Scientists Behaving Responsibly:

Should science walk the talk on climate breakdown?

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Written by Andrew Simms with Dr Stuart Parkinson

ABOUT THE AUTHORS

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Scientists for Global Responsibility (SGR) is a UK-based membership organisation which promotes responsible science and technology. Its membership includes hundreds of natural scientists, social scientists, engineers and professionals in related areas. It carries out research, education, and advocacy work centred around science and technology for peace, social justice and environmental sustainability. It is an active partner of ICAN, which was awarded the Nobel Peace Prize in 2017.

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THE SURVEY QUESTIONS AND ANSWER OPTIONS

1. Would you say that: I have considered what the global climate goals, including the 1.5C proposed maximum, mean for changes in my own life

   Yes / I have plans to do so / I do not have plans to do so

2. Would you say that: my home life is broadly consistent with the global climate goals

   Yes / No / Don't know

3. Would you say that: my work life is broadly consistent with the global climate goals

   Yes / No / Don't know

4. In the scientific and /or engineering community that you are familiar with, how would you describe its current efforts towards recognising and reducing its climate impact to align with international targets?

   Highly satisfactory / Satisfactory / Average / Unsatisfactory / Highly unsatisfactory

5. Flying - which of the following options best approximately describes (a) your behaviour up to the current moment and (b) your likely behaviour from now on:

   Not flying / 1 return short-haul (SH) flight per year / 1 return long-haul (LH) flight or 2 return SH flights per year / 2 return LH flights or 4 return SH flights per year / 3 or more return LH flights or 6 or more return SH flights per year

6. Car ownership and use - which of the following options best describes (a) your behaviour up to the current moment (b) your likely behaviour from now on:

   Not owning a car and travelling by car rarely / Owning a car, and taking very serious steps to minimise its impact (e.g. own an electric car, work from home, lift-share for most journeys, strictly limit use) / Owning a car, and taking significant steps to minimise its impact (e.g. own a small petrol car/ medium-sized hybrid car, lift-share for about half of journeys) / Owning a car, and taking some steps to minimise its impact, (e.g. own a medium-sized petrol car, lift-share sometimes) / Owning a car, and not taking steps to minimise its impact (e.g. own a large petrol car, drive alone on most journeys)

7. Energy use – how you heat and power your home. Which of the following options best describes (a) your behaviour up to the current moment (b) your likely behaviour from now on:

   Use only renewable energy generated locally for heat and electricity use in my home (e.g. solar panels, air or ground source heat pumps), and take major steps to reduce my energy use as much as possible (e.g. high levels of house insulation, small number of high efficiency appliances) / Use electricity from a renewable energy supplier and have gas for heating and take major steps to reduce my energy use / Use electricity from a renewable energy supplier, have gas for heating and take some steps to reduce my energy use / Use conventional energy sources (e.g. grid electricity, gas for heating) and purchase high efficiency appliances / Use conventional energy for heating and powering my home

8. Food – about your eating habits. Which of the following options best describes (a) your behaviour up to the current moment (b) your likely behaviour from now on:

   Eating habits are not determined by environmental issues / Eat a conventional diet, but actively seek to reduce food waste / Follow a largely plant based diet and eat no more than small amounts of meat, fish and dairy (this might include pescatarian diets, and vegetarian diets where dairy is consumed) / Follow a largely plant based diet and actively seek to minimise food waste / Follow a vegan diet and actively seek to minimise food waste

9. Consumer goods – the 'stuff' you buy. Which of the following options best describes (a) your behaviour up to the current moment (b) your likely behaviour from now on:

   Not generally include climate considerations when buying goods / Generally check the likely climate impact of things I buy and avoid high impact goods / Generally buy new stuff, but only buy the most energy efficient/ climate friendly options / Avoid new purchases, preferring to buy second-hand and maintain and repair goods for as long as possible / Actively minimise the amount of stuff I have to reduce my climate impact, including repairing goods to keep them in use

10. Which of the following best describes, with regard to the climate issue, your approach to family life?

    Climate change is not a factor in choices and behaviour to do with family / Actively teaching my children to minimise their climate impacts / Limiting the size of my family in consideration of climate change / Planning to be a one child family / Avoiding having children

11. What is the best example you know of 'walking the talk' on climate action?

12. What is the worst example you know of not walking the talk on climate action?

13. What are the biggest factors preventing you taking more climate action in your life? (you may tick more than one option)

    Cost / Resistance from employer / Family commitments / Belief that government and / or industry should lead / Lack of easily available options

What should scientists do?

Should scientists and engineers change their work patterns and lifestyles to align with the 1.5°C climate change pathway –and in doing so set a responsible example for changes needed in wider society?

What is responsible science in an age of climate breakdown?

The threat of climate breakdown is now accepted as endangering human civilisation. We have science and scientists to thank for our understanding of this challenge. In particular, the 2018 special report of the Intergovernmental Panel on Climate Change (IPCC) on what it will take to stay below the 1.5°C warming target concludes that, 'rapid, far reaching and unprecedented changes will be needed in all areas of society.' This obviously includes the scientific establishment and scientists themselves, even more so given their privileged insight and understanding of the problem. Yet, the issue is not simple.

Much media commentary has built a debate in which it is hard to win. Those who make an effort to reduce their climate impact, and speak about it, are condemned for not being perfect and still, inevitably, being responsible for some pollution. Of course, if some decide to speak of the problem without actively changing damaging behaviours, they are criticised too. The argument is almost framed as if you must be either an angel or a hypocrite, even though within a fossil fuel dependent economic system it is virtually impossible to be a climate angel. Nevertheless, psychological research shows how important and influential is the modelling of behaviour change - people being seen to

act differently – to validating, popularising and spreading new ways of living, and in this case with reducing our climate and environmental impact. New social norms emerge from the effect of positive 'social contagion'. But how far has the science community itself, even the community around climate science, gone to align its activities and own behaviour with the climate challenge. Does it matter if there is a gap between their analysis, a recognition of scale of the problem, and what they actually do in their lives and work? If there is a damaging gap between the analysis, professed values of planetary concern and actual behaviour, how can it be closed?

This briefing is divided into two sections. The first is a short overview of issues to do with personal and professional behaviours and how these relate to the challenges of taking meaningful action against climate breakdown. The second section presents the findings of a survey looking into what it means to 'walk the talk' on climate breakdown for people working in scientific and engineering fields.

How big is the challenge of environmental behaviour change?

To achieve the goals of the Paris Climate Agreement, including the 1.5°C maximum heating target, rapid transition to sustainable behaviours in how we live and work is needed. Meeting the Paris targets will not be possible without significant lifestyle change, specifically by a global high-consuming minority of the world's population. A report by the UK's Committee on Climate Change – a government advisory body – on meeting the nation's target of net zero carbon emissions, found that 62% of necessary measures included societal and behaviour change.[1] But the problem can also be bigger than is allowed for in official estimates. Prof Kevin Anderson of the Tyndall Centre for Climate Change Research, for example, estimates that, in the case of the UK, consumption-based emissions are far higher than more normally quoted territorial emissions – conservatively by around 45% in the UK.[2]

Further, the IPCC, on whose work most national plans depend, modelled four indicative net zero emissions scenarios to inform their 1.5ºC report, and only one of them does not rely on negative emissions technologies (NETs) – which are as yet either hypothetical or at very early stages of development and not tested at scale – to remove large volumes of carbon from the atmosphere.

For the best available evidence on personal emissions compatible with a 1.5°C pathway, a recent report from the Institute for Global Environmental Strategies suggests per capita CO_2e* emissions targets for lifestyle carbon footprints of 2.5 tCO_2e by 2030, 1.4 t by 2040, and 0.7 t by 2050.[3] To put that into perspective, a single return flight from London to Los Angeles would add 2.6 tCO_2e to an individual's personal emissions.

While there remain big infrastructure questions at play, even so for many there are still significant personal choices that can be made. Where transport emissions are concerned the two largest factors are flying and car ownership and use. Buying a more efficient vehicle can reduce personal emissions by about 1.2 tCO_2e per year and moving to a car-free lifestyle saves between 1 tCO_2e and 5.3 tCO_2e per year.[4] Where food is concerned the largest factor relevant to carbon emissions is the proportion of animal products in your diet.[5] At the moment, the average UK diet contains nearly 50% animal products.[6] Reducing the percentage of animal products to zero, in other words by adopting a vegan diet, reduces emissions by about 80% from a 'business as usual' trajectory.[7] Moving to a vegan diet can reduce personal emissions in the UK by up to 1.6 tCO_2e per year.[8] Where household carbon footprints are concerned the big impacts are heat and power. Here the greatest savings come from switching to renewable energy, energy saving and efficiency measures such as insulation, and reduced consumption through fewer and more efficient electrical appliances. Other significant factors mentioned below include consumer goods – in relation to both 'embedded carbon' from the manufacturing process, and energy use if the goods are energy consuming – family size, whether or not households have meat-eating pets, and financial behaviour in terms of whether pensions and savings are invested in, for example, the fossil fuel industries.

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* CO_2e means carbon dioxide equivalent taking account of other pollutants which have a heating impact.

Academia: high emission lifestyles and work patterns?

Have academic researchers been locked into heavily polluting working lives by the institutional pressures of their sector? A study on the 'hypermobility' of academics suggests so.[9] Frequent flying to conferences in order to 'cultivate and maintain international collaborations' has developed into a generally tolerated norm, and even given its own term – a system of 'academic aeromobility'.

These patterns have been found to co-exist with, and fundamentally contradict, university policies professing commitment to sustainability. In response to their own findings, the study's researchers discuss the possibilities of using technology to substitute for air travel, and the idea of 'slow scholarship.' The carbon emissions from just one conference trip can be equal to 7% of an average individual's total emissions.[10] Another study showed that dissemination of research in particular, on which funders can make strong demands, is responsible for the largest part of the research carbon footprint.[11]

But many scientists, internationally, are already making radical lifestyle changes to align their working awareness of the climate crisis with their own contribution to it. Others are becoming activist in other ways, joining campaigns, getting directly involved in advocacy and public protests.[12] But choices are not straightforward. Corinne Le Quéré, founder of the Global Carbon Budget, and Professor of Climate Change Science at the University of East Anglia, spoke on BBC Radio 4's *The Life Scientific* about the difficulty of aligning a scientific working life with a personal emissions profile compatible with a 1.5°C pathway.[13]

A group of scientists, academics and the public have set up an organisation called 'No Fly Climate Sci', through which they commit to align their 'daily life choices' with the reality of the climate emergency, on the basis that 'actions speak louder than words'.[14]

What are the issues?

Is there a 'concern – action' gap among researchers?

A study at the University of Adelaide[15] looked at academic air travel and found that although there was a high level of concern about the climate crisis, far fewer were willing to reduce their frequency of flying due to worries about damaging their careers pointing, at least, to perceived institutional pressures to fly.

Is flying to conferences linked positively to academic productivity?

Conversely, separate research carried out at the University of British Columbia looked at the relationship between the frequency of flying in the course of work – for example, in travelling to academic conferences – and actual academic productivity. It found that there was no relationship between the two.[16]

Do the actions of leading scientists, technologists and engineers matter?

Not limited to the science and technology sector, but more broadly, the link between 'leadership, beliefs and pro-social behaviour' has been investigated. In this research, leadership figures were shown to 'strongly shape their followers' initial beliefs and contributions'. The examples set by leaders in terms of their ethical stances, and the coherence of their behaviour, were highly influential with long lasting effects. Setting good or bad examples can create different types of self-reinforcing 'path dependency' among followers.[17]

How does behaviour change by the researcher affect the influence and credibility of research?

The situation is acute where climate science is concerned. The credibility of climate research appears to be particularly vulnerable. If the personal carbon emissions of the researchers concerned is large, and therefore seen to contradict the nature of the research, it undermines the credibility of the work itself. As the authors of one US study put it, 'Would you follow advice about personal

energy conservation from a climate specialist with a large carbon footprint?' Where such contradictions lead to low credibility, it is also seen to lower the likelihood of people reducing their own energy consumption and personal emissions. The effects reported were 'large, both for participants who believe climate change is important and for those who do not.'[18]

How do different professions score, including environmentalists?

A study carried out jointly by the University of Cambridge in the UK and of Vermont in the USA compared the behaviour of people working in three different science-based professions: conservationists; economists; and medics.[19] They assessed the link between knowledge of environmental issues and pro-environmental behaviour, and how variable behaviours were, both within and between the different professions. Of the three, conservationists did have marginally lower carbon footprints: taking fewer personal flights, going further to reduce domestic energy use, engaging in more recycling, and having more plant based diets. However, there was no significant difference seen between conservationists and economists in terms of how they travelled to work, knowledge of environmental issues, or which pro-environmental actions were taken. Conservationists, perhaps less surprisingly, also had more pets, consumers in their own right. The size of individuals' carbon footprints was largest for men, Americans, economists, and among those with higher academic qualifications and incomes. They didn't, however, show a relationship to an individual's environmental knowledge.

Taking to the streets: science and protest

Is activism and protest part of scientists' 'walking the talk' on climate breakdown?

To address the climate and ecological crises, academics Charlie J. Gardner and Claire F. R. Wordley recently argued in an article for *Nature Ecology and Evolution*[20] the case for scientists to go beyond changes in consumption behaviour and conventional policy advocacy, to support and participate in civil disobedience movements.

As context, they point out that representative groups like the Union of Concerned Scientists have, since 1992, warned that 'a great change in our stewardship of the Earth and the life on it is required, if vast human misery is to be avoided and our global home on this planet is not to be irretrievably mutilated.' They reason that campaigning within the law and changing personal consumption patterns, while good, have failed to work at the 'necessary scale.' However, 'civil disobedience requires relatively few people to be effective', citing research that just 3.5% of a population, for example, is needed to topple a dictatorial regime and that non-violent protests are twice as likely to succeed as those employing violence.[21] Precedent too was established when, in April 2019, 12,000 scientists endorsed the global school strikes which were acts of civil disobedience, 'justified and supported by the best available science'.[22]

Not all sympathetic scientists need to get arrested, they say, explaining that there are a range of ways to show support in print, by letter or interview, logistically and online. But scientists participating in protest can change how those protests are reported, increasing the credibility of the action. Such actions do not undermine trust in an academic's work or their credibility, write Gardner and Wordley. The other reason is to redress the asymmetry of access to decision makers enjoyed by vested interests like the fossil fuel industry, who are also much better funded and advance positions on climate breakdown which undermine or are contradictory to robust scientific evidence.

In September 2019, the leading science journal, *Nature*, reported that, as a wave of international climate strike protests led by school age children spread, scientists worldwide joined strikes for climate change from 'Bangkok to Brisbane'.[23] In the following month, large numbers of scientists also demonstrated in support of Extinction Rebellion global protests,[24] with nearly 400 endorsing a campaign of civil disobedience.[25]

The survey

We conducted a poll to further explore some of the questions above. We asked scientists, technologists and researchers a series of questions about science walking the talk on climate breakdown. Firstly, we posed some big picture questions about people's awareness of the issue and how it was perceived to relate to their own personal and working lives. We then asked a series of questions about the behaviours which are responsible for the bulk of personal carbon emissions. In particular, we asked people what their behaviours had been up to the present moment, and what changes, if any, they were intending to make. A summary of the results are presented in this section.

Who was polled?

This was a straw poll disseminated to specialist scientific audiences including SGR's own membership and those who follow the international climate negotiations.[26] There were 153 responses. In order to have a sense of the specialisms of respondents we asked them to describe the broad sectors in which they worked. Of those who replied, 47% described themselves as scientists or engineers working in a climate related field, 36% were scientists or engineers not working in a climate related field, 6% were students of science or engineering in a climate related field, 4% students in other areas of science and engineering and 7% identified themselves as non-scientists / engineers. Of all the respondents, just under 39% were professional, associate or student members of Scientists for Global Responsibility.

What were people asked and how did they respond?

Most scientists and engineers polled had considered what the global climate goals meant for changes in their own lives

We began by asking people whether they had considered what the global climate goals, including the 1.5°C proposed maximum temperature rise, meant for changes in their

own lives. 87% said that, yes, they had. A further 10% said that they intended to do so. Just 3% said that they had no plans to do so.
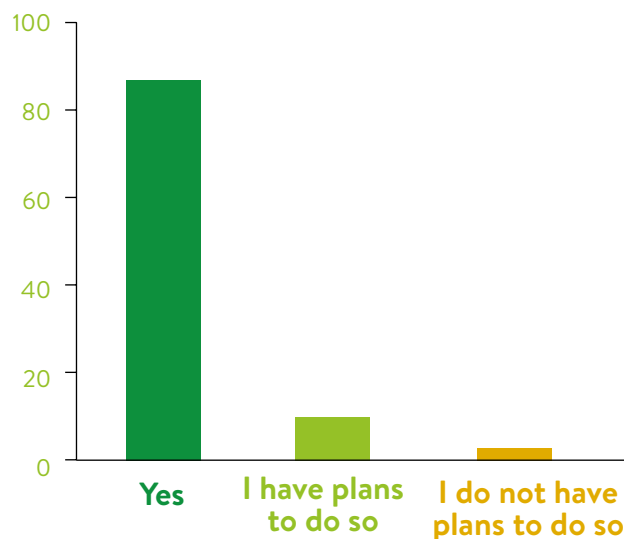

Around half believed that they are living lifestyles compatible with the 1.5° climate target

Next, we asked people whether their home lives were broadly consistent with the global climate goals. This question revealed an awareness / action gap. Only around half, 52%, thought that their lives were aligned. Another 40% said no, they were not aligned and 8% said that they did not know. It is worth noting that '1.5° compatible' lifestyles are very hard to achieve given today's energy intensive infrastructure, but it is interesting to note how many believed they had done so.
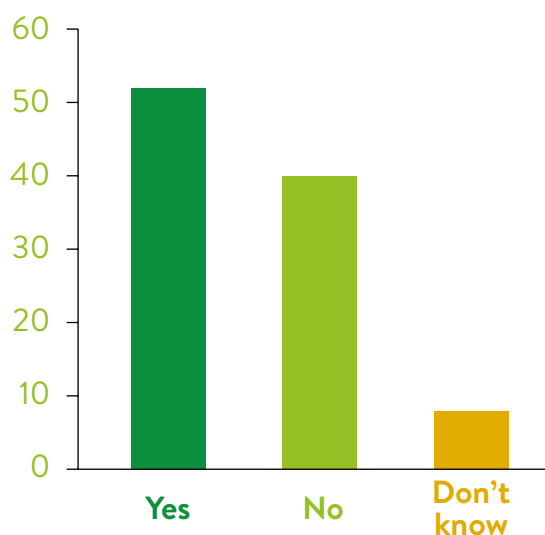
By a small margin, more believed that their working lives compared to their home lives are more climate friendly

The same question was asked with regard to people's working lives. Here the result was marginally more positive. At work, 56% thought what they did was in line with the climate target, with 36% saying the opposite, and the rest not knowing.
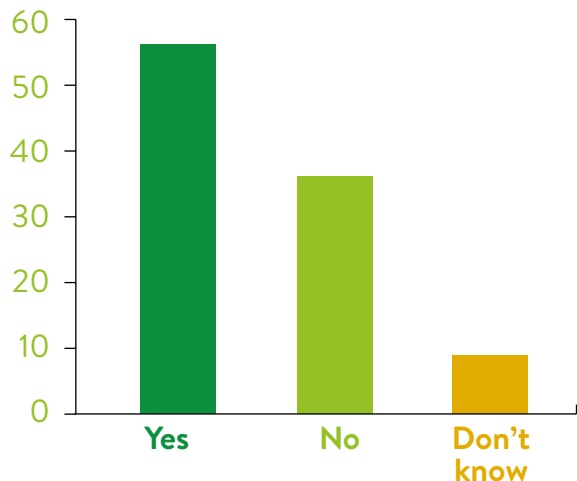
But people were more sceptical about their areas of work as a whole: 71% thought their field of work's response to the climate emergency either unsatisfactory, or highly unsatisfactory

Shifting the level of reflection from individuals at work, to sectors of work as a whole, however, revealed a different pattern. We asked, concerning the scientific and /or engineering community with which respondents were familiar, how they would describe its current efforts towards reducing its climate impact to align with international targets?
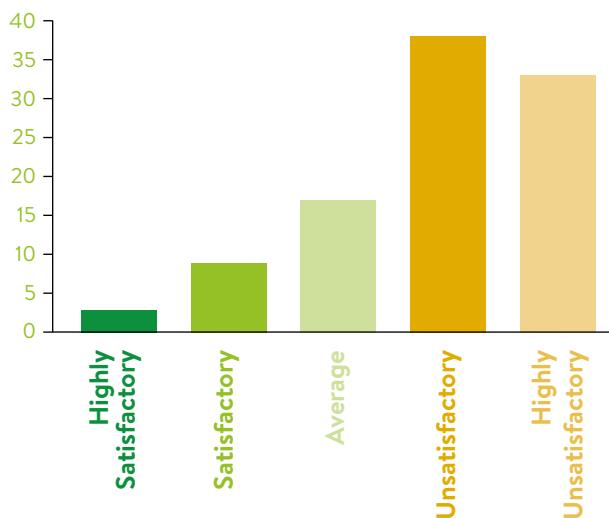
In this case 71% said that their field of work had a response to the climate emergency which was either unsatisfactory, or highly unsatisfactory. Only 12% thought that their working community was satisfactory or highly satisfactory in their efforts to tackle the climate emergency, with the rest citing an 'average' response.

We then asked a range of questions that covered what are typically the major areas of activity which have a sizeable carbon footprint and climate impact. These included behaviours such as flying, driving, energy use in the home, diet, the use of consumer goods, and family size. In most cases, as described, we asked about both their current and intended future behaviours.

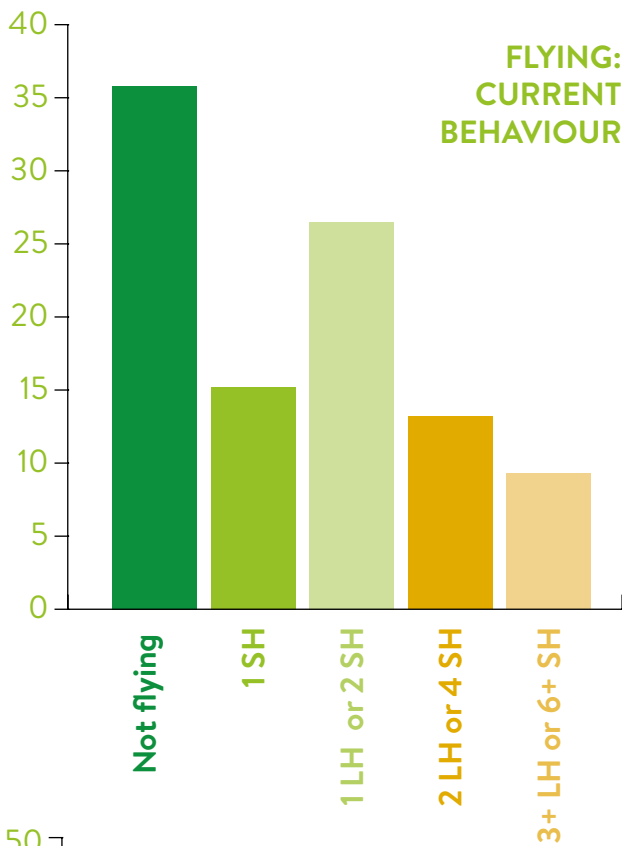## More than one in three already rejected flying, with that number pledged to increase

We asked people about their current behaviours with regard to flying. In particular we asked which of a number of options, ranging from a high frequency of flying to not flying at all, best approximately described their behaviour up to the present moment.

In 2018, nearly half of the population of England (48%) took no flight at all according to the Dept of Transport.[27] This results from a combination of economic and choice factors. Generally speaking, people in higher income brackets – such as scientists or engineers – fly more. In our poll, more than one in three, 36%, said that not flying was the best description of their approach to aviation. Just over 15% took one short haul flight per year, and over 26% took the equivalent of one long haul or two short haul flights per year. There were 13% taking the equivalent of two long haul or four short haul flights per year and over 9% taking more than that.
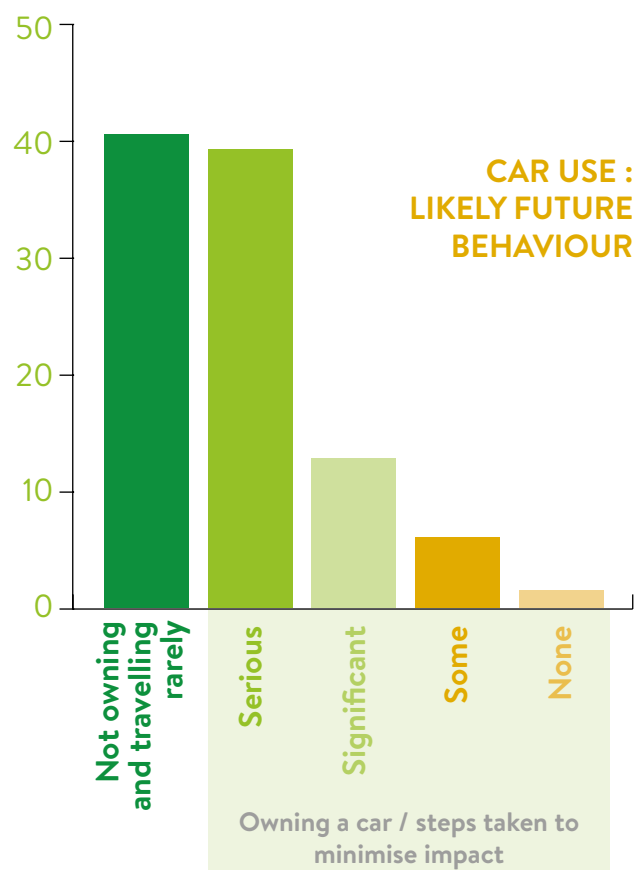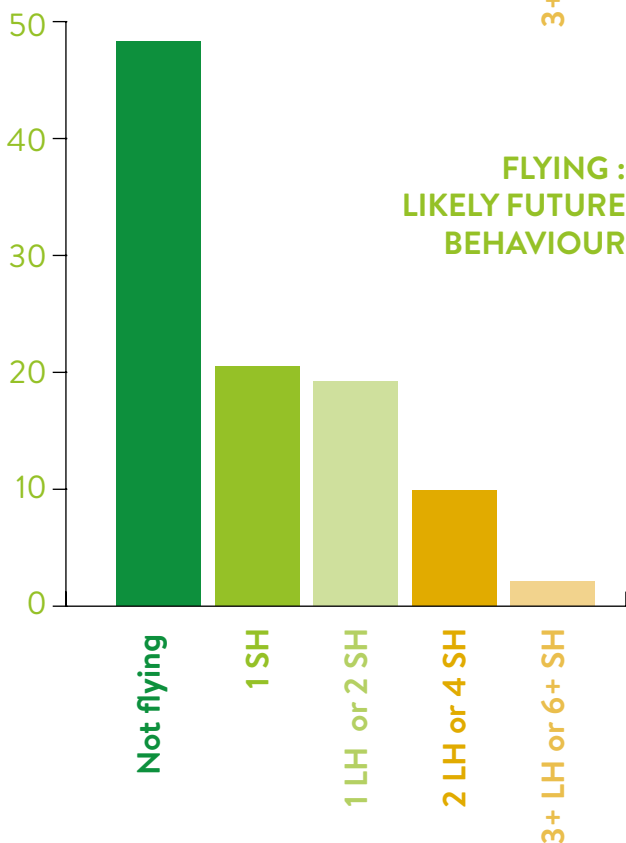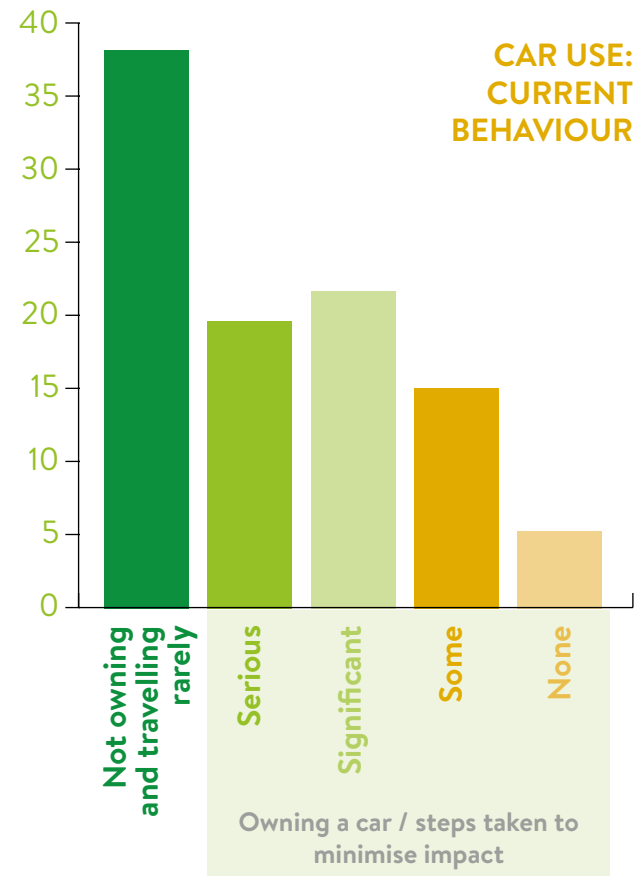
But when asked about their likely behaviour in the future, the number of those intending to either fly less or not at all rose by a sizeable amount.

For example, the number planning to not fly at all grew to just over 48%. All the other

characterisations of frequency and distance of flying shifted towards fewer, shorter flights. While this is obviously a specialist and select demographic, it appears to contradict aviation industry projections of an inevitable increase in demand.

FLYING: CURRENT BEHAVIOUR

(x-axis: Not flying, 1 SH, 1 LH or 2 SH, 2 LH or 4 SH, 3+ LH or 6+ SH)

CAR USE: CURRENT BEHAVIOUR

(x-axis: Not owning and travelling rarely, Serious, Significant, Some, None)

Owning a car / steps taken to minimise impact

FLYING : LIKELY FUTURE BEHAVIOUR

(x-axis: Not flying, 1 SH, 1 LH or 2 SH, 2 LH or 4 SH, 3+ LH or 6+ SH)

CAR USE : LIKELY FUTURE BEHAVIOUR

(x-axis: Not owning and travelling rarely, Serious, Significant, Some, None)

Owning a car / steps taken to minimise impact

SH = Return short haul flights per year
LH = Return long haul flights per year

Next we asked about car ownership and which options, in a range from minimal to high use, best described respondents' current behaviour. 38% did not own a car and only rarely travelled in one. Another 20% owned a car but were taking 'very serious' steps to minimise its use and impact, such as working from home, lift sharing or switching to an electric car. Another combined 37% were taking either sizeable or limited steps to reduce the impact of their car use. Only 5% said that they were not actively taking any steps to reduce impact.
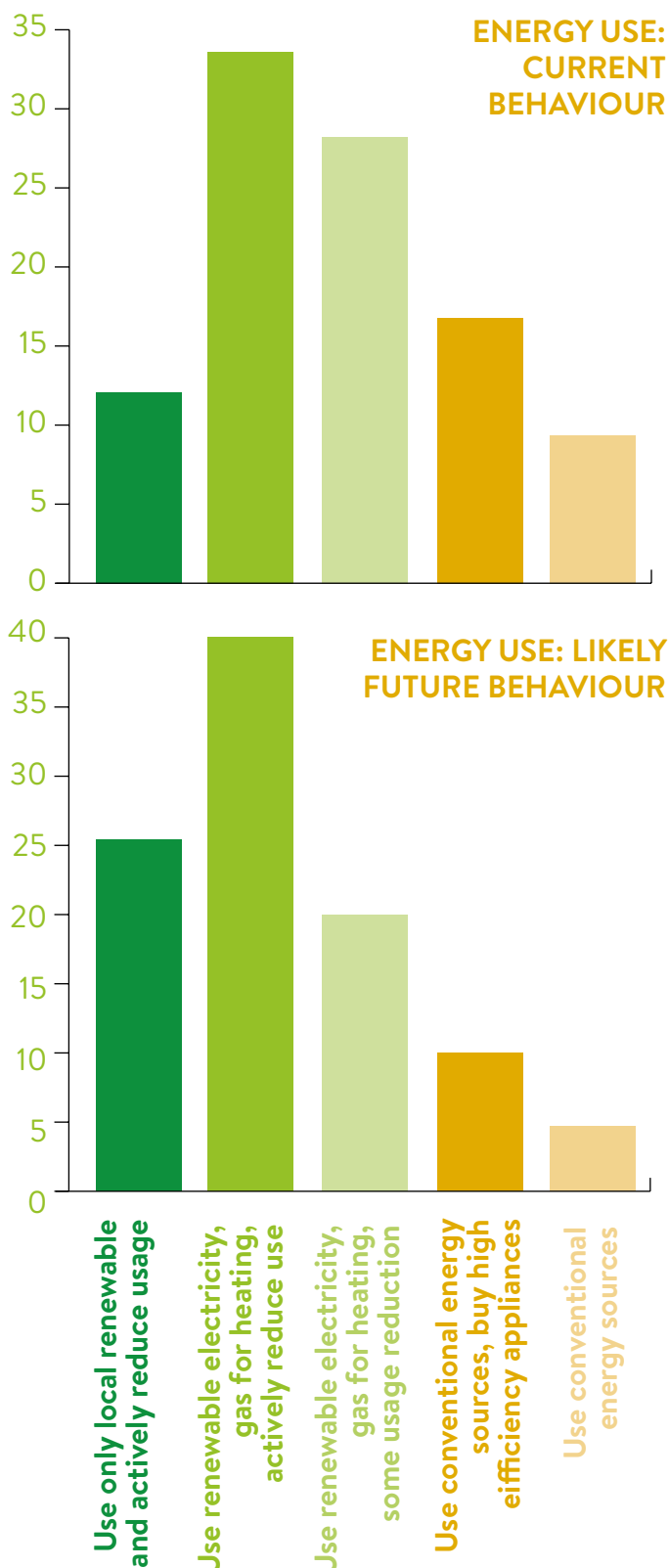
When asked about their car use in the future, only an addition 2% moved into the group who would not own a car and would only travel rarely in one. But there was a big shift upwards in the group saying they would take 'very serious' steps to the impact of their car use – from 20% to 39%. There was a commensurate fall in the number of people remaining in the higher use groups.

The number of respondents who placed themselves in the lowest carbon home energy use category – based on efficient use of renewable energy – was just under 1 in 8, but including those planning to take further action, this rose to 1 in 4

In looking at current and planned domestic energy use, we again presented people with a range of options to best describe the intensity of the environmental impact of different choices. The lowest carbon category, which involved only renewable heat and power plus great attention to energy conservation, saw just 12% saying it matched how they currently lived. The next option, which included those combining renewable electricity with gas heating and still making great efforts to conserve energy, was the largest single group at 34%. After that, in a similar situation but only taking 'some' steps to be more efficient, was a group comprising 28%. The last two categories both used conventional energy sources – grid electricity that was not specifically renewable and gas for heating – made up 26%.

The biggest change among respondents, when asked to describe what their choices

would be going forward, was among those choosing the lowest carbon category – using only renewable heat and power, plus great attention to energy conservation – which rose to be 25% of respondents. The other segment of respondents to increase in share was the next lowest carbon option, which grew from 34% to 40%. These choices drew from all the remaining options which all shrank.

ENERGY USE: CURRENT BEHAVIOUR

ENERGY USE: LIKELY FUTURE BEHAVIOUR

Use only local renewable and actively reduce usage

Use renewable electricity, gas for heating, actively reduce use

Use renewable electricity, gas for heating, some usage reduction

Use conventional energy sources, buy high efficiency appliances

Use conventional energy sources

72% say they are adopting largely plant based diets with a further 13% adopting vegan diets

Where diet was concerned, we again asked about people's eating habits up to the current time, and what they intended their behaviour to be going forward.

**DIET: CURRENT BEHAVIOUR**

DIET: LIKELY FUTURE BEHAVIOUR
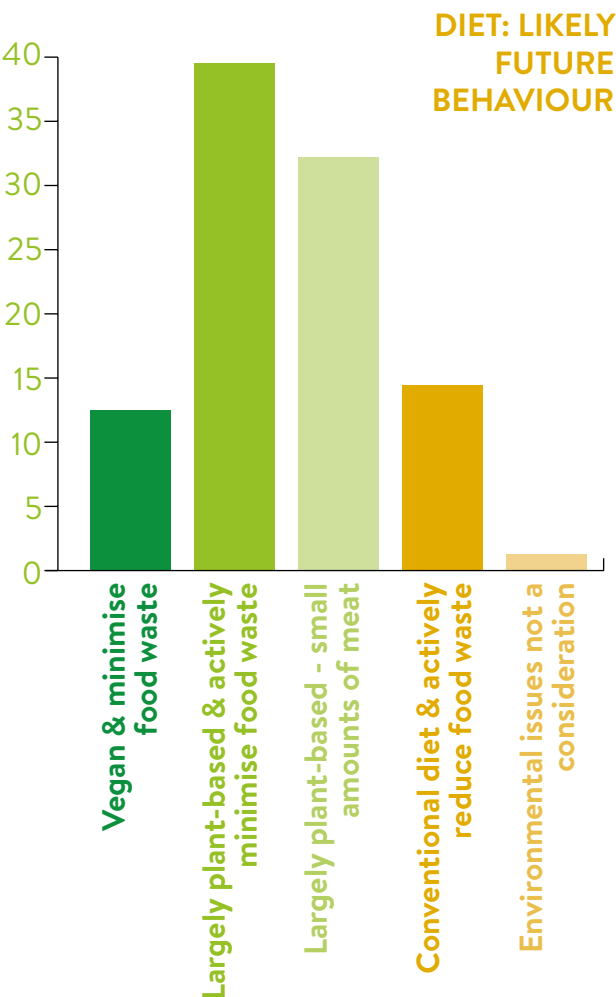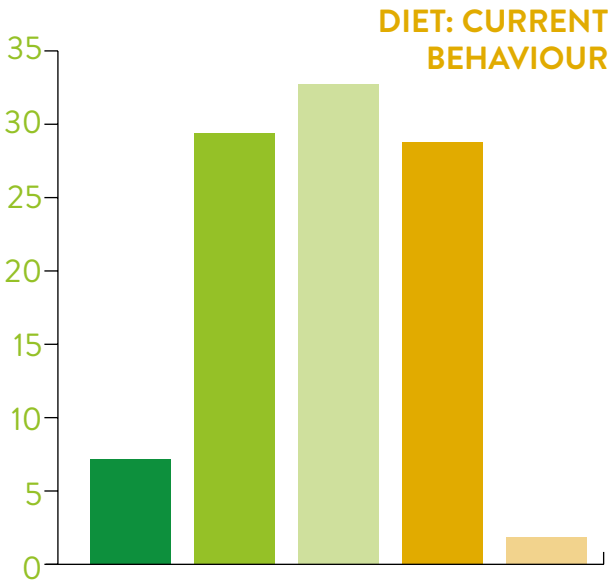
We asked about people's diets because food choices have a big effect on our carbon footprints, with plant-based vegan diets at the low end of the scale of impact. Respondents reporting that they followed such a diet whilst also actively seeking to minimise their food waste stood at 7%. But a much larger 29% declared that they followed the next least impact diet, following a largely plant based diet while reducing food waste. A slightly larger group, 32%, declared that they followed a diet which might include smaller than average amounts of meat, fish and dairy. The number following a conventional diet including average amounts of meat, fish and dairy was 29%, but this group also identified with reducing food waste. Only 2% said that their diet was not in any way determined by environmental issues.

Asked about what behaviours they would choose in the future, the biggest shifts were in those opting to be vegan and the most waste-reducing plant based diets. People opting for a vegan diet went up to 13%, and the next most low carbon option moved from 29% to 39%. The biggest shift overall was from people following a conventional mixed diet, to options that were largely or entirely plant based. Only around 16% in total remained with diets that did not fall into these categories.

76% say they are turning their back on new consumer goods – choosing less, second hand and long-term repair options instead

Next we asked respondents about their behaviour in relation to consumer goods, as a practical expression of attitudes to materialism and consumerism. At the low impact end of the spectrum we described an approach in which the respondent would actively minimise the amount of 'stuff' they had in order to reduce their climate impact, including repairing goods to keep them in use. At the other end of the spectrum, people identified as 'not generally including climate considerations when buying goods'. Just under 1 in 4 (24%) said the most environmentally friendly option best described their behaviour up to this point. This rose markedly to 41% with the inclusion

of the behaviours respondents declared they intended to follow in the future. More than one in three in both current and intended behaviour options said that their behaviour was best described as avoiding buying new goods and opting for second hand and the long term maintenance and repair of goods.

CONSUMER GOODS: CURRENT BEHAVIOUR

CONSUMER GOODS: LIKELY FUTURE BEHAVIOUR
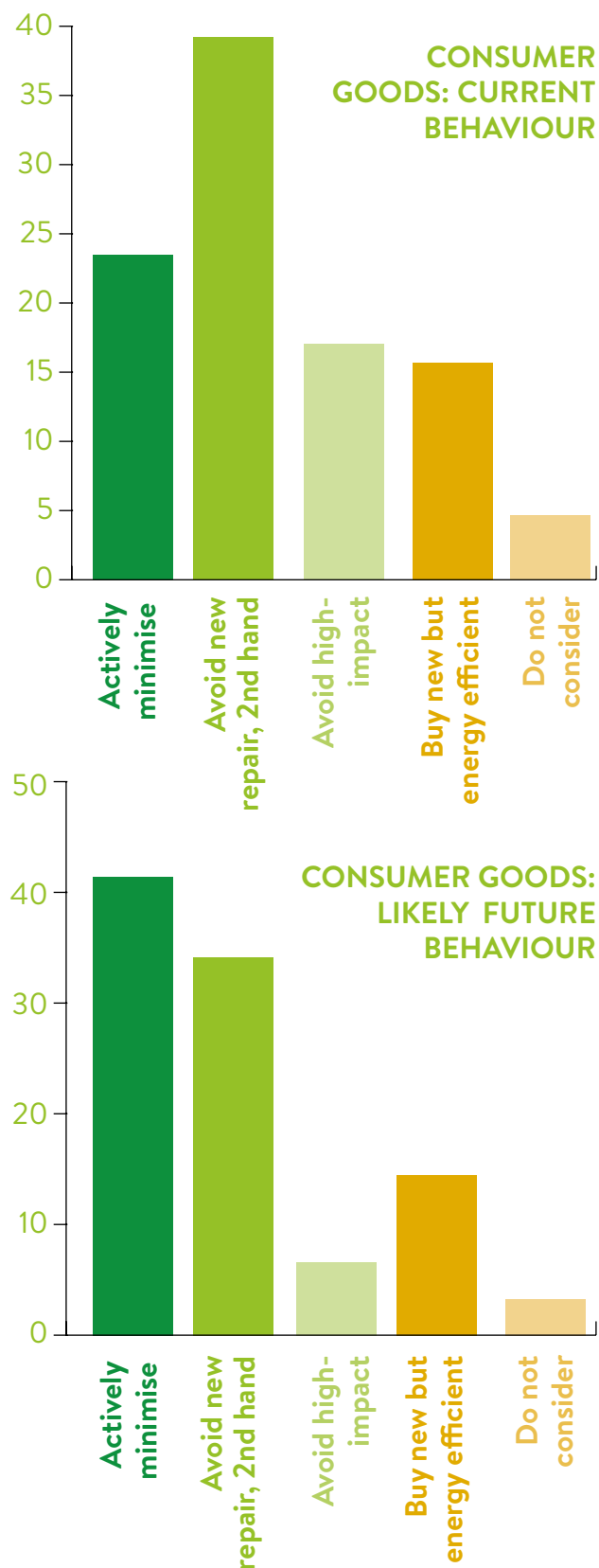
## Nearly one in three are choosing to go child free

We next asked a question which fell into a different category and because of its nature was less suited to split time frames of the previous questions. We asked people about how the climate issue influenced their approaches to family life. Nearly 1 in 3, 31%, said that this issue led them to avoid having children. Another 8% said it made them chose to plan to be a one child family, and further 15% said that it meant them 'limiting' the size of their family. A large group, 39%, took the approach of actively teaching their children to minimise their climate impacts, with only 7% saying that climate change was not a factor at all in thinking about family life.
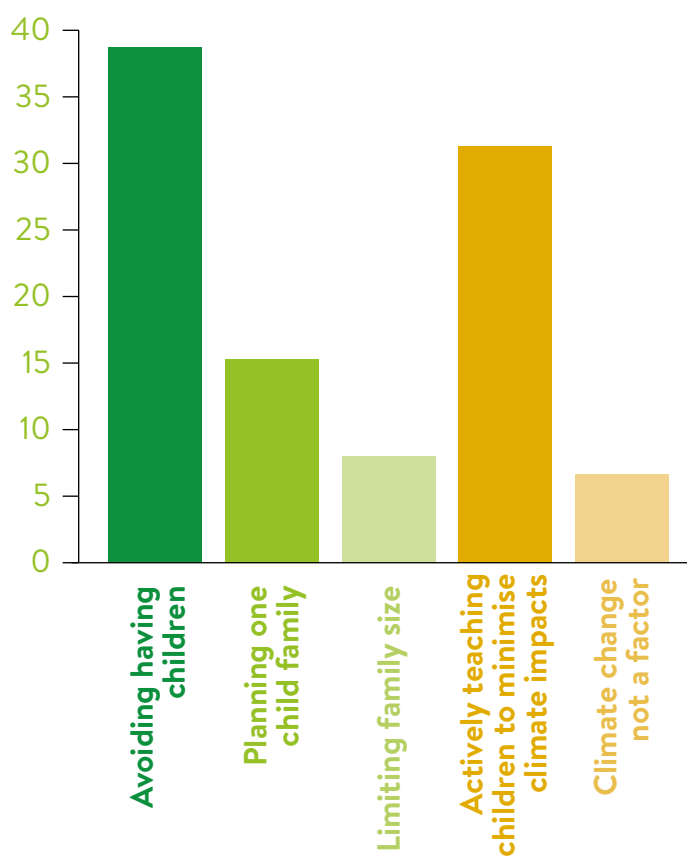
Nearly two thirds cite the lack of easily available options as the main obstacle to climate action

After considering this range of options for behaviour change, we asked what were the factors holding people back from making such changes. Respondents were offered a range of options and were able to choose more than one factor. The biggest

obstacle cited was the lack of easily available alternatives, with 65% of respondents giving this reason. Cost was the next most common reason given, but with only 34% referencing it. Then, 26% cited the belief that it was the job of government and / or industry to make the necessary changes, 22% giving reasons to do with family life, and 11% resistance from employers.
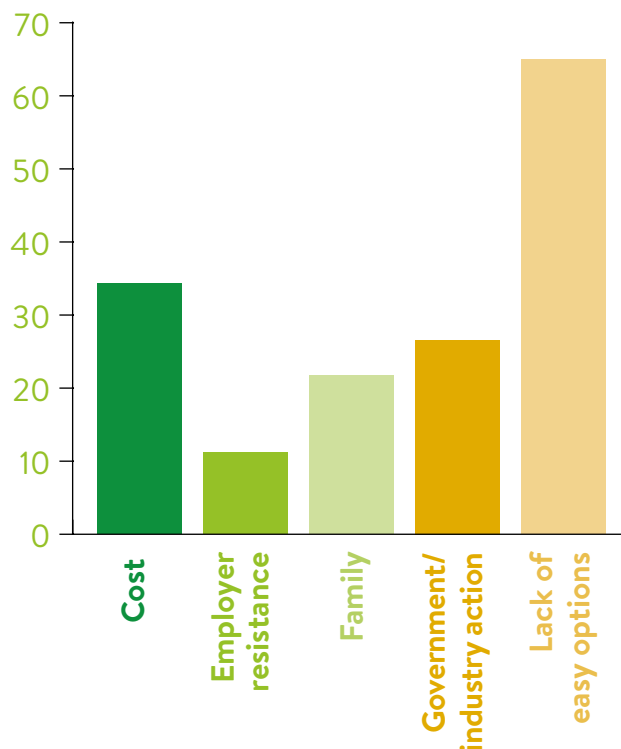
Lastly, we asked respondents to tell us about the best and worst examples of walking the talk on climate action, or not.

Among the 'best' examples quoted, not flying was the most common, followed closely by taking part in protest actions. Several people mentioned shifting to plant based diets, and several also mentioned inspirational leadership from individuals making bold life choices themselves. In this case Greta Thunberg was mentioned several times, as was the climate scientist Kevin Anderson. Several respondents talked of choosing to limit family size and one of the pride taken in maintaining a bicycle in use that was built before 1970. One respondent summed up the holistic nature of the challenge writing: 'Being a role model in all aspects of life: reducing waste, sustainable fashion choices, local plant-based food consumption, not buying anything new. Travelling only for research or familial purposes

and being open about the fact that it's not sustainable.' Several university departments and the Met Office were mentioned for transport policies that sought to encourage more sustainable choices including taking the train from London to Vienna for a conference.

In highlighting some of the more egregious examples of examples of anti-environmental behaviour, the examples were in many cases the reverse of the best examples, such as flying a lot. But this question also raised issues around accepting sponsorship and other funding from fossil fuel companies, driving SUVs and examples of conspicuous consumption. Waste and advertising were also mentioned. One person with courageous honesty highlighted themselves as a 'worst' example. The duplicity of oil companies who say that they acknowledge the problem but continue to explore for and develop new oil and gas fields was specified too. The consideration of a 'Space Port' by a county council in the English South West was cited. But perhaps the last word should go to the respondent who said that the worst example was, 'saying that the present crisis has nothing to do with me.'

Conclusion

The argument for people working in the fields of science and technology to take action to reduce their personal carbon emissions is, in one sense, the same as for other members of society. As identified by the Committee on Climate Change UK, 62% of necessary measures included societal and behaviour change. But there is also a case, especially for those working on issues related to the climate emergency, that following pro-environmental behaviours can protect the credibility of research.

It is also clear from our poll that, as with many others in society, environmental behaviours amongst scientists are changing and becoming more pronounced. Scientists are increasingly walking the talk on the climate emergency. However, given the scale and speed of necessary change, there is still a very long way to go, and a much faster pace of transition is needed.

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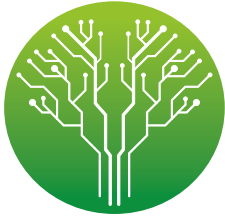
Scientists Behaving Responsibly:

Should science walk the talk on climate breakdown?

The threat of climate breakdown is now accepted as endangering human civilisation. We have science and scientists to thank for our understanding of this challenge. In particular, the recent special report of the IPCC on what it will take to stay below the 1.5 degree warming target concludes that, 'rapid, far reaching and unprecedented changes will be needed in all areas of society.' This obviously includes science and scientists themselves, even more so given the privileged insight and understanding of the problem that they have. But how much difference can individual choices make when the infrastructures we live within constrain what choices are available to us? Research on behaviour change shows how important and influential is the modelling of behaviour - people being seen to act differently – to validating, popularising and spreading new ways of living, and in this case with reducing our climate and environmental impact. Does it matter if there is a gap between their analysis, a recognition of the problem and what they actually do in their lives and work? If there is a damaging gap between the analysis, professed values of planetary concern and actual behaviour, can it be closed? This responsible science briefing explores these questions.

Scientists for Global Responsibility (SGR) is a UK-based membership organisation which promotes responsible science and technology. Its membership includes hundreds of natural scientists, social scientists, engineers and professionals in related areas. It carries out research, education, and advocacy work centred around science and technology for peace, social justice and environmental sustainability. It is an active partner of ICAN, which was awarded the Nobel Peace Prize in 2017.

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