High Speed 2

10 Questions to ask before deciding about HS2

Questions and Answers by HS2 Action Alliance

March 2011

HS2 ACTION ALLIANCE

Introduction

HS2AA is the evidence-based arm of a campaign (with over 70 affiliated groups) challenging the case for High Speed 2 (HS2).

10 Questions

This document asks 10 questions that we believe are relevant to deciding if there is a case for a £30bn new high speed railway. We set out our answers, and hope that it is helpful to you in coming to a decision about whether the business case is robust and if £30bn would be well spent on HS2.

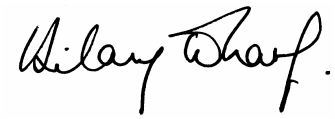
The Business Case for HS2

Our latest report gives a fuller review of the February 2011 Consultation Business Case for HS2[1]. Our report's executive summary is attached as an annex.

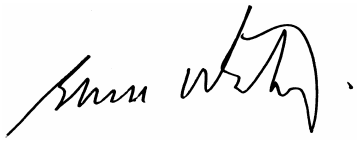
HS2AA's earlier findings on the March 2010 business case[2] (separately endorsed by FTI Consulting in their review[3]) are supported by two other reports that examine the case for alternatives (uprating the existing WCML) and issues related to the wider economic impacts of high speed rail[4].

HS2AA's latest report concludes the new business case remains flawed – there are better, cheaper, and greener alternatives readily available.

For further detail please see our full report 'Initial Review of the Consultation Business Case for HS2', March 2011, available on our website www.hs2actionalliance.org.



Hilary Wharf
HS2 Action Alliance



Bruce Weston
HS2 Action Alliance

28 March 2011

Addendum

DfT have just released a 75 page update to their appraisal of alternatives 'to be consistent with the latest assessment of HS2'. However it is undoubtedly inconsistent with the February Consultation Case and contains a number of unexplained changes. This has been raised with DfT. Clearly any assessment must be on a like for like basis. When matters are resolved we will update our reports accordingly.

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1 'Initial Review of the Consultation Business Case for HS2', HS2AA, March 2011
2 'Review of the Business Case for HS2', HS2AA, Feb 2011
3 A Review of the Business Case for HS2', for HS2AA, 13 December 2010, FTI Consulting
4 'More capacity on WCML: an alternative to HS2', Feb 2011, HS2AA; 'Review of Wider Economic Impacts of HS2', HS2AA, December 2010

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[5] 'Initial Review of the Consultation Business Case for HS2', March 2011, HS2AA

1. Are DfT's new rail demand forecasts really 'conservative'?

DfT claim that their new forecasts (that still represent a doubling in demand) are for an annual rate of growth of less than 2% (1.4%), while over the past 15 years it has averaged 5%, hence they claim their forecasts are conservative. However, DfT's forecasts for the long distance routes at issue (WCML, MML and ECML) are all 2% or more. The 1.4% is misleading as its not really for long distance journeys[6]. The reduction (from 3.4% in their March 2010 business case) is the result of using the latest [7]economic growth forecasts and the impact of three years of pricing at RPI+3%.

In fact DfT's forecasts remain excessive because:

- To obtain a doubling in demand, they project demand growth for an unreasonably long period (35 years to 2043, 10 years longer than before) – despite their model being most suited to short term forecasting[8]
- DfT use an out of date version of the forecasting model[9] that is now known to systematically overestimate growth in the longer rail journeys which are crucial to the demand needed for HS2 – and recent research for DfT confirms this
- DfT also expect a major uplift in demand (on top of the doubling in background growth) as a result of the journey time reductions – but mobile technology is already making time on-board trains useful, so the uplift would be much smaller.

Overall domestic travel shows signs of saturation, for both total and long distance journeys[10]. Within this, rail's share has increased since privatisation from the improved services, increased subsidy, and airline style pricing. While rail's share has not stopped growing yet, DfT accept it is unreasonable to project past trends forward indefinitely.

The effect of these erroneous assumptions can be calculated. Forecasting 'background' growth for only 25 years (2008 to 2033), as was done for the 2010 White Paper, and adopting the approach to demand income elasticities of the latest version of the forecasting model, at least halves the net benefit ratio (NBR) of HS2. Economic and social benefits do not cover, or barely cover, the subsidy ie costs:

- *Phase 1*: NBR drops to **0.6** (from 1.8), and with wider economic impacts to **1.0** (from 2.0)
- *Full 'Y' network*: NBR is **1.0** (from 2.2), and with wider economic impacts **1.2** (from 2.6)

A reduction in the demand uplift with the introduction of HS2 would further diminish the NBRs.

Demand forecasts for rail schemes are notoriously overestimated. More than 9 out of 10 rail projects have demand overestimated, on average by a factor of two[11].

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[6] 1.4%/a is for all 'strategic trips' in their model and does not conform to normal over 50 mile definition of long distance (FOI 3 February 2011)

[7] June 2010 economic growth forecasts by Office of Budget Responsibility

[8] DfT rail model (Passenger Demand Forecasting Handbook, PDFH) is a fixed elasticity model that over long periods predicts unbelievable increases in the proportion of income spent on long distance rail

[9] DfT use PDFHV4.1 not the latest Aug 2009 version 5.0. V4.1 income elasticity includes a 'distance term' that DfT sponsored research by Arup & Oxera says no longer applies. V5.0 has no distance term

[10] Section 1.1 of the 'Review of the Business Case for HS2', HS2AA, Feb 2011

[11] 'Inaccuracies in Traffic Forecasting' B Flyvbjerg, M Skamris Holm and S Buhl. Transport Reviews, January 2006.

2. Is HS2 the best or only way of getting the capacity we need – is WCML full?

There are alternatives to a new railway eg improving the existing railways, that DfT themselves evaluated as part of the March 2010 work[12] on HS2. One was called Rail Package 2 (RP2) which is uprating the existing WCML. The 2010 work shows:

- RP2 could provide **all the capacity** DfT say is needed and has **less crowding** than HS2
- RP2 **is at least 5 times cheaper** than HS2 (£2bn net cost, not £11.9bn –DfT's 2010 figs)
- RP2 could be delivered **more quickly** (starting whenever required, not waiting to 2026)
- RP2 is a risk free **incremental approach** (it's not all or nothing)
- RP2 is **better value for money** (50% better NBR than HS2, on DfT's figures).

Uprating the existing infrastructure can provide capacity earlier than HS2 and in sufficient volume[13] to more than meet even the capacity requirements forecast by DfT to 2043. This is demonstrated by the upgrade package being less crowded than HS2 ie having a 51% load factor (the ratio of passengers to seats) compared to 58% on HS2, and 57% in 2008.

In the Feb 2011 consultation materials DfT seek to conceal the superiority of improving the existing infrastructure by assessing a package of changes[14] that are far from the best and which create unnecessary capacity. However, when the upgrade to WCML was separately analysed in the 2010 published materials, it was clear that it had a 50% better net benefit ratio (3.63, compared to 2.4 for HS2) – as well as lower loading, so less crowding. But its potential was misleadingly presented in the 2010 White paper, both on capacity and NBR[15].

Uprating the WCML is cheaper, better value for money than HS2 and can be delivered earlier and in stages, avoiding crowding and the risk from needing to forecast over many years.

When an appropriate approach to demand forecasting is taken, the forecast increases in demand are modest ie substantially less than the 2%/a now being forecast. They may then even be addressed by commercially viable solutions such as longer trains and reducing the provision of first class, or arise as a side effect of addressing urgent problems such as the need to provide additional commuting capacity for Milton Keynes and Northampton. Measures that separate fast and slow traffic on the railway create additional capacity for both. In the assessment of upgrading options the benefits of additional commuting and freight paths were not even identified.

Much is said about WCML being full. What is true is that more commuting capacity from Milton Keynes and Northampton is needed now. This is addressed as part of RP2 and waiting until 2026 is not a solution. It is also true that Friday WCML services from Euston see enormous queues stretching across the concourse. But this is mainly a regulated pricing issue (ie when the first saver becomes available) not due to a real shortage in capacity.

The full London to Manchester and Leeds scheme (Phase 2) is not capable of running all the services it is claimed to, and has insufficient capacity for key flows onto the classic network. The 18 services/hour are insufficient to provide services to Heathrow and HS1 at peak times, as well as the identified service pattern, so some of the benefits claimed cannot be deliverable.

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[12] HS2 Strategic Alternatives Study – Strategic Outline Business Case, March 2010 (Atkins for DfT)
[13] RP2 provides at least 135% more capacity and this could be increased to over 170%, see HS2AA 'More capacity on WCML: an alternative to HS2'
[14] Package is for the Y network and covers WCML, ECML, MML
[15] Discussed at Section 3.3 of HS2AA report 'More capacity on WCML: an alternative to HS2'

3. Won't the alternative of upgrading existing railways create major disruption?

Taking upgrading WCML as an example, the capacity requirements are met by removing a series of bottlenecks, rather than replacing all the track and signalling (as occurred in the last WCML Route Modernisation upgrade which is inevitably disruptive) and by introducing more services and longer trains.

With more limited demand growth, longer trains and replacing some first class accommodation with standard class may provide the capacity needed[16] and reduce emergent crowding in a commercially viable manner. This would create no disruption and quite possibly not require a subsidy. The majority of the work needed to take the longer trains is already taking place.

Building HS2 would create more disruption to existing rail travellers than uprating the existing infrastructure, eg with the complete rebuilding of Euston over seven to eight years.

HS2 will also have a permanent effect on existing services. Without further additional funding many cities and towns on the HS2 route (eg Coventry, Stoke on Trent) will get a worse service frequency. Most passengers are forecasted to switch to HS2 and so the existing services can no longer be justified – what was for example 3 trains an hour from Coventry to London becomes just 1 (and 10 mins longer with extra stops). There is no reason to think that additional subsidy will be provided to support commercially non-viable services.

4. Is HS2 good value for money?

On DfT's latest assessment of the London to West Midlands phase, there is a net benefit ratio (NBR) of just 1.6 (2.0 with WEI), and for the full "Y" network of 2.2 (2.6 with WEI). These new NBR's mean that in value for money terms the case for HS2 is now at least a third worse[17].

But even achieving these ratios depends on key factors:

- Rail demand on the key long distance route doubling – but to achieve this growth is forecast for 35 years using a short term forecasting model (doubling the period normally sanctioned by DfT) and is forecast using an out of date version of the model that overestimates growth in the longer journeys
- Time on board trains being accounted as wholly unproductive, which is now justified on the basis that correcting for this would make no difference because crowding benefits and modal transfer from air and car would more than off set this[18]. But this ignores the alternative of uprating the existing infrastructure having less crowding, and that air passengers will shortly be as able to use time as usefully as rail passengers[19]. This leaves modal switch from car which is just 7% of all passengers. Ignoring the fact that travellers use time on board usefully already also means that the uplift in demand from shorter journey times will be overestimated
- Benefits from reduced crowding and shorter waiting times (from improved train frequency) for both business and leisure travellers – but again if compared to upgrading the existing rail system these benefits disappear.

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[16] See HS2AA 'More capacity on WCML: an alternative to HS2', March 2011
[17] In March 10 the NBR for phase 1 was 2.4 (and 2.7 with the wider economic impacts (WEI))
[18] See Section 5.2 of HS2AA 'Initial Review of the Consultation Business Case for HS2', March 2011
[19] See Sunday Times article 27 March 2011 (in gear) The breakthrough is in providing connectivity without interfering with, or dependence on, ground based transmitters

Re-working the NBR and correcting for some of the erroneous assumptions gives values for the London – West Midlands phase of just 0.3 (0.5 with WEI) and for the "Y" an NBR of 0.4 (0.6 with WEI) ie between 30pence and 60pence benefit for every £1 of public money spent (see 6 below). All of these values have subsidy exceeding economic and welfare benefits, and on DfT's approach are classified as 'poor' value for money.

5. Is HS2 part of the green economy?

The Government themselves say that HS2 will only be carbon neutral, but this neutrality depends upon[20]:

- HS2 gaining passengers from domestic air flights, and domestic flights reducing for this reason, although the opportunities for this may be much more limited than DfT forecast
- Freed-up take-off and landing slots not being re-used by longer haul flights (despite BAA saying this is exactly how they would be used)[21]
- Failing to reduce carbon savings from air to HS2 modal shift from the White Paper levels to reflect reduced forecast inter-modal shift
- Accounting the emissions of the electricity consumed by HS2 at the overall total generation average, rather than for the day-time and peak generation that it requires
- Not recognising that electric or hydrogen cars can utilise renewable and baseload electricity supplies because they are storage technologies, and hence will decarbonise in advance of full generation de-carbonisation
- Assuming excessive reductions in car emissions from modal shift, because the average (Webtag) car occupancy is used instead of the higher one for long distance journeys.

There is also nothing green about gouging a concrete scar through London's nearest area of outstanding natural beauty or through some of England's remaining tranquil countryside.

6. Is HS2 good for the economy – are the £44bn worth of benefits real?

The £44bn is DfT's figure for the quantified economic and social benefits for the whole "Y" network, with the figure being less than half that (£20.6bn) for the first phase. The largest item (almost 40%) is what DfT attribute to business time and reliability savings[22]. But these areoverestimates[23] for three reasons:

- Time on-board trains is not entirely wasted and in future there will be no impediments to it being as productive as the office. Advances in mobile technology have transformed how time on-board is used now, never mind by 2026. Business time saving is the major economic benefit DfT attribute to HS2 ie a minute saved in journey time is counted as a minute more productivity

[20] These issues are all discussed in Section 3.2 and Section 10 of HS2AA 'Initial Review of the Consultation Business Case for HS2', March 2011
[21] 'High-speed rail set to boost UK emissions from aviation', the ENDS report, 18 March 2011
[22] £8.5bn out of £20.6bn benefits (including the Wider Economic Impacts) for Phase 1.
[23] See Section 3, 5 of HS2AA 'Initial Review of the Consultation Business Case for HS2', March 2011

- Savings in waiting times diminish or disappear if the best alternative of uprating existing rail infrastructure is used as the comparator (as do benefits from reduced crowding, but crowding is not currently considered a productivity issue)

- The unit value of business time relates to a very high level (equivalent to £70k/a in 2009 money) in the distribution of earnings. This is because it is out of date and relates to when rail business travellers were even more elite than they are now or could be with the projected almost fourfold increases in business demand.

In addition the first phase of HS2 will create 1,500 permanent jobs on the railway, and 9,000 temporary jobs building it. No account has been taken in the loss in jobs operating and maintaining the classic railway resulting from the reduction in services due to the great majority of long distance passengers moving onto HS2. Virgin Trains currently employ about 3,000 people and would lose about 80% of their passengers.

No account has been taken of additional jobs providing new services utilising freed-up capacity on the classic network. However it is likely that many enhanced services will require additional subsidy and would not happen for that reason.

With HS2, the benefit of enhancements to services that are now or imminently needed would be delayed, as they would attract benefits for only the period until HS2 is operational. No account is taken of the economic benefits of early implementation of improvements to the existing infrastructure, or the jobs that they would create.

In addition HS2 would be a catalyst for new jobs in the vicinity of stations, as it would attract additional investments for new shopping centres and offices. DfT estimate that about 33,300 jobs would be created in this way. However, these would be largely counterbalanced by fewer jobs in less well sited places in the area[24] ie the jobs are just relocated rather than being a net increase to the economy.

It is plausible that the net creation of long term jobs is negligible.

Finally Government makes much of HS2 bringing cities closer together and 'transforming' the economy. There is no robust evidence for such economic benefit[25]. Indeed in the information age, and with the rapid spread of super-fast broadband and the imminent widespread and cheap availability of teleconferencing, travel will increasingly be the preserve of leisure. Fibre-optic not rail connections are becoming the pre-requisite of economic growth.

7. Will HS2 bridge the North-South divide?

DfT say that the London to West Midlands phase of HS2 will lead to 30,000 new jobs in the vicinities of the new stations, but more than 7 out of 10 of these will be in London[26]. Furthermore, these jobs are likely for the greater part to be relocated from other retail and office locations in the area.

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[24] This was the view of HS2 Ltd after they had asked the opinions of academics in this field (see A3.1.6, HS2 Demand Model Analysis (2010)).

[25] Professor Overman (LSE) in his October 2010 evidence to Transport Select Committee said: "….Claims about the "transformational" nature of transport investments for particularly areas should be generally discounted in assessing these benefits because they have no convincing evidence base to support them." Professor John Tomaney (Newcastle) was reported as agreeing with him.

[26] Confirmation of the breakdown of the figures was obtained in an e-mail exchange of 2 March 2011, between Phil Graham, Deputy Director HSR, DfT, and Hilary Wharf, HS2AA (given the discrepancies between the Consultation Summary (page 18), and main Feb 2011 consultation document (page 45)).

HSR is thought to affect service sector jobs, but because London is dominant in financial services, there is a risk that business will shift to London because it is more efficient, rather than the reverse.

Most HS2 trips (70%) will be for leisure, but DfT see the growth in trips to London as a destination considerably outstripping trips from London, with the result that London will benefit from net additional leisure expenditure rather than the regions.

8. Who will benefit from the subsidy for HS2?

DfT's case for HS2 is not a commercial one: they seek to obtain economic and welfare benefits from subsidising the building of HS2. But who benefits from the subsidy?

Long distance rail services are currently mainly used by the affluent, with 47% of journeys made by people in the top income quintile of households (although DfT do not disclose this[27]). Putting aside the issue of premium fares, if HS2 maintained the same passenger profile, the subsidy would go to businesses and those least needing a subsidy.

The subsidy promotes long distance travel, as evidenced by DfT's current prediction of 22% of HS2's passengers being people making journeys they otherwise would not make. 70% of users will not be business travellers. As travelling is one of the most energy intensive activities this seems a curious thing to promote and not consistent with other Government initiatives to reduce travel (through greater use of the modern technologies that now permit it).

HS2 also promotes modal shift, albeit on DfT's forecasts 87% of passengers are from classic rail or generated travel. However, as discussed above, despite some potential reduction to air travel, HS2 will on balance have environmental disbenefits.

Given the likely beneficiaries of HS2, and the other effect of the subsidy, this does not look a priority for Government support.

9. Will HS2 reduce domestic and short haul flights?

DfT predict that 6% of HS2 users will transfer from domestic flights for the London – West Midlands phase and the figures suggest[28] a similar proportion for the full "Y". The London-West Midlands figure is just over 8000 journeys/day or about 90% of the current air passengers flying between Heathrow and the North West and Scottish Lowlands (ie the potentially relevant air market).

Flights between London and the North West and the lowlands of Scotland have been declining form the mid 2000's. There are no flights between London and Birmingham, and rail has already won the London-Manchester traffic, except that which is servicing other flights eg long-hauls from Heathrow.

In effect, HS2 will only compete with air to win traffic from the lowlands of Scotland, for which HS2 has a projected journey time of 3:30 to 3:40. The summer 2011 ECML timetable includes one train from Edinburgh to London at 4:00. Given that ERTMS and in-cab

[27] DfT do not disclose it in their Equality Impact Screening that is part of the Feb 2011 consultation materials, at 'High speed Rail: Investing in Britain's Future - Equality Impact Screening', DfT

[28] Insufficient data is given on the "Y" to be confident

signalling is planned to be mostly complete by 2025 on ECML (and completed on WCML by 2030)[29], the additional timesaving by HS2 and consequential modal shift may well be modest.

If the moratorium, that the Government has imposed on building additional runways for London airports stands (which was done after the original case for HS2 was developed), there would be insufficient domestic air traffic for these levels of switch even to be possible. Consequently DfT have changed the basis of their air forecasts to be 'unconstrained', ie unconstrained by whether there is airport capacity to carry it. So their current estimates of domestic air demand include 'suppressed demand' – ie demand that doesn't actually happen but would were conditions more suitable.

Whatever the merits of this approach to forecasting, satisfying 'suppressed demand' is not actually swapping journeys from air to HS2, so there is no actual reduction in air passengers.

10. Do we need HS2 to catch up with our competitors?

Sir Rod Eddington (in his 2006 review of transport priorities) observed that Britain already had fast frequent services between London and other major cities, and these stood comparison with other major European countries. Undoubtedly this owes much to Britain being a relatively small and densely populated country, but these are also reasons why it is less suitable for HSR than many other countries. A similar analysis[30] finds the UK with the shortest average journey time compared to other major West European nations today.

Despite inherently more suitable circumstances abroad, many countries are having second thoughts about High Speed Rail, with the cancellation of schemes in USA, (in Wisconsin, Ohio and Florida), issues with out-turn demand being lower than forecast or simply low demand (Taiwan, certain Chinese and Spanish lines) and schemes making serious losses (Dutch High Speed Alliance, newly added lines in China).

The top speed of the WCML, ECML and GWML intercity services is 125mph – which is a speed that in Europe can qualify an upgraded railway as 'high speed'. And this speed is only limited on the existing routes by safety standards that require in-cab signalling for speeds above 125mph. In-cab signalling is scheduled to be fitted for all the major routes before the "Y" is built. This would allow 140mph, with Pendolinos on WCML and 225's on ECML.

[29] UK plan was submitted in the 'ERTMS National Implementation Plan', September 2007, DfT, with now binding target dates on the UK

[30] 'A justification for HS2 – a case of myths not reality', HS2AA, August 2010. The average journey time between capital city and largest five population centres: averaging 145 minutes in UK (or 148 mins using the same five cities as Eddington); 151 minutes in Spain; 184 minutes in Italy; 221minutes in France; 244 minutes in Germany

Executive Summary – HS2: a costly white elephant

(from 'Initial Review of the Consultation Business Case for HS2', HS2AA, March 2011)

The Government's proposed new high speed rail line (HS2) is set to be a white elephant that will cost every family well over £1,000, but only benefit a fortunate affluent minority.

The initial plan is to build a high speed rail link from Birmingham to London – costing £17.8 billion but only saving 30 minutes in journey time (against today's timetable). The second phase, which will take high speed rail to Manchester and Leeds (the "Y"), will take the capital cost to over £30 billion.

An investigation of the Government's new consultation document by the HS2 Action Alliance, building on an earlier investigation of the original March 2010 business case, exposes five myths about HS2:

MYTH ONE: HS2 is the best way to improve the rail network

- More affordable alternatives to HS2 are not properly considered but it is clear that they can deliver better value.
- The business case shows that a number of towns and cities – including major cities and towns like Coventry and Stoke-on-Trent – will see train services cut thanks to high speed rail. And there will be 8 years of disruption as Euston is rebuilt.
- Even the first phase from London to Birmingham will not be delivered till 2026, whereas alternatives can deliver needed capacity much more quickly.

MYTH TWO: HS2 offers good value for money

- The expected benefits have been cut by at least a third from the original business case.
- That estimate is still based on a number of invalid assumptions. If they are corrected to be more realistic then the case that the new line's benefits outweigh its costs collapses:
    1. No account has been taken of people working while travelling – in other words, that it is not time wasted but time used productively
    2. While the rate of projected demand growth has slowed, by basing the business case on what might happen over the next 35 years, and using out of date forecasting factors, the Government has still greatly overestimated demand for long distance train services (by some 47%)
    3. The comparator used is one in which the rail network is maintained as it is without improvement for 30 years
- Re-doing the sums on a realistic basis shows the taxpayer gets back just 30 pence (or 50 pence including the wider economic impacts) for every £1 spent on phase 1. For the full "Y" network the figures increase, but only to 40p and 60p respectively.

MYTH THREE: HS2 will benefit ordinary people

- Use of HS2 will be dominated by those earning high incomes.
- The specific answers on the equality impact of HS2 in the consultation documents conceal the extent to which it is the affluent who will benefit.

- No case is made for a regressive subsidy that benefits the rich and encourages travel, when there is an alternative approach, ie charging full costs.

MYTH FOUR: HS2 will help bridge the North-South divide

- The new business case shows that 7 out of 10 jobs created by high speed rail will be in London, not the Midlands or North of England.
- Most of the jobs claimed will not be genuinely new employment but moved from other areas within that region.
- HS2 would affect the service sector, where London dominates. Since 70% of HS2 passengers are leisure travellers and there is much greater growth in trips to London (than from London) it is London not the regions that will gain.

MYTH FIVE: HS2 is good for the environment

- The new business case shows that just 6 in every 100 travellers on high speed rail would be people who have switched from flying to trains.
- 87% of passengers will have switched from existing rail services or be making new journeys, meaning that more energy is used and therefore more emissions are produced.
- Overall, despite the huge cost, HS2 will not cut emissions.