



Executive Insights

Sustainable Travel: How Transport Can Help the UK Achieve Its Emissions Goals

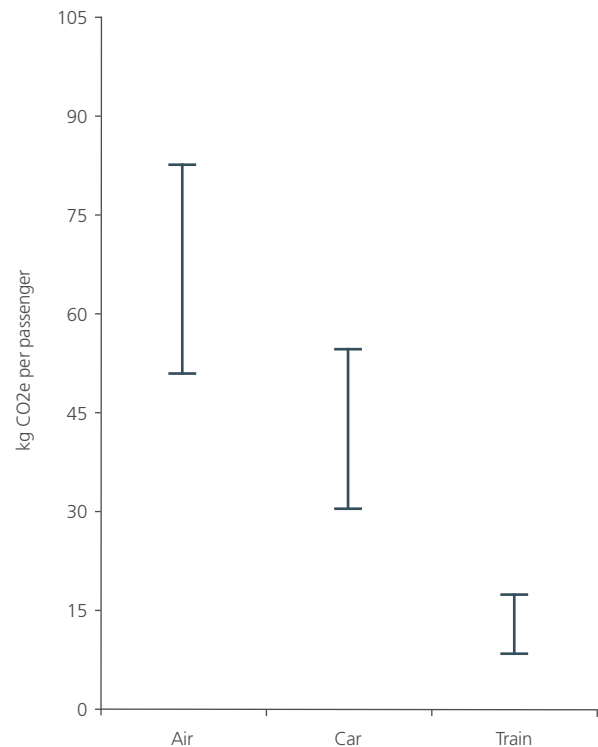
When a traveller decides to take the train rather than drive, they probably consider it a greener option. It may also be cheaper and more convenient. But how important was the environment in the decision? And how can operators of low carbon transport systems such as railways or buses make climate change a larger part of the decision – and in turn increase passenger volumes and help reduce carbon emissions?

When assessing the environment as a decision factor, there are four key questions:

- How much better for the environment is a rail journey?
- How much does the environment influence passenger behaviour?
- How well informed are passengers on environmental sustainability and travel?
- Can the reality of environmental credentials make a meaningful difference to modal choices?

The transport industry often concludes that passengers are not willing to change their behaviour (i.e., to incur more cost or time) in order to reduce their environmental impact. However, L.E.K. Consulting's work in the area, combined with recent survey

Figure 1
Average emissions by transport type
Emissions produced by different modes on a one-way journey from Exeter to Manchester



Source: Department for Transport; L.E.K. analysis

Sustainable Travel: How Transport Can Help the UK Achieve Its Emissions Goals was written by **Andrew Allum** and **Becrom Basu**, Partners at L.E.K. Consulting. Andrew and Becrom are based in London.

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Executive Insights

evidence, suggests that there are segments of travellers willing to change, that low carbon transport operators need to make much more noise about this and that the benefits in modal share gain would be considerable.

How much better for the environment is a rail journey?

Transport has not contributed to the UK's considerable reduction in emissions in recent decades. The latest UK government statistics show that transport produced 121 million tonnes of CO2 in 2018, representing 33% of the total. However, rail travel contributes less than 2% of emissions, and this output has been roughly stable while rail passenger numbers have grown by 40% over 20 years. A big shift towards railways would significantly improve the UK's future emissions trajectory. Our work indicates how this should be achieved.

Unlike railways, airlines increasingly provide passengers with estimates of the environmental impact of their journey and offer offsets or other measures of climate impact. For railways, this is a serious omission, because they have a very good story to tell.

On a marginal basis – considering only the incremental emissions from one extra journey – railways are almost carbon free. This is a fair way to think about additional journeys in off-peak periods. If you drove instead, the incremental energy use would be far higher because the c. 1.5 tonnes of car would also move the entire journey.

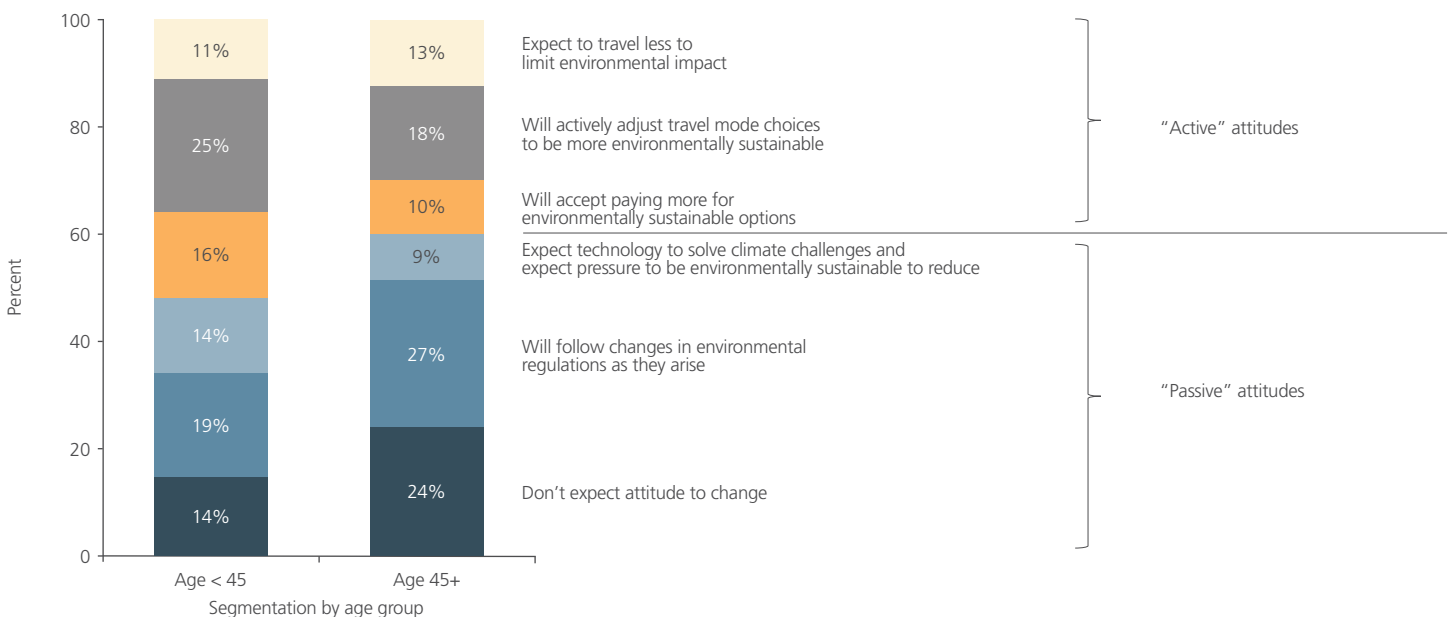
Considering instead average emissions, if the emissions of the vehicle are spread across all its passengers, rail ranks much better than car or air. Figure 1 below shows average emissions by transport types for a 300 kilometre domestic journey.

Estimates vary widely on the equivalent offset cost to remove this amount of carbon from the atmosphere. Notwithstanding scepticism about auditing these schemes, the short-haul air journey example in Figure 1 could cost up to £1.10 to offset, as a simple per-tonne ratio, compared with the train journey's 28p. Such a low cost is not widely understood and should form a much more prominent part of railway marketing messages.

Discussion about the climate impact of building the UK's HS2 line illustrates that the supply chain's environmental impact also needs to be considered. The emissions and other sustainability impacts of manufacturing and construction are not yet conclusively studied and tend to get into a complex web of counterfactuals. However, on a simple asset utilisation basis (comparing passenger kilometres completed per unit manufactured of rolling stock or kilometre of fixed assets), rail travel seems to be far superior to car travel. Trains are about four times more efficient than cars in terms of the passenger kilometres travelled per tonne of rolling stock or car manufactured and about three times more efficient in fixed infrastructure requirements (comparing passenger kilometres with road and rail kilometres).

So overall, rail journeys are a low carbon alternative. Furthermore, railways can head towards carbon neutrality through faster switching from diesel to electricity, sourcing renewable electricity and exploring new types of traction. The Dutch national railway, NS, transitioned to 100% renewable electricity in 2017. Our work on emerging passenger attitudes suggests that the business case for such changes could be made based on passenger growth through modal switching, as long as the positive message about mitigating global warming is prominent.

Figure 2
Attitudes to environmental sustainability and transport



Source: L.E.K. survey and analysis

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How much does the environment influence passenger behaviour?

In February 2020, L.E.K. surveyed a representative sample of 1,000 UK adults about attitudes towards travel and the environment (see Figure 2). A surprisingly high proportion, 44%, responded with “active” attitudes towards climate change and travel, with even higher representation among the young. In the under 45s, 25% are willing to change travel mode for environmental reasons. Railways and other low carbon modes need to do more to attract these travellers on the basis of mitigating global warming. A further 16% are willing to pay more and could therefore be attracted to rail even if driving is cheaper.

We also asked about the priority of six factors in mode choice for a recent journey. The average rankings are shown in Figure 3. Environmental sustainability ranked fifth on average, highlighting the large movement in attitudes required for the UK to achieve its stated goals on carbon emissions. The 10% who ranked environmental sustainability in the top two are younger than average, so if they hold on to those attitudes as they get older, an overall shift towards low carbon modes may be anticipated, albeit not fast enough to meet the UK’s environmental goals. A major marketing campaign would be needed to move these rankings more rapidly.

Figure 3
Travel mode decision criteria and importance of environmental sustainability

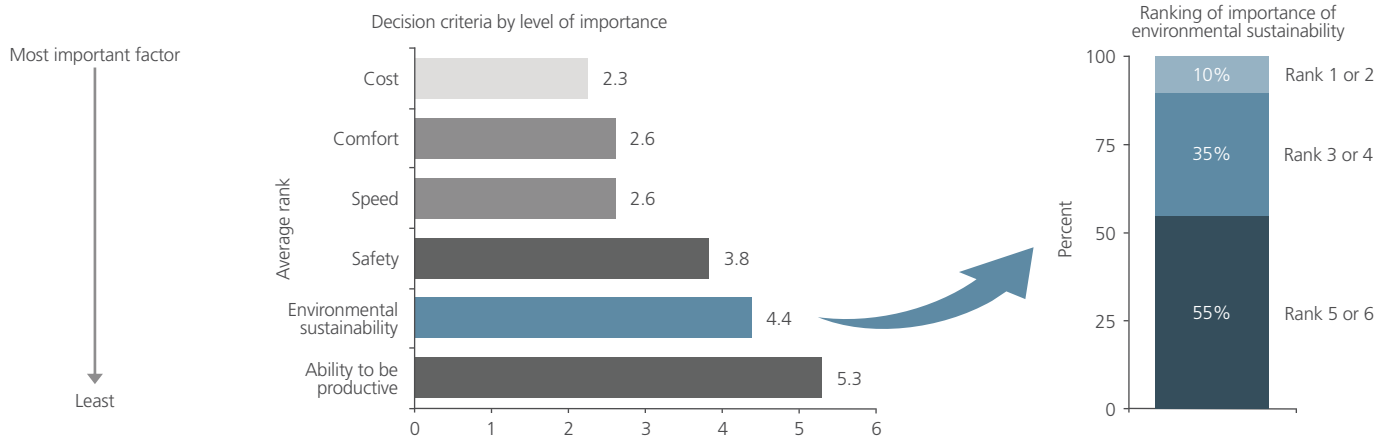
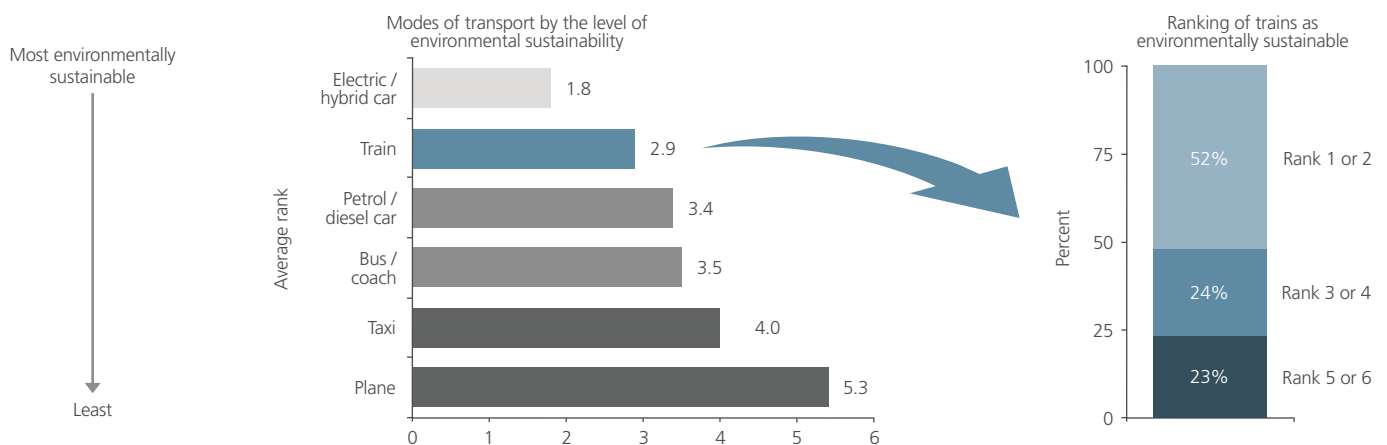


Figure 4
Modes of transport by the perceived level of environmental sustainability



Source: L.E.K. survey and analysis

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How well informed are passengers on environmental sustainability and travel?

We asked respondents to rank six modes of transport in terms of environmental sustainability. The average results are shown in Figure 4.

Whilst train travel ranked highly on average for environmental sustainability, around half of respondents did not score it in the top two, and nearly a quarter believe that it is one of the least environmentally friendly modes. These respondents are represented across all age and income groups in our survey. If the UK transport sector is to help tackle climate change through modal shift to low carbon modes, a major education campaign is needed to inform the public of the climate merits of train travel.

Can the reality of the environmental credentials of rail transport influence a shift from cars to trains?

Combining attitudes to modes and environmental sustainability, we can see large actual differences in behaviour. The survey showed more than just good intentions – respondents' choices on recent journeys depended on their attitudes towards the environment. We divided respondents according to a) whether they consider trains to be relatively good for the environment and b) how much they care about the environment. Figure 5 below shows the propensity to travel by rail, split by these factors.

In the top right corner, people who consider trains to be good for the environment, and who ranked environmental sustainability highly, used the railway four times as often as the bottom left quadrant, who had opposite attitudes on both factors. As always, surveys may overstate differences, but even a small proportion of the modal difference observed above would be very powerful. If

the rail industry can move passengers up and to the right on these scales, it could deliver a very important uplift in rail patronage and thus reduce carbon emissions.

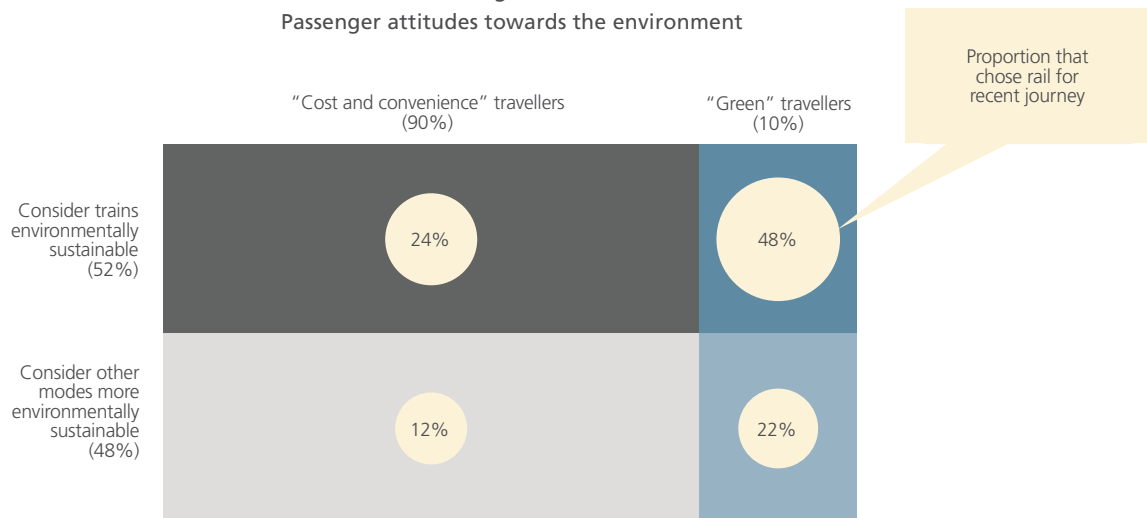
If such moves allowed rail to gain just 1% more journeys each year, then by 2030:

- rail would grow from 10% to 20% modal share, and
- the UK's carbon output from transport would reduce by 8% relative to today's emissions and mode mix, equivalent to c. 7 million fewer tonnes of CO2 per year

Many commentators assume that consumers are not yet ready to change behaviour or pay a premium to mitigate climate change. But such a generality misses the spread in attitudes and the important issue of customer segmentation. It also overlooks the rapidly changing nature of attitudes towards climate change. In 2019, a global airline brought forward \$16 billion of capex to replace its fleet with more fuel-efficient planes. In January 2020, the world's largest investment fund manager announced that "awareness [of climate change risk] is rapidly changing and we are on the edge of a fundamental reshaping of finance". A major investment bank has recently pledged to finance \$750 billion for climate transition projects, whilst imposing stricter limitations on fossil fuel investments. The future is already here, it is just not fully distributed.

Our work shows that there is already an important segment of people who decide to travel by rail rather than drive, and who are prepared to pay more to do so to reduce their impact on global warming. The rail industry can do much more to encourage such shifts in behaviour. On top of the technological changes to reduce the impact of each mode, modal switching has a big role to play.

Figure 5
Passenger attitudes towards the environment



Source: L.E.K. survey and analysis

How can low carbon transport and mobility providers help the UK decarbonise?

A. Showcase their environmental credentials versus cars – and grow passenger numbers

1. Show your passengers, clearly and often, how green their choice is
2. Give passengers the option to offset the climate impact of their rail journey (by pennies, in our example), providing a very positive comparison with other choices
3. Build awareness of the environmental benefit of rail travel into the ticket purchase process (“If you had driven, it would have added so much CO2 to the environment”)
4. Focus on modal share gain from cars, by identifying trips where the decision between car and rail is marginal enough that environmental concerns can tip the balance for many travellers
5. Develop CRM strategies that focus on those segments of passengers who will take the environmentally sustainable option even when it is not the winner on time, cost and convenience
6. Conduct detailed econometric work to calibrate a “climate factor” into transport economics calculations simulating modal choices
7. Target environmental marketing messages at those customer demographics that our survey shows are already willing to change their behaviours

8. Work with other stakeholders to make the environment a higher priority for passengers. An industrywide campaign may be the best way to achieve this
9. Consider and respond to the “green” threat from electric vehicles, which are, by regulation, going to dominate in the 2030s. Rail has advantages of speed over middle distances, city access without parking, and of course productive or fun use of time on board

B. Work to reduce the carbon impact of their operations even further

10. Partner with other low carbon travel providers to create and promote environmentally friendly end-to-end journeys
11. Seek and support local government partnerships such as low emission zones
12. Source renewable electricity for traction
13. Invest to rapidly eliminate diesel, which is far worse for the environment, leveraging interest in sustainable finance and climate transition to secure private-sector investment
14. Consider changes to wider company processes to reduce carbon, such as catering, waste and personnel travel
15. Develop a credible industrywide carbon offset scheme (comparable to the air industry's CORSIA scheme) and make passengers aware of the low offset costs

About the Authors



Andrew Allum is a Partner at L.E.K.'s London office, who joined the firm in 1992. He has more than 25 years' experience in the rail industry, advising a variety of operators, infrastructure managers, suppliers and investors. His main areas of practice are surface transport and business services, with a focus on human capital sectors such as training, education and recruitment. Andrew holds a BSc (first class)

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Becrom Basu is a Partner in L.E.K.'s London office, who joined the firm in 2005. He has 13 years of senior consulting experience with L.E.K., during which time he has led many significant engagements in our transport, travel and new mobility sectors. Becrom holds a MEng in Chemical Engineering from University College London and an MBA from INSEAD. Before his MBA, Becrom

held management roles at a technology start-up and Eurocontrol, the European agency for air traffic control.

About L.E.K. Consulting

L.E.K. Consulting is a global management consulting firm that uses deep industry expertise and rigorous analysis to help business leaders achieve practical results with real impact. We are uncompromising in our approach to helping clients consistently make better decisions, deliver improved business performance and create greater shareholder returns. The firm advises and supports global companies that are leaders in their industries — including the largest private and public-sector organizations, private equity firms, and emerging entrepreneurial businesses. Founded in 1983, L.E.K. employs more than 1,600 professionals across the Americas, Asia-Pacific and Europe. For more information, go to www.lek.com.