and advertising businesses in supporting or enabling behaviour change

As table 2 shows, brands, novelty, consumer choices and media and online influences are all more influential than environmental concerns in shaping behaviour.

T. How can the Government best set parameters for environmentally responsible business, in support of behaviour change?

Our workshop responses suggest that many consumers want high carbon consumption options to be removed from the marketplace, by legislation.

Government policy
U. Main strengths and weaknesses of current Government policies on behaviour change, and suggested improvements

The main weakness is that 'behaviour change' as a policy approach has focused on information provision and voluntary change, whereas the link between awareness and pro-environmental behaviour is largely unproven. Key messages (for example on reducing heating levels) are possibly successful, but largely ineffective in the broad scheme of reducing emissions significantly.

V. External and/or material factors that could restrict the success of these policies

Broadly, the fact that the Government prioritises business, profit, and consumer choice, rather than climate action. The existence of obdurate, large scale infrastructures that are dependent on fossil fuels (roads, airports, gas pipelines) make high consumption lifestyles inevitable.

W. For behaviour change efforts, how effective is the coordination between government departments and the split of Ministerial and departmental responsibilities, and are sufficient resources in place (staff and budgets)?

Government coordination is not effective and not reinforced, with many systemic loopholes. See comments above.