

Why the UK needs an urgent rethink on HS2

Overview

The UK Government is proposing to spend at least¹ £50 billion on a new high speed railway, HS2 – between London Euston, Birmingham and the north of England.

HS2 represents an amazing opportunity to create a step change in our rail infrastructure but the scheme is expensive, disruptive, will take years to build and is not without controversy.

In March the House of Lords published a damning report into the Economics of HS2. It stated that:

“The construction of High Speed 2—a railway estimated to cost £50 billion—will be one of the most expensive infrastructure projects ever undertaken in the UK. The Government has yet to make a convincing case for proceeding with the project. We fully support investment in rail infrastructure and welcome the Government’s commitment to it. But the project has to be developed against a background of financial restraint and it is not at all clear that HS2 represents the best, most cost effective solution to the problems it is intended to solve.” [House of Lords report into the Economics of HS2](#) (published March 2015)

A team of engineers and consultants has developed an alternative to HS2 that will be much cheaper to build, will benefit far more people, and will be less damaging to the environment, *High Speed UK*.

High Speed UK is based around a new high speed line following the M1 from London to Yorkshire, continuing north to Scotland, with a trans-Pennine spur linking Liverpool, Manchester, Leeds and Sheffield. All major communities of the West and East Midlands will benefit from High Speed UK services, with a new 'Midlands Ring' created that will transform connectivity across the region.

Furthermore it’s likely that HSUK can be partly or fully financed by capturing the increases in land value that it causes, without resort to general government taxation or higher fares. This ‘Rail + Property’ approach is used successfully in Hong Kong where mass transit improvements are entirely self-financed in this way. Such an approach was also used historically in London in the 19th Century to finance the Metropolitan Line.

This reduces the cost to the public exchequer still further, potentially making the entire scheme self-financing.²

¹ The expected cost for Phase I (London to Birmingham) has already increased one third beyond budget and will probably go up further.

² For more information on HSUK and how it can be funded, see <http://www.rethink-hs2.uk>

Background

What Is HS2?

HS2 is a proposed high speed railway line between London Euston and Birmingham, and then onwards in a 'Y' configuration to Crewe and Manchester in one direction and Sheffield and Leeds in another. The route is designed to a maximum speed of 400 km/h (250 mph) with all routes comprising a single pair of tracks (i.e. one in each direction). Between London and Birmingham this will cause massive capacity issues.

The route from London to Birmingham goes west from Euston to Old Oak Common and then north west to Birmingham with a route that cuts through the Chilterns and rural Warwickshire to an interchange near Birmingham airport. From there, a branch takes trains to a new terminus at Birmingham Curzon Street, at least a 10 minute walk away from the main interchange at Birmingham New Street. Two branches, in a 'Y-shaped' configuration go on to Crewe and Manchester in one direction and Sheffield and Leeds in the other.

The tracks will be designed for European sized trains (taller and wider than standard British loading gauge). The cost of phase 1 (from London to Birmingham) and phase 2 (onwards from Birmingham to Manchester, Leeds and Sheffield) of HS2 is projected to be £50 billion at 2011 prices.

What Was the Justification for HS2?

The Government's two declared objectives for the project are to increase capacity on the railway to meet long-term demand and to rebalance the economy by stimulating growth in the north of England (as stated in the House of Lords report). It was also hoped that such a scheme would reduce journey times and help to reach the UK's climate change commitments.

Capacity is crucial. Passenger numbers in the UK are growing, and much of the present West Coast Main Line is running close to capacity. Yet HS2 would offer only two new tracks between London and Birmingham, barely sufficient to relieve the West Coast main line, let alone the Midland and East Coast main lines. HS2 does little to rebalance the economy; that must wait for HS3, at some future time.

HS2 would go fast – up to 400 km/h (250 mph), yet this will only offer benefits if it can improve the entire door-to-door journey, and that requires full connection to, and integration with, the existing rail network. HS2 offers no worthwhile connections and the few stations such as Birmingham Curzon Street (a 10 minute walk from New Street) and Toton (located midway between Nottingham and Derby) are inconvenient and isolated.

High speed rail was also meant to take passengers off roads and aeroplanes and onto trains, so reducing greenhouse gas emissions. But HS2 would go at such an extreme speed that requires significant energy itself, and dictates controversial rural routes that bypass major communities, such as Milton Keynes, Coventry & Stoke, that should be benefitting from high speed services. The lack of direct connectivity to

Heathrow, Gatwick, the Channel Tunnel and Scotland reduces the possibility of modal shifts from air. As a result HS2 would be only carbon neutral at best.

Connectivity has always been key to a successful railway. The HS2 route – from Euston via West London and the Chilterns to the West Midlands – was chosen partly to ensure a direct connection to Heathrow and to HS1 (the link to the Channel Tunnel). But both the link to HS1 and Heathrow were subsequently cancelled. Many of the trains used won't be able to connect to the existing British network.

Why Rethink HS2?

The Government has yet to make a convincing case for proceeding with the construction of High Speed 2 – one of the most expensive infrastructure projects ever undertaken in the UK. Whilst we fully support investment in rail infrastructure, HS2 does not represent the best, most cost effective solution to the problems it is intended to solve.

An alternative proposal – High Speed UK (HSUK)

High Speed UK is a fully mapped³, timetabled and costed plan using the M1 corridor, designed by experienced British railway engineers. HSUK is a cheaper, greener and better connected alternative.

How good could HS2 be if it matched the High Speed UK proposals?

Better Value:

- Costs £20bn less than existing plans (HS2 & HS3) (core plan only, equivalent to HS2+HS3)
- Has 200 miles less railway to maintain
- Provides 48% journey time savings on journeys between the top 33 cities and major airports

Better Connected:

- Makes 92% of journeys between cities faster, compared to 13% for existing plans (HS2 & HS3)
- Allows high speed services to extend on to the existing network
- Links directly to Heathrow and HS1 whilst connecting directly all major UK cities

Greener:

- Saves 600 million tonnes of CO₂ – essential for climate change commitments
- Makes use of existing transport corridors such as the M1
- Avoids route through Chilterns AONB and other important and tranquil rural areas
- Needs less tunnelling, less spoil, less energy and less concrete than existing plans
- Uses city centre stations without need for cars to access parkway stations
- Includes a national rail freight network

Smarter:

- Improves regional rail across the UK
- Integrates with existing rail services
- Gives higher return on investment, and lessens need for subsidies to existing routes
- Provides extra capacity, with 4 tracks to the Midlands (existing plan has only 2)

² See Appendix 1: High Speed UK network map; and detailed plans on <http://highspeeduk.co.uk>

Faster to Deliver:

- Connects the key northern cities straight away as part of the core plan
- Reduces risk of delays due to legal challenges by having a less contentious route
- Can be built incrementally, delivering sooner

More Popular:

- Allows Euston station to be rebuilt within its own footprint, avoiding disruption in Camden
- Delivers full interconnectivity benefits to 20 principal UK cities and Heathrow Airport

More About High Speed UK (HSUK)

High Speed UK (HSUK) will comprise a 'skeleton' of new high speed lines at the core of a transformed national intercity network in which 21 of the UK's principal centres⁴ will be fully interlinked with direct hourly (or better) high speed services. The HSUK concept is supported by detailed design of nearly 1000 km of new railway, and a national intercity timetable indicating average journey time reductions of 48%.

The proposed HSUK scheme includes a 4-track North-South spine between London and Killmarsh (near Sheffield) along the M1 corridor. The spine route extends along the east of the Pennines to Newcastle, Edinburgh and Glasgow, and across the Pennines from Sheffield and Leeds to Manchester and Liverpool via the abandoned Woodhead corridor. HSUK also includes detailed upgrade plans for the whole of the national rail network and a rail freight plan, including a cross-Pennine HGV shuttle.

In the Midlands, the HSUK strategy entails the upgrade of radial routes. The West Coast Main Line between Coventry and Birmingham New Street would be upgraded to four tracks, with minimal disturbance to the existing tracks, and there would be further upgrades to the existing network elsewhere, to ensure complete interoperability with the new high speed line.

The HSUK route needs far less tunnelling and has a lower design speed of 360 km/h (215 mph). This is necessary to follow existing corridors such as the M1, avoiding HS2's massive environmental damage in the Chilterns, and allowing full integration with the existing network. This integration is vital to creating a faster, better-connected, more comprehensive and higher-capacity network, which in turn will achieve potential savings of over 500 million tonnes of carbon dioxide emissions.

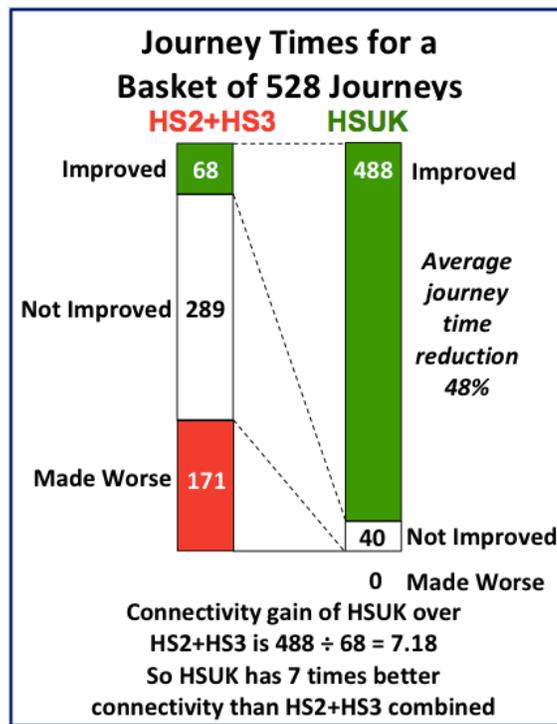
Whilst HSUK's tunnels and bridges would be built to full European loading gauge for future-proofing, the trains used would be standard British loading gauge and therefore can easily pass onto the existing network, unlike some of those used in the plans for HS2. More frequent trains are also possible with HSUK because of increased capacity. HSUK links to Heathrow through a connection via Brent Cross and can connect to HS1 through either the Midland Main Line or the North London line.

HSUK provides four tracks from London to Killmarsh (near Sheffield), creating the capacity needed for a truly national high speed network. Journey times from Manchester and Birmingham to London would be comparable to HS2, but the overall benefits in terms of connectivity and time saving would be far greater. Timetabling of HSUK's national network now indicates 48% average journey time savings across the national intercity network.

⁴ London, Heathrow, Oxford, Milton Keynes, Northampton, Birmingham, Wolverhampton, Leicester, Nottingham, Derby, Stoke, Stockport, Sheffield, Manchester, Liverpool, Leeds, York, Darlington, Newcastle, Edinburgh and Glasgow.

Connectivity Compared

- HSUK tested the connectivity of its full proposals⁵ and compared them with the HS2+3 offering.
- HSUK selected 33 places to start from and used the same 33 places as destinations. Discounting the return journey in every case, there are 528 possible different journeys.
- The places selected were: Aberdeen, **Birmingham**, Bradford, Chester, Coventry, **Darlington**, Derby, Doncaster, **Edinburgh**, **Glasgow**, Heathrow, Huddersfield, Hull, **Leeds**, Leicester, **Liverpool**, **London**, Luton, **Manchester**, Milton Keynes, **Newcastle**, Northampton, Nottingham, Oxford, Perth, Peterborough, **Preston**, **Sheffield**, Stoke, Walsall, **Warrington**, Wolverhampton and **York**.
- This was felt to be representative of the principal places which can be served from either HS2 or HSUK. Places in **bold** are the only ones directly served by HS2; HSUK serves them all directly.
- Each journey was ranked as **Improved** or **Not Improved** or **Made Worse**. We have kept HS2 and HS3 separate and then added them together to make a comparison with HSUK.
- **Improved** journeys occur when the intervention of high speed rail results in a reduced journey time when compared with the best times today, even if there is a change of trains involved.
- **Not Improved** means that there is no change to today's best timings.
- **Made Worse** means longer journey times because of additional stops or a less frequent service than today.
- The average journey time reduction for the journeys improved by HSUK is 48%.



⁵ Not just the core HS2-equivalent route, but also the improvements to the existing network funded through spending the money saved on the £20bn cheaper core route.

Funding High Speed Rail

Overview

It is possible to pay for railway upgrades at little or no cost to the general taxpayer, using the HK model of '**Property + Rail**'. This model was also used to finance the construction of London's **Metropolitan line** in the late 19th century. Hong Kong's Mass Transit Railway has been built at no cost to the taxpayer, and generates a £1bn annual profit, paying annual dividends to the Hong Kong Government.⁶

Value Capture

Using land value increases to pay for infrastructure is a general approach known as Land '**Value Capture**'. The idea is to capture the increased land prices caused by the transport improvement for the benefit of the public, to avoid spending funds from general taxation, and so that landowners don't make gains at everyone else's expense.

For example, the **Jubilee line extension** was paid for in part by a levy on business rates for those businesses along the line, although their contribution was relatively small compared to the rise in land values and the overall cost of the scheme.

Economic Background to this Idea

The economic theory of land and its importance in economics goes back a long way to the early economists - the 'Physiocrats', and classical economists Adam Smith and David Ricardo - all of whom called for a tax on land values. This was popularised by Henry George in his masterpiece '**Progress and Poverty**' of which one of the **most famous passages** describes the effect of a railroad on enriching private landowners. The **game of monopoly is derived** from 'Georgist' ideas. **Winston Churchill** was another prominent supporter of a land value tax. Value capture is a partial way to achieve some of the features of a land value tax in the specific case of infrastructure improvements.

A related approach is '**Land Value Covenants (LVCs)**' where the government buys land (at pre-announcement cost) and leases it back.

Proposed Approach for High Speed UK

In general, a funding model for HSUK might include:

- Purchase of land and integrated Rail+ Property + Integrated Transport development in the 'inner core' adjacent to a new HSUK station
- Purchase and leaseback of land in the intermediate area slightly further away from the station in the 'outer core' area
- Increases in Council tax and Business rates for properties in the 'periphery' that still nevertheless benefit from the railway and its connections

⁶ See http://www.lincolnst.edu/pubs/1388_Rail-and-Property-Development-in-Hong-Kong

How Much Money Can Be Raised This Way?

Some understanding of how this can be the case can be observed from Sheffield, which would have the travel time to London cut **from just over two hours now to 65 minutes** under the HSUK proposal. Just a 20 minute reduction in commuting times from Bristol to London (from an hour and 40 minutes to an hour and 20 minutes) is set to boost property values in the Bristol area by up to 10%, according to a **recent report**. Similar effects have already been seen in Cambridge where **house prices have sky rocketed** after electrification, longer trains and the announcement of a second station in the north of the city.

Even a £20,000 increase spread over 1 million properties, would add up to £20 billion in additional value that could be captured to fund the scheme.

Why Isn't This Approach Being Used Already for HS2?

HS2 has very limited connections both to cities and to the existing network. Therefore the opportunities for value capture are more limited. Furthermore, there is significant negative impacts of HS2 on the Chilterns and rural Warwickshire which require significant *compensation* (negative value). It's also possible that this method of financing has not been sufficiently investigated by HS2 and the relevant government departments.

Conclusions

It is not currently clear what portion of the costs of HSUK can be covered by these methods of Value Capture; but it's likely to be a substantial fraction or even a net profit for a well-thought through scheme (as is observed in Hong Kong, admittedly for urban mass-transit rather than intercity rail). In this case HSUK would be self-funded and would not require any expenditure from general government taxation/borrowing. It would come **'for free'**.

Appendix 1: High Speed UK Network Map

For full HSUK network, including upgrades of existing routes, see <http://highspeeduk.co.uk>

