

Zero-Emissions Aviation Technology

Public Perception Report

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Overview & methodology

This report analyses and summarises the findings of research carried out in October 2023 among over 2000 UK adults to gauge their knowledge and perception of zero-emissions aviation technologies – namely hydrogen and battery-electric, on behalf of Innovate UK Business Connect to support the Jet Zero Council.

Flight frequency by demographic

As a benchmark, we asked the public how often they fly so we could later compare and contrast knowledge and attitudes towards zero-emissions aviation fuel by flight frequency.

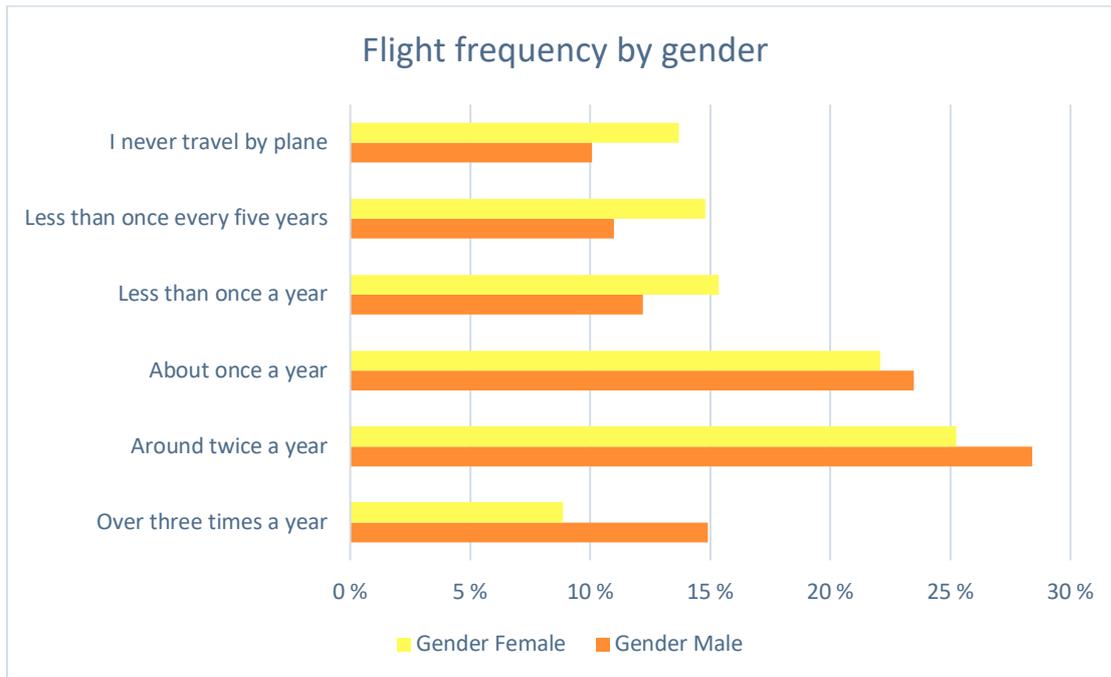
The majority of those studied, (62%), fly at least once per year. A significant proportion (25%), however, rarely or never travel by plane.

Naturally, flight frequency is impacted by age. Those aged 18-44 are significantly more likely than the mean, and fly upwards of three times a year. At one end of the spectrum, 34% of 18-24 year olds fly around twice a year, and 17% fly more than three times. At the other end, only 7% of those aged 64+ fly more than three times a year, and they are far more likely (19%) to never travel by plane.

Flight frequency by gender

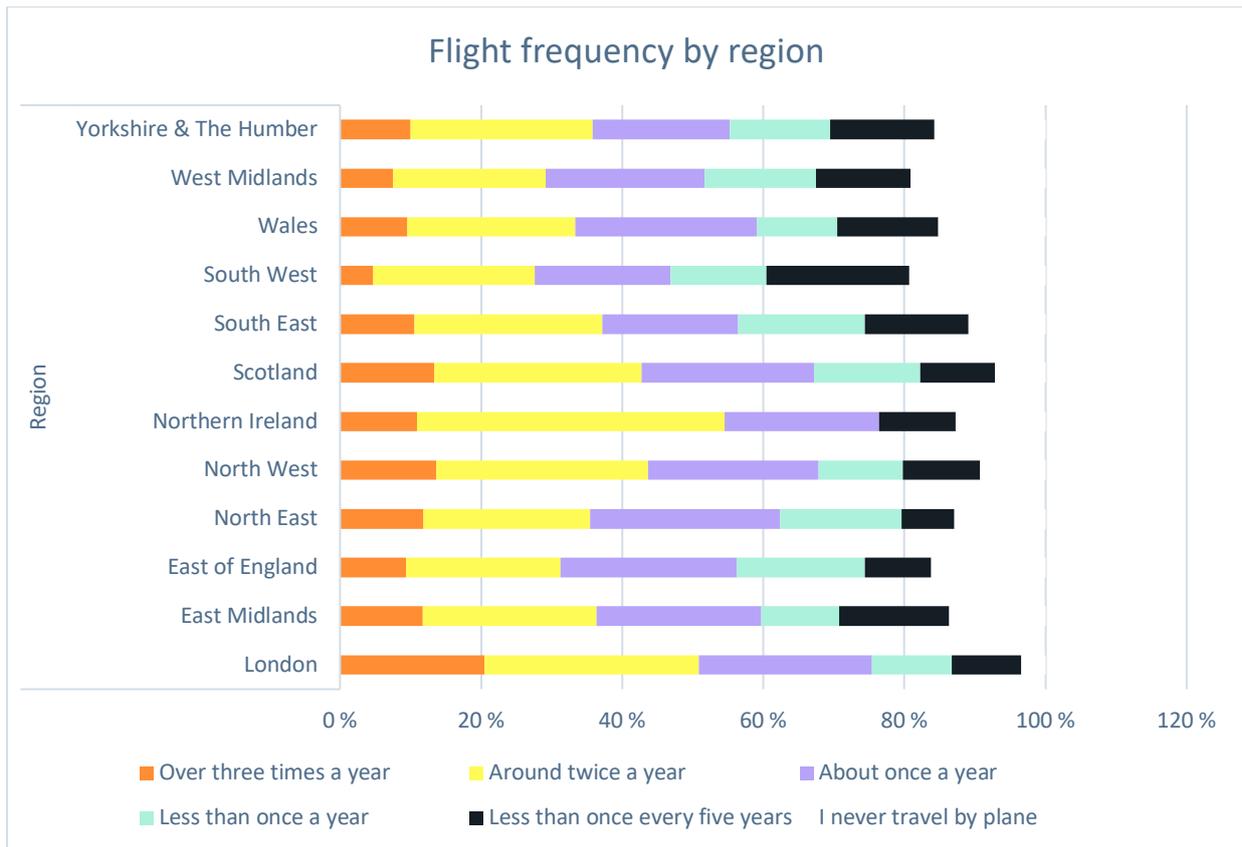
Flight frequency also varies by gender. Men are marginally more likely to fly frequently – 28% fly twice a year and 15% fly more than three times, compared with 25% and 9% for women.

The women surveyed are also slightly more likely to rarely (15%) or never (14%) travel by plane, compared with 11% and 10% for men.



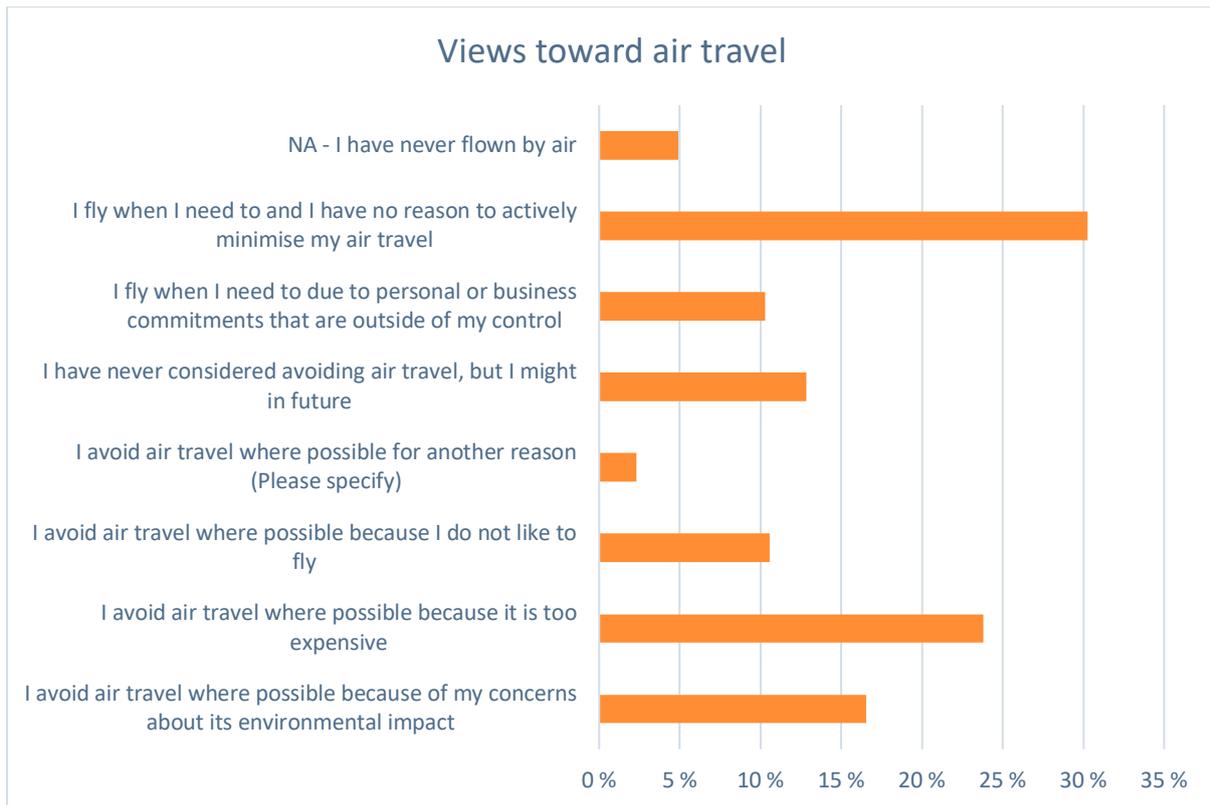
Flight frequency by region

There are no statistically significant variations from the overall picture of flight frequency region-to-region, but comparing the extremes is interesting. Londoners are 4 times as likely as people living in the South West to fly more than three times a year (20% compared with 5%). While people living in the South West are three times as likely as Londoners to rarely or never fly (39% compared to 13%).

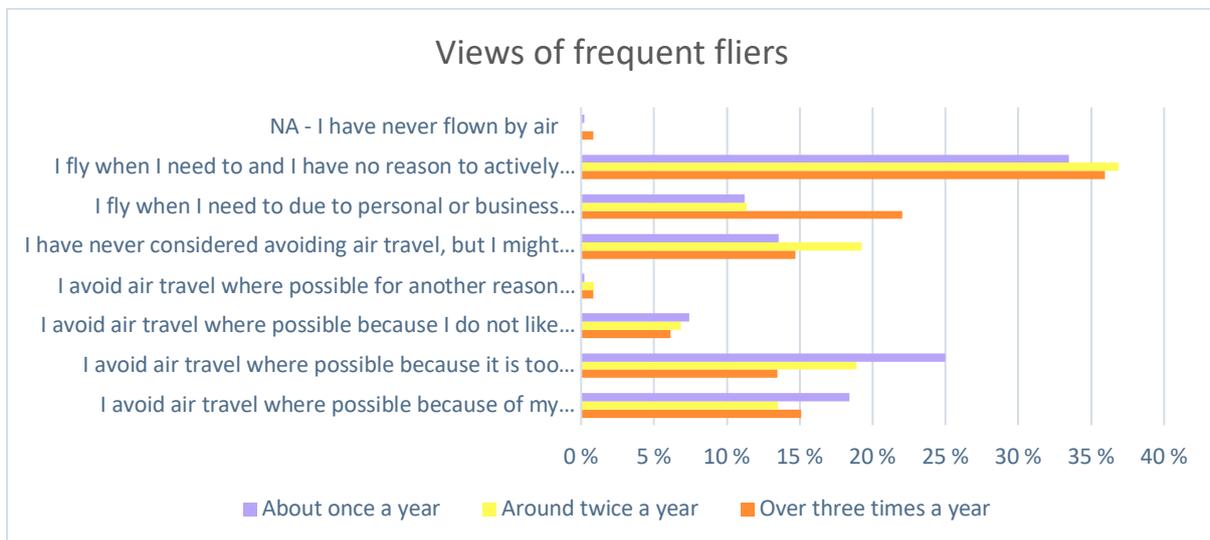


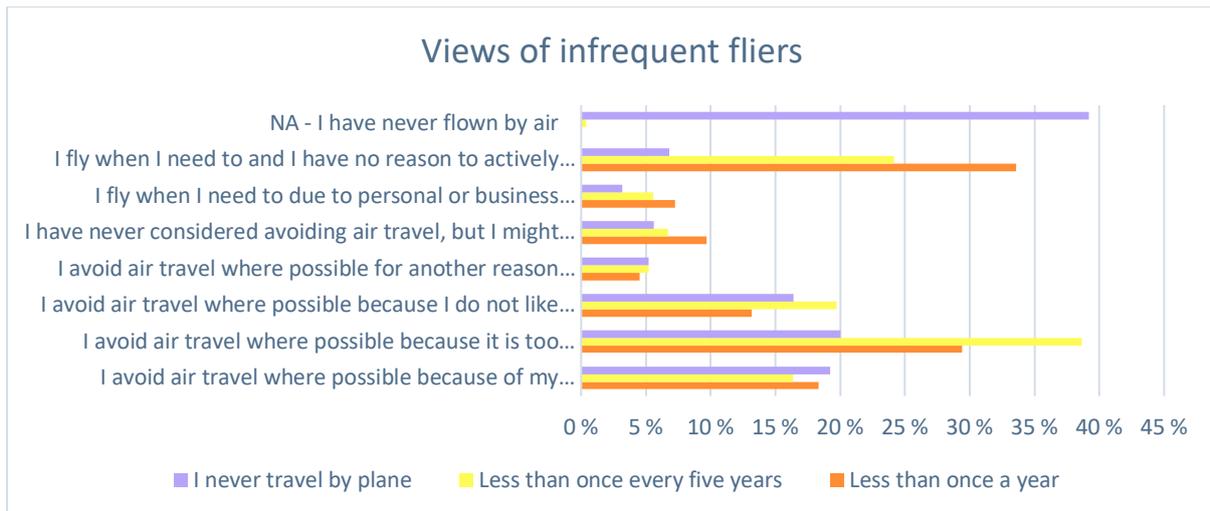
Considering the environmental impact of flying

Overall, most people (53%) don't actively try to minimise their air travel at present, but 13% would consider doing so in the future. For those that do minimise air travel, excluding the respondents who never fly, actively minimising air travel is more likely to be motivated by cost (24%) rather than flying's perceived environmental impact (17%).



Drilling down into the data further, we compared the answers of frequent and infrequent flyers on this same question.





Interestingly, there is no real deviation in motivations for actively minimising air travel, with cost being the biggest deciding factor for both groups.

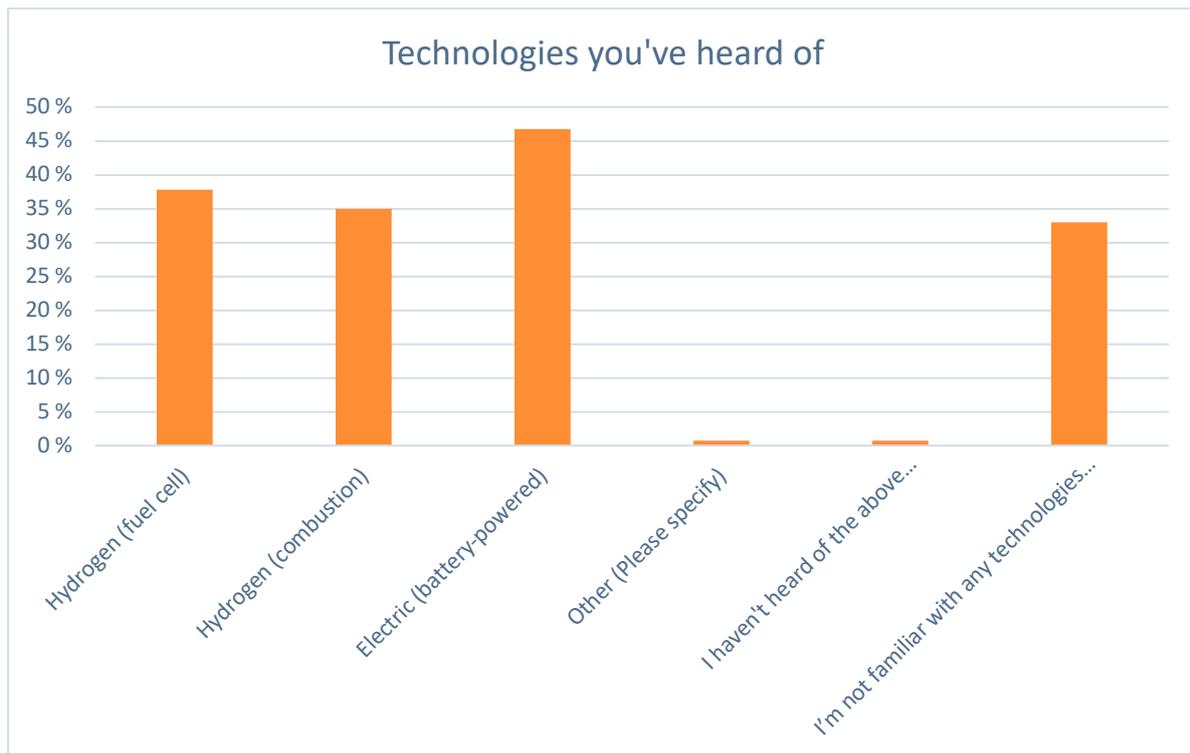
We wanted to see if this was also the case for those who never fly. Again, cost is the biggest factor at 34%, followed by a fear of flying (24%) and “no particular reason” (24%). Reducing their personal carbon footprint motivated only 20% of those who never fly.



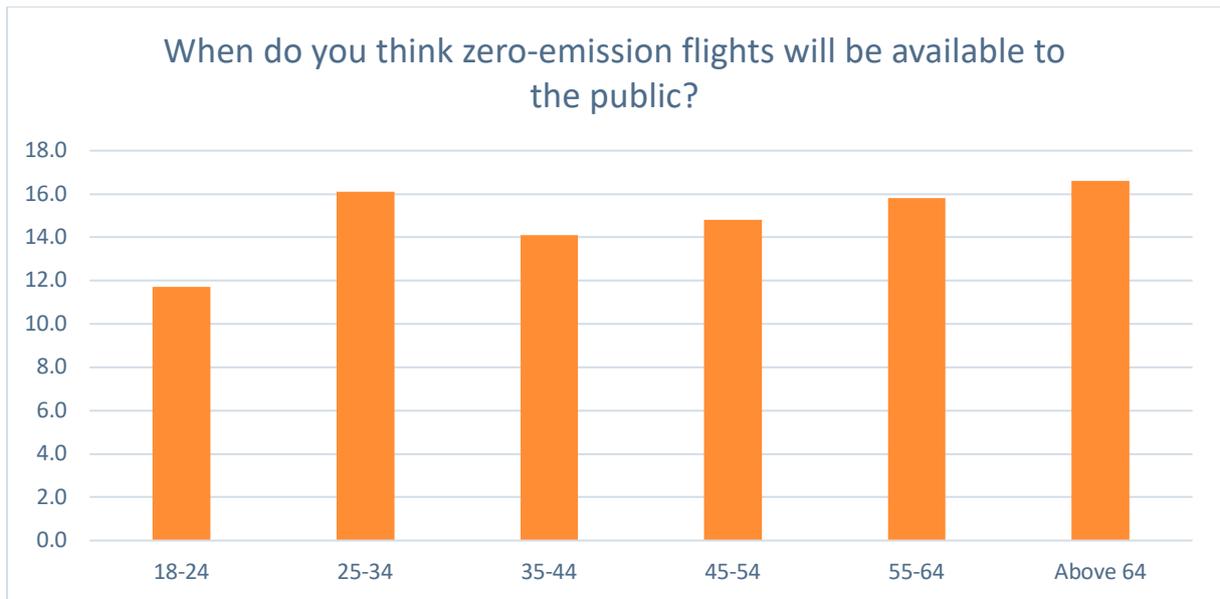
Awareness of zero-emissions technology

Interestingly, only a third (33%) of respondents were completely unaware of zero-emissions aviation technologies. The remainder were at least aware of battery-electric technology (48%), hydrogen fuel cells (38%), and hydrogen combustion (35%).

Awareness by age and flight frequency follow the same overall trend.

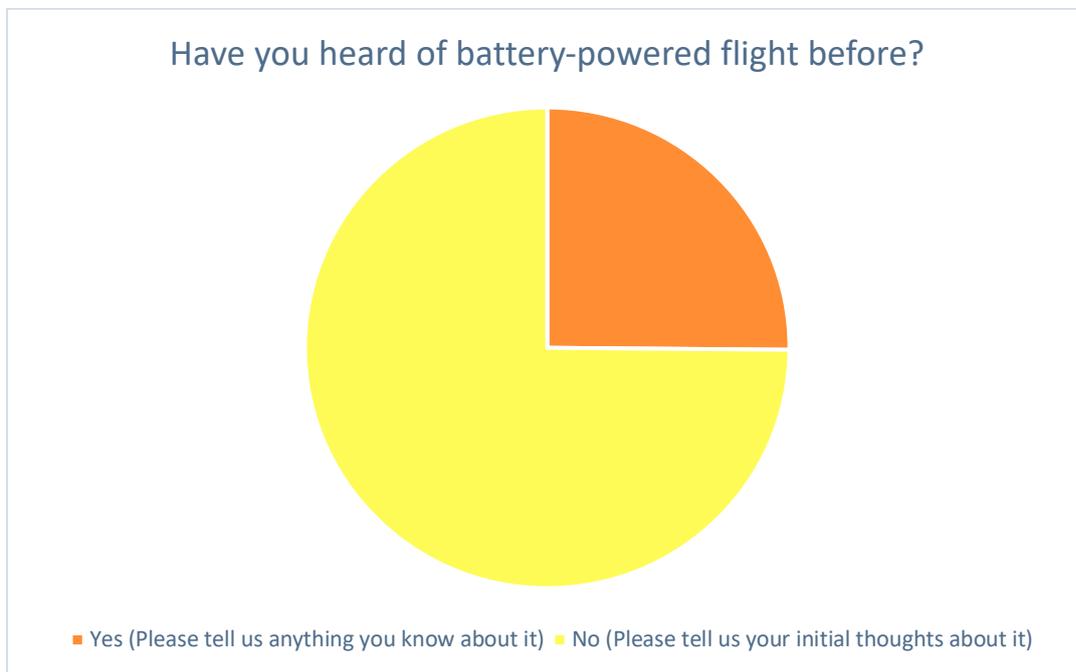


On average, respondents believe that zero-emissions fuel technologies are 15 years from being used on commercial flights. This figure doesn't deviate much by demographic, with the exception of 18-25 year olds who have the more optimistic estimation of 12 years.



Battery-powered flight: knowledge & perception

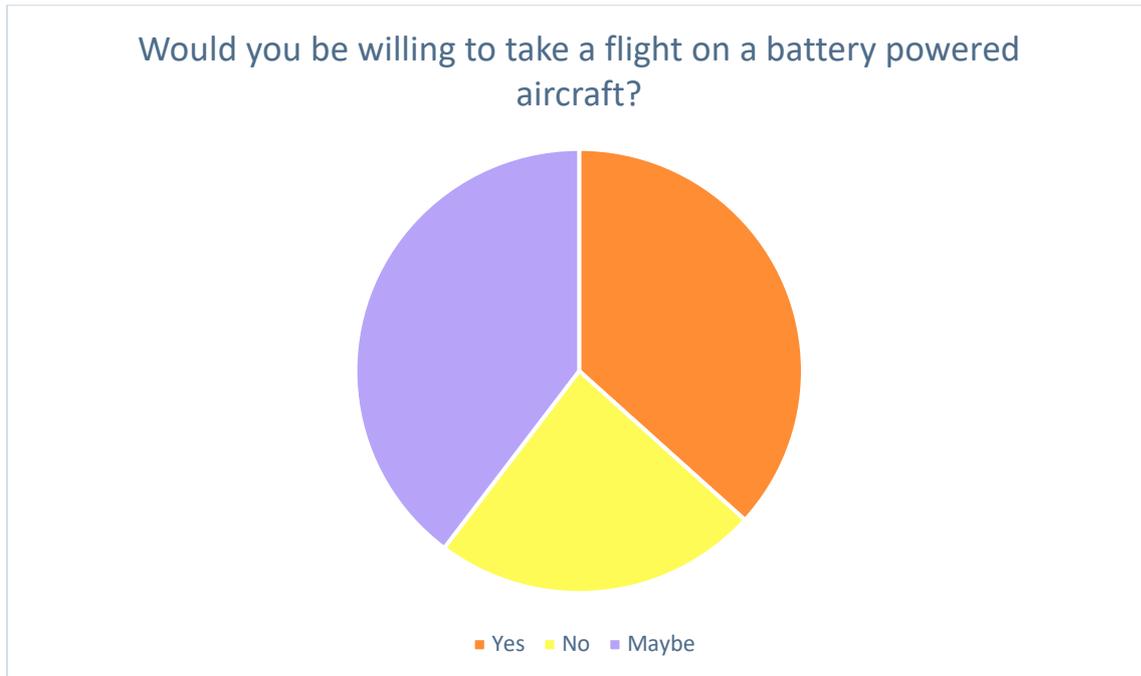
Awareness of a technology, however, does not translate to more detailed knowledge about it in relation to aviation. When asked if they had heard of battery-powered flight, the vast majority (75%) of respondents answered no.



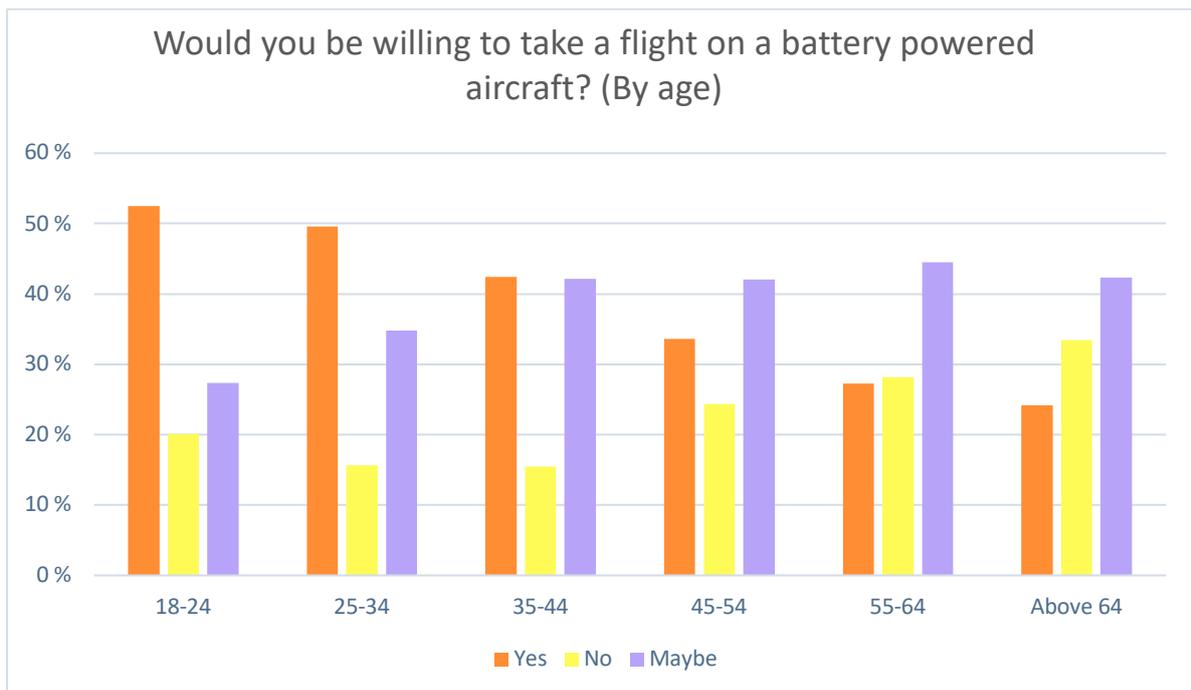
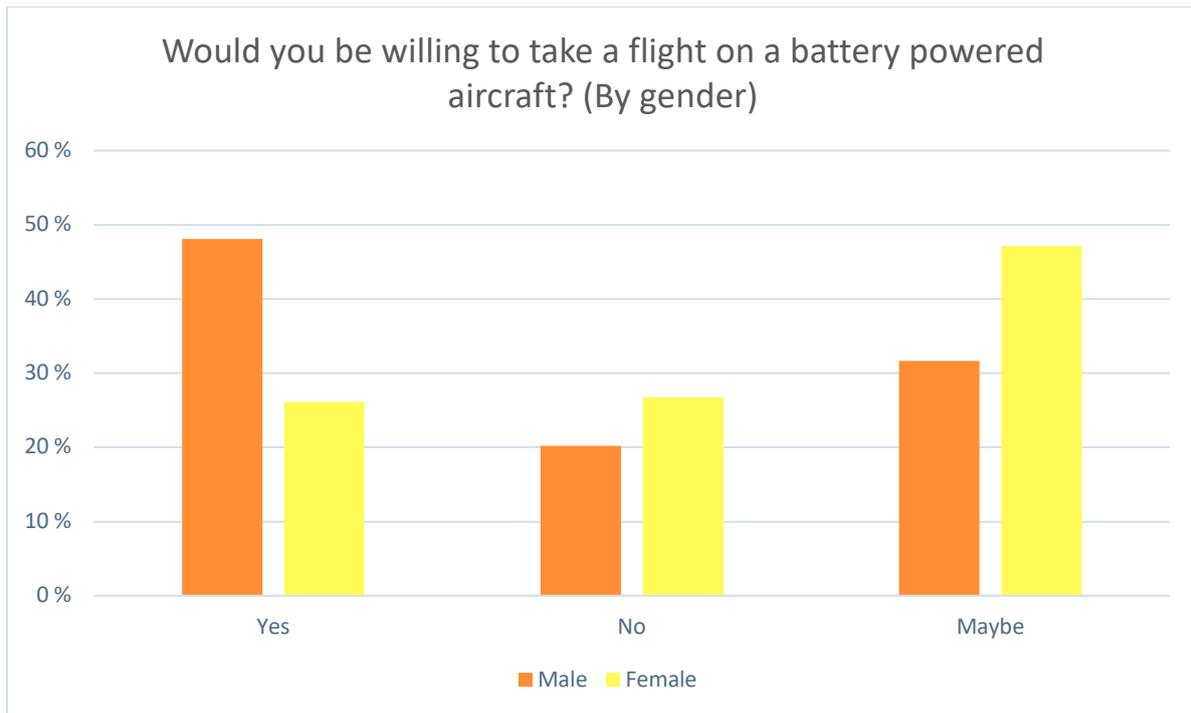
Of the 25% who had heard of it, there were concerns over the viability of the technology. Second to safety, the most common concern was over battery weight and flight distance:

For the 75% who hadn't heard of battery-powered flight, there was an even split of qualitative answers that could be categorised as "sounds good" and "sounds bad".

We asked if our respondents would be willing to take a flight on a battery-powered aircraft, further demonstrating this hesitation, with 40% overall answering "maybe", 37% answering "yes" and 24% answering "no".

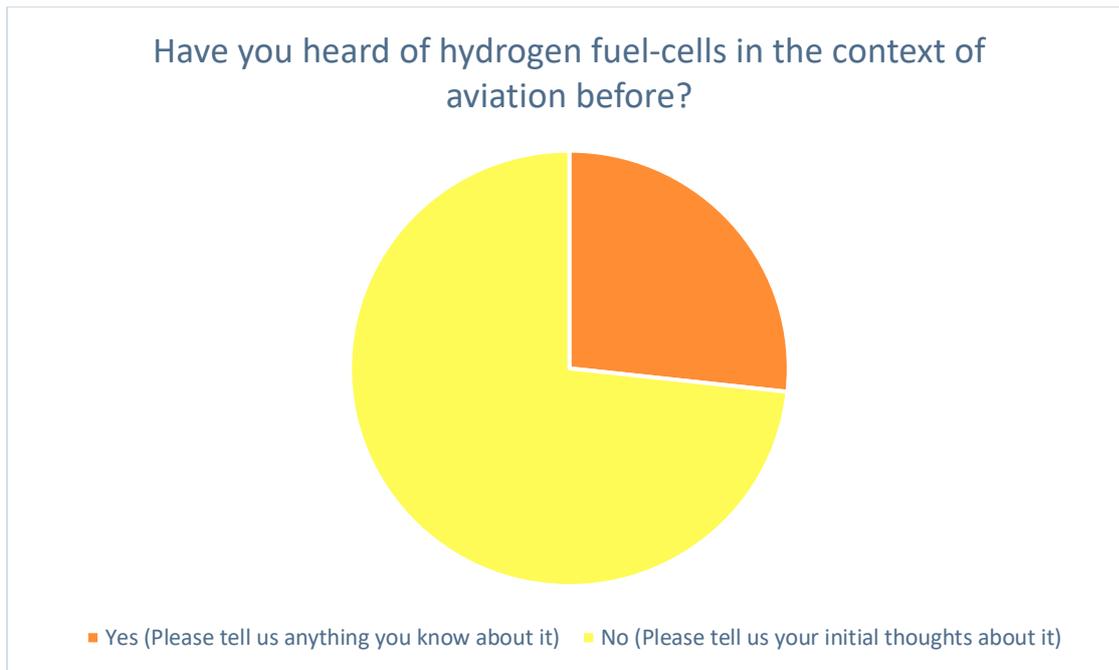


When it comes to battery-powered flight, women are slightly more cautious than men on average, and confidence in the technology diminishes proportionally with age.



Hydrogen-powered flight: knowledge & perception

There is marginally more awareness of hydrogen-powered flights among respondents, with 27% having heard of it, compared with 25% who'd heard of battery-powered flight. However, once again the majority (73%) had not heard of it.

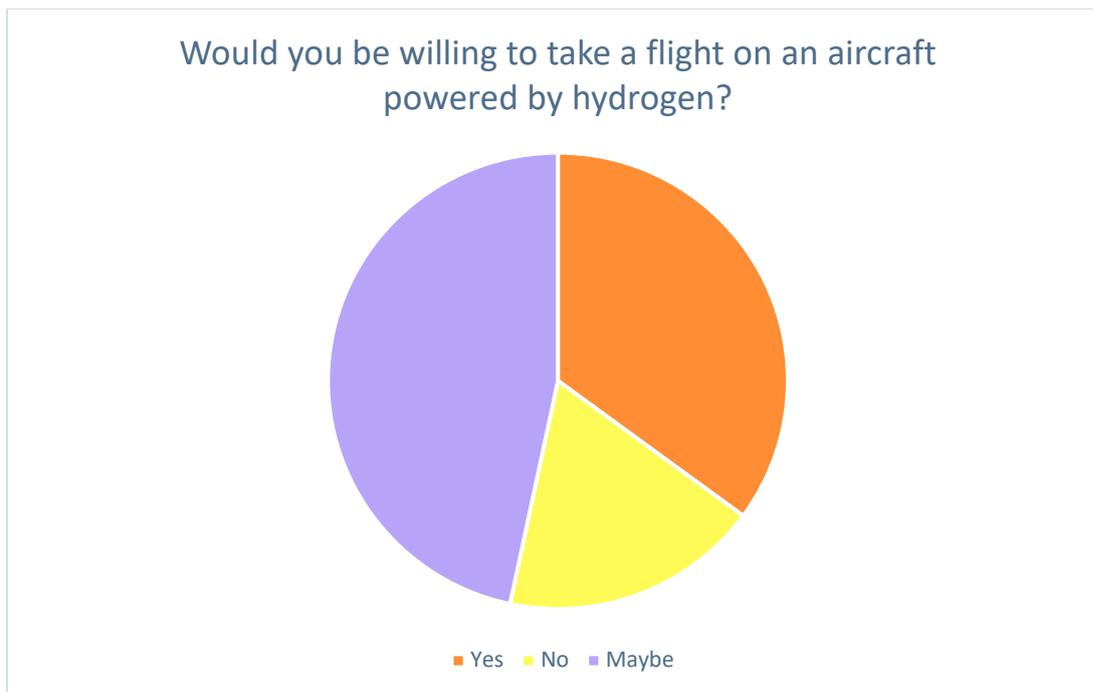


Of the 27% who had heard of it, only 5% of respondents reported safety concerns, 47% felt positively about the technology, and the remainder were ambivalent.

For the 73% who hadn't heard of hydrogen-powered flight, 8% believe it is unsafe and a further 12% could be categorised as anxious about the technology. The initial impression of the technology was positive for a third (32%), and the remainder were ambivalent.

When asked if our respondents would be willing to take a flight on a hydrogen-powered aircraft, there were fewer outright negative responses (18%) compared with on battery-powered aircraft (24%). There were marginally fewer answers in the positive also, but the difference is only 2%.

Interestingly, there was significantly more respondents that said "maybe". Taken together, this could suggest that people are more open to hydrogen-powered aircraft at present, and the technology is viewed slightly more favourably than battery-electric.



Turning to the qualitative data for answers, we found that the general public has equivalent concerns over the safety of both technologies. Hydrogen, however, does not seem to inspire concerns over performance, which may explain why it is viewed marginally more favourably than battery-electric. “Range”, “weight” and “distance” are not mentioned at all in any of the qualitative feedback on hydrogen technologies, whereas the phrases are mentioned 74 times in the qualitative feedback relating to battery-electric.

Views towards zero-emissions aviation technology

In a scale from 1 to 10, with 1 being *strongly disagree* and 10 being *strongly agree*, respondents *agreed* with the following statements:

- *I am excited at the prospect of taking zero-emission flights*
- *I believe that battery-powered flight technology is the future of sustainable aviation*
- *I believe that hydrogen powered flight is the future of sustainable aviation*
- *I believe a combination of battery and hydrogen fuel cell powered flight is the future of sustainable aviation*

And strongly agreed with:

- *Sustainable aviation technology will need to be rigorously tested to ensure its safety before its introduced commercially*

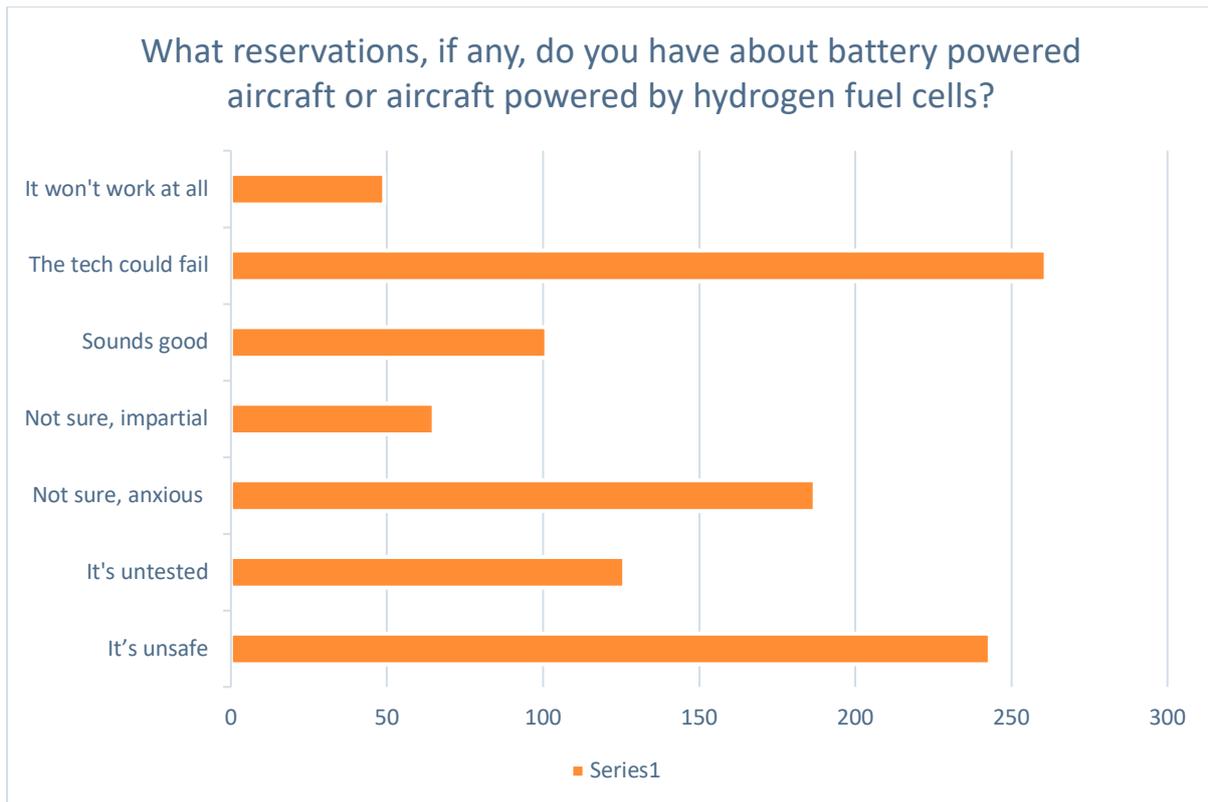


We asked respondents to be explicit about any concerns they had about the technology, which could inform communications strategies as these technologies are rolled out.

For the purposes of comparison, we have grouped these long-form answers based on their sentiment, into the following categories:

- Sounds good
- Not sure, impartial
- Not sure, anxious
- It's untested
- The technology could fail
- It's unsafe
- It won't work at all
- I don't know
- Misc

Only 11% responded with either no concerns or with an answer that could be categorised as "I don't know", a considerable number had reservations. However, it's worth noting that 42% did not respond, which could be interpreted as "no concerns" given that the question was worded "What reservations, if any, do you have about battery powered aircraft or aircraft powered by hydrogen fuel cells?"

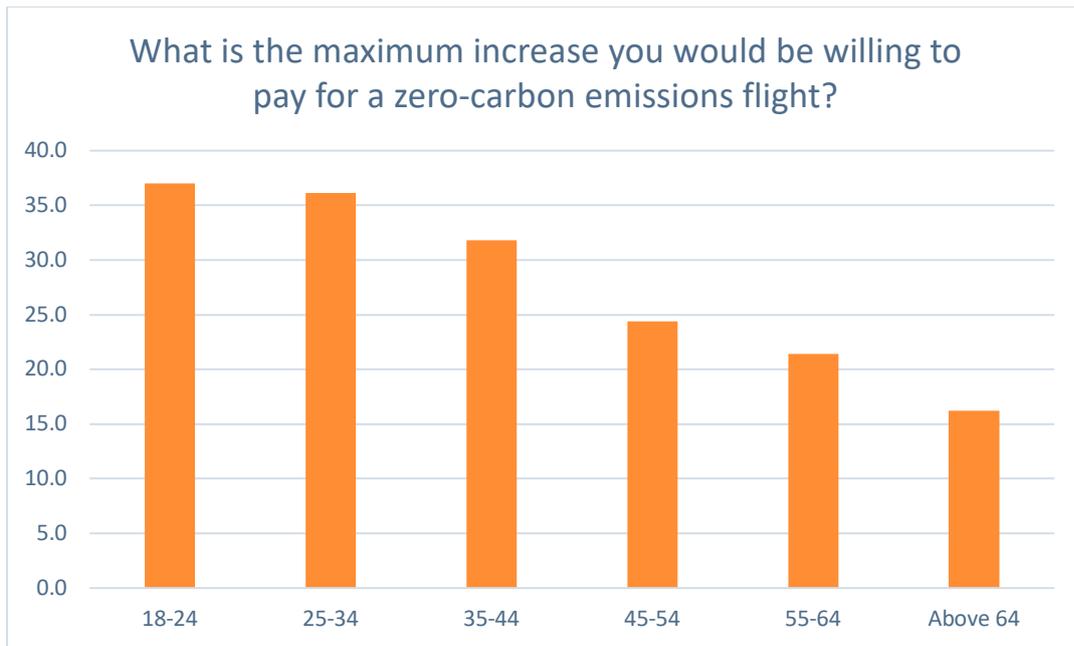


Considering cost

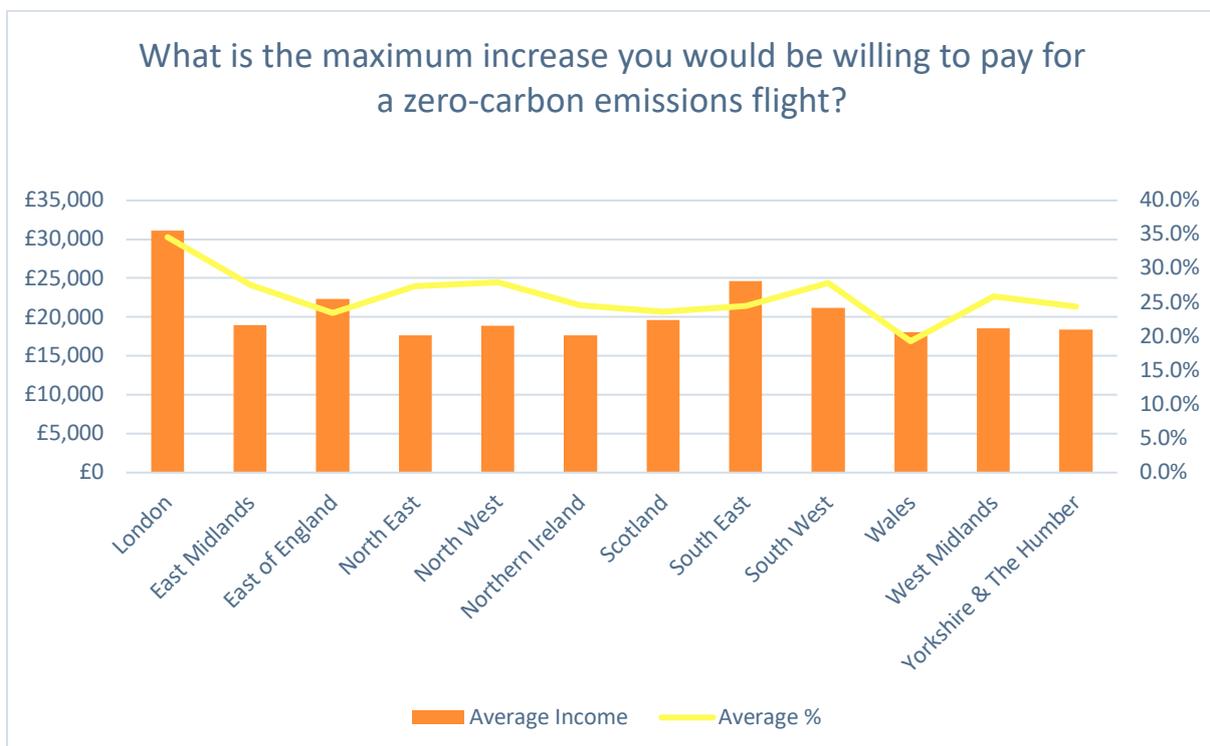
As we saw earlier in the report, cost is the biggest factor impacting flight frequency across all demographics. As such, we wanted to interrogate price-sensitivities around zero-emissions aviation.

While we don't know whether zero-emissions flights will be more expensive than those powered by traditional fossil fuel, all demographics would be willing to pay more. On average, they'd be willing to pay 27% more for a zero-emissions flight.

The younger people are, the more willing they are to pay over the odds for zero-emissions flights.



And there are some regional variations. When compared with ONS data, there is a clear correlation between the willingness to pay more for zero-emissions flights, and disposable income. It is probably this, rather than the region, which is at play.



Conclusions

The cost of flying is the biggest concern to most people at present, far outstripping environmental impact. However, there is a significant number (20%) of frequent flyers who are actively minimising their carbon footprint by flying less. With this in mind, it is significant that every demographic would pay more for zero-emissions flights.

Broadly, attitudes towards new aviation technologies could be described as neutral to positive. Safety, however, is a critical ingredient in the public's confidence in them.

The general public has a slightly more favourable view of hydrogen-powered flight than battery-electric, but there needs to be clear communication about the safety and performance of both technologies for the public to embrace them.

This research was commissioned by Innovate UK Business Connect and delivered by Energy PR. The Government has not been involved in the production of this report and its findings do not represent government policy.