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The opportunity costs of HS2

HS2 is using money that's needed for buses, trams, walking, cycling and other railway projects if we are to beat climate change and cure commuter hell.

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Summary

The government and main opposition parties have identified how much public money should be spent on infrastructure investment.

How much to spend is a political choice; some commentators suggest much more money can and should be spent¹, others will argue for less spending.

Either way, it's a reality that there isn't a bottomless pot of money for the government to fund transport projects, or indeed any other public services.

Funding decisions need to be guided by a transport strategy that clearly sets out how transport in the UK will deliver on environmental objectives, social wellbeing and economic development.

Sadly there is no such strategy in place.

The government's Transport Infrastructure Strategy, which guides the Department for Transport's spending decisions, has four priorities. Climate change is not among them, despite the document stating that "The need to combat climate change is one of the most significant challenges of our time."

[2](#)

It's therefore perhaps not surprising that transport spending is not in line with what's needed to reduce carbon pollution.

This briefing argues that the decision to spend vast amounts of money on HS2 was the wrong decision in the context of current spending limits, but fortunately one that can still be reversed.

A new north-south train line is probably needed to take traffic off the roads and reduce greenhouse gases, but HS2 will not reduce carbon pollution. In fact it will increase it.

Friends of the Earth argues that the priority for transport infrastructure spending is to fund buses, trams, cycling, walking and fixing the current railway system. If money is available in addition to build a new north-south train line it must be done in a way that maximises reductions in carbon pollution.

While this briefing doesn't directly address road spending, we also argue that much of the spending on roads also needs to be cut and reallocated to public transport.

Overview of transport

Most travel is by car. Electric cars are an important part of reducing the climate change impacts of car use. But electric cars will not on their own reduce transport emissions in line with climate change objectives.

Research for Friends of the Earth has shown that, in order to deliver on the UK's international climate change commitment, the minimum level of traffic reduction needed by 2030 is 20%, even if there is a rapid transition to electric cars³.

Much more spending on public transport options such as buses and trams is essential.

Invest in buses and make them free

Three times more journeys are by bus than train and buses are the main mode of transport for the quarter of the population without a car.

Buses are the most used form of public transport, yet the number of bus journeys has decreased by a fifth over the past 15 years outside of London and in London have remained the same⁴.

Bus fares have risen by 75% over the same period⁵ and 3,347 bus services have been reduced or withdrawn across England and Wales since 2010⁶.

The Local Government Association recently warned that nearly half of bus routes are under threat because of a lack of government funding⁷.

Yet research shows that the economic benefits of investing in buses and trams are very significant. This is because this investment can significantly reduce the productivity gap that exists between UK cities and cities of similar sizes overseas⁸.

This return on investment will be much higher than HS2, which will not address these very real productivity issues.

In over 100 towns and cities across the world, bus travel is now being made free, resulting in increased use. For just £3 billion a year, all bus journeys could be made free in the UK⁹.

Better railway investment options

Most rail journeys are for commuting and the daily overcrowding of many commuter trains is well documented.

Rail investment is needed to address this issue, as well as to address the slower journey times and lower frequency of trains, particularly in the north of England.

The New Economics Foundation (NEF) has worked with railway experts to produce an alternative package of railway investment that delivers on these objectives much better than HS2.

HS2 will not address the majority of commuter overcrowding, nor improve many of the poor quality services in the north of England.

A new north-south railway line is probably needed but it isn't the priority investment for transport spending. It isn't even the priority for spending on the railways.

It isn't too late to stop HS2, but it may be soon.

If it isn't stopped, there's a very real risk that the step-change in spending on public transport needed to address climate change does not materialise.

HS2 is extraordinarily expensive, but it is more than that; it represents a huge opportunity cost.

Transport spending and climate change

The Treasury says that public spending on infrastructure should be in the order of 1-1.2% of GDP per year (roughly £25 billion per year)[10](#).

This is the same as the Labour Party's promised 10-year £250 billion National Transformation Fund [11](#).

There's no golden rule that spending can't be much higher, particularly if the result is a better economy in the future (eg, less climate change damage or increased tax receipts).

Infrastructure spending is for uses across the economy and not just transport. But transport does represent a significant proportion of government infrastructure spending.

The Department for Transport's Transport Investment Strategy has four goals:

- Create a more reliable, less congested, and better connected transport network that works for the users who rely on it.
- Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities.
- Enhance our global competitiveness by making Britain a more attractive place to trade and invest.
- Support the creation of new housing.

Climate is not one of the priorities, despite the strategy stating "The need to combat climate change is one of the most significant global challenges of our time"[12](#).

Air quality and health are also not identified as priorities, nor are the social elements of sustainable development.

According to the National Infrastructure Commission, over the next 10 years around £135 billion of transport infrastructure spending is planned in England, plus a further £3.5 billion in Wales[13](#).

This is approximately £14 billion per year. And most of this is public spending.

Of this amount, capital spending on HS2 represents £13 billion to 2021 and £56 billion full life costs according to official figures. But as the NEF HS2 report shows, the sums could be as much as £100 billion.

The transport investment budget also includes "the biggest investment in the strategic roads network since the 1970s"[14](#).

HS2 will increase carbon pollution

HS2 will not reduce carbon pollution, instead it will increase it.

Construction of HS2 will lead to carbon emissions, as would building of any other substantial infrastructure project. Proponents often argue that it will however offset these through attracting people from cars or domestic flights. However, the Department for Transport's own figures suggest only 1% of passengers are likely to be people who would have flown, and only 4% of people who would have driven¹⁵.

This analysis also doesn't take into account the aviation industry switching slots for domestic flights to more profitable international flights, as is the norm, nor increased car transport as people drive to HS2 rail stations instead of using local stations¹⁶.

The latest assessment of carbon emissions from HS2 Limited states that "The Proposed Scheme's operational emissions are anticipated to result in 8,000 tCO₂e over the 120 year operational assessment period, once modal shift, carbon sequestration from tree planting and freight benefits from released capacity on the conventional network are taken into account. When the operational and construction carbon footprints of the Proposed Scheme are combined, the residual carbon emissions are estimated to be 1,459,000 tCO₂e"¹⁷.

To put this 1.49 MtCO₂e lifetime figure into context, current transport annual emissions are 125.9 MtCO₂e. Although this shows HS2's total contribution to transport emissions is small in comparison, it's at a time when emissions should be falling quickly.

Pitiful levels of spending on walking, cycling, buses and trams

Spending on buses, cycling and walking represent a tiny fraction of spending. The government's cycling and walking investment strategy commits just £1.2 billion for cycling and walking over the 5 year spending review period 2015 to 2020¹⁸.

A proper level of investment would be at least £2 billion per year (15 times current levels)¹⁹, but annual local authority spending to support buses outside of London has fallen to just over £0.2 billion in England and Wales, a reduction of 46% since 2010-11²⁰.

Transport spending should deliver a number of objectives, including economic, environmental and social objectives.

Among the environmental objectives is reducing greenhouse gas emissions, to enable the UK to deliver on its legally-binding Climate Change Act, and reducing air pollution to legal limits to protect and improve public health.

Reducing air pollution will require a faster switch to electric cars, but also funding for electric buses.

The Committee on Climate Change has strongly criticised the Department for Transport's strategy, sending a strongly worded letter to the Secretary of State Chris Grayling²¹.

The letter says that:

"Transport is now the largest greenhouse gas (GHG) emitting sector, accounting for 28% of all UK GHG emissions in 2017. There has been little change in the level of transport emissions since 2008. This trend must be reversed if the legally binding fourth and fifth carbon budgets are to be met."

“The continued rise in road transport emissions highlights the urgent need for stronger policies to reduce growth in demand for travel. Evidence from cities like Greater Manchester shows it is possible to plan for economic growth while reducing car traffic, by promoting walking, cycling and public transport and deterring car and van traffic.”

More investment in public transport and active travel needed

To deliver the reductions in greenhouse gas emissions needed will require much more investment in public transport, as well as a much more rapid transition to electric vehicles than planned.

Research for Friends of the Earth has identified that the reduction in car mileage required to fulfill the UK’s international obligations on climate change is at least 20% to 2030, even with a fast transition to electric cars and rapid decarbonisation of the electricity grid²².

Achieving this level of reduction will require substantial increases in spending on public transport, cycling and walking.

The National Infrastructure Commission has recommended significant investment in mass public transport in cities to address congestion problems, which it says is holding back economic development.

It says investing in public transport in growing and congested cities offers some of the highest returns for transport investment.

It calls for greater investment in buses, bus rapid transit systems and trams, as well as better provision for cycling and walking.

It suggests an additional £43 billion pounds in urban transport spending between now and 2040 (ie, around £2 billion per year), noting that because HS2 is “committed spend” less money is available in the near term.

This illustrates one of the opportunity costs of proceeding with HS2.

The average additional £2 billion a year infrastructure recommend by the National Infrastructure Commission is likely to be far short of the spending that’s needed to address both climate change and air quality goals.

UK public transport is much less extensive than it was in the past. This is the result of declining bus services, the removal of tram routes from the 1940s and the closure of train lines in the 1950s.

In 1927 there were 14,000 trams in operation across the UK²³ yet today very few UK cities benefit from trams.

The UK is way behind much of Europe in terms of public transport.

While the UK is heading backwards in terms of investment in buses, free bus travel is now provided in around 100 towns and cities worldwide.

This includes more than 30 in the USA and 20 in France, as well as in Poland, Sweden, Italy, Slovenia, Estonia, Australia and elsewhere.

Free buses deliver on social, economic and environmental goals.

Before this can happen in the UK, the public transport system has to be re-regulated, but Friends of the Earth is calling for free bus travel for the under 30's to be funded immediately, coupled with delivery of much better bus services.

Investment in urban public transport (buses, bus rapid transit, trams, etc) probably needs to increase by at least another £4 billion per year and perhaps much more, and at least £2 billion should additionally be invested in walking and cycling.

This would represent a step-change in funding. For comparison, spending on the railways in 2017-18 was £6.4 billion (£2 billion of which was for HS2)[24](#).

This increased funding for urban public transport should come in large part from reduced spending on roads.

But scrapping HS2 and replacing it with an alternative rail investment package could free up some additional money for funding urban public transport.

An alternative rail investment package

Around 70% of people think that the money being spent on HS2 would be better spent on the existing railway, including commuter lines²⁵.

Friends of the Earth commissioned the NEF and transport expert Professor Paul Salveson to examine HS2 and its alternatives.

We particularly wanted to know if there was an alternative package of investment options that would address both the issues HS2 is designed to address and also other pressing issues, such as overcrowding.

The NEF report finds that if some of the more dubious assumptions made on HS2 are incorrect - for example, on passenger numbers or that time travelling on trains is unproductive - then HS2 is no longer good value for money.

The report also identifies that HS2 will not significantly benefit the economy in the north of England, despite claims to the contrary.

Much more detail of this analysis is available in the NEF report.

Instead NEF offers an alternative package of investment, which includes setting up a number of rail innovation centres, electrification of some lines, opening new lines and improvements to current rail infrastructure.

Below are some of the investment recommendations NEF makes.

The NEF railway investment package

Investment in northern railways, including:

Re-instating and electrifying a new Manchester-to-Sheffield line - by reopening the Woodhead Tunnel.

This fourth east-west northern connection with a possible 45-minute journey time between Sheffield and Manchester and a possible additional one-hour Leeds-Manchester link is seen as strategically important.

Electrification of much of the core North of England network – by expanding current electrification plans to include electrification of the Calder Valley line via Bradford, Leeds to York. Sections of line to Hull and Middlesbrough should also be electrified, providing a largely wired northern network.

Re-opening the Colne-to-Skipton line - enabling connection through Yorkshire to the Midlands via Bradford Crossrail.

A Bradford Crossrail to join the two stations in Bradford – to enable through trains.

Investment to the north-south main lines, including:

Linking Paddington and Crossrail with the West Coast Mainline.

Reopening the former goods lines over the Ribble Viaduct - feeding into Preston and also expanding Preston Station.

Full electrification of the Midland Mainline - this includes the Corby loop.

Investment in the wider rail network, including:

Electrification - electrification of the Great Western Line to Plymouth, from Cardiff to Swansea and the cross-country route between Bristol and Doncaster and Leeds, together with a range of other places (detailed in the report).

Reopening of the Edinburgh-Carlisle Waverley line - from Tweedbank to Carlisle, providing a new central Scottish mainline.

Reopening the Exeter to Plymouth via Okehampton line - missing out the weather-dependent section of the line at Dawlish.

A cheaper package

The cost of NEF's alternative package is less than even the official cost estimates for HS2, but it's widely believed that the actual cost of HS2 is likely to be much higher.

As can be seen from the examples above, the NEF package would bring benefits to much more of the country and many more people than HS2.

If HS2 goes ahead, there's a real risk that many of these investments just won't happen. It's another illustration of the opportunity costs of HS2.

Importantly, the NEF package would also enable much more freight to be taken off the roads than HS2, with real climate change benefits.

HS2 will bring negligible climate change benefits, if any, and may even worsen emissions in the short-term.

Conclusions

HS2 may have been proposed with good intentions. It certainly received support from across the political spectrum in the north and south of England. In part, this was because many thought it would help reduce carbon pollution, which official figures now show isn't the case.

Now costs have escalated and HS2 is rightfully under renewed scrutiny.

If money was limitless and it delivered for climate change then this scheme wouldn't be the focus of so much attention, although Friends of the Earth and others would still be vociferous about the damage and destruction of 108 ancient woodlands²⁶ and other wildlife sites along the route.

But money isn't limitless.

Transport spending has to vie with other spending priorities, such as health and education.

Money has to be spent wisely to deliver combined economic, social and environmental goals rather than trading one off against the other.

“The lack of a Transport Strategy that properly addresses all three elements of sustainable development is a disgrace.”

It's no surprise that carbon pollution from transport is not decreasing as needed and that the Committee on Climate Change had to send strongly worded letters to the Secretary of State, Chris Grayling.

Friends of the Earth is calling for a complete reappraisal and reprioritisation of transport spending that ensure environmental objectives, social wellbeing and economic development goals are all met.

What is already clear is that at least £4 billion a year and probably much more needs to be spent on public transport (buses, bus rapid transit and trams) and at least £2 billion a year on cycling and walking.

The social, environmental and economic benefits of these investments will far outweigh any benefits that may result from HS2 at some distant time in the future.

Significant investment in the railways is still needed.

But it needs to be spent in a way that addresses the overcrowding issues that commuters face across the UK, as well as significantly improving the railways for people and the economy in the north of England.

It also needs to take freight off the road. The alternative package that NEF has identified with rail experts does this much better than HS2.

NEF argues for an approximate £70-90 billion 10-year investment programme in the railways²⁷. This is less than the combined official cost of HS2 and the separate £50 billion 2019-24 investment fund that Network Rail has been promised²⁸.

It illustrates that important investment can be made in the railways and money freed-up for investment in urban public transport, cycling and walking.

The biggest investment in the strategic roads network since the 1970s is clearly a nonsense in an age of climate change. It needs to be very significantly scaled back.

If the government sticks with its limit on infrastructure investment - or the Labour Party does if it's elected - then we argue that HS2 has to go. The opportunity costs are simply too high.

Investment into urban public transport, cycling, walking and the NEF alternative railway package must take preference.

Buses particularly need much more funding, including providing free bus travel to the under 30s.

If much more infrastructure spending is available for transport – recognising that other critical areas are also significantly underfunded, such as the £10s of billions needed for home insulation and eco-heating – then an additional north-south line is likely to make sense, but it has to be one that maximises reductions in carbon pollution and should not plough through over 100 ancient woodlands and damage countless other wildlife sites.

Notes

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