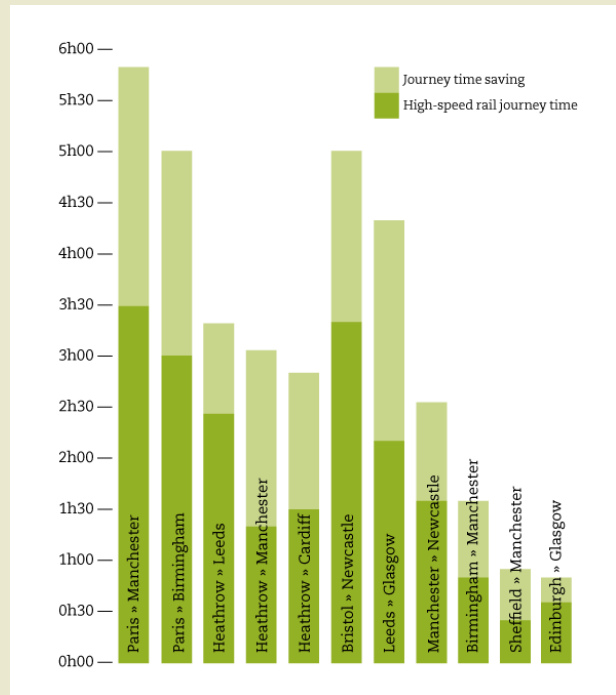
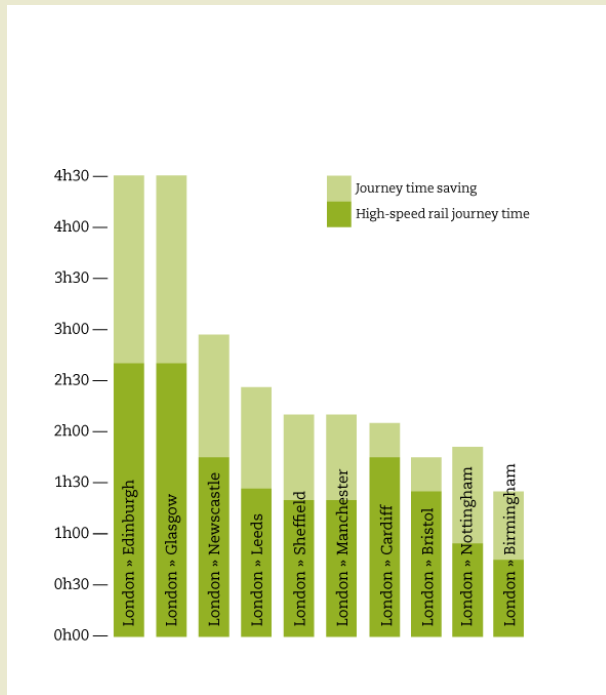


High-Speed Rail Journey Times



Key points

High speed rail (HSR) has the potential to deliver a step-change in the time it takes to travel between major cities of the UK, typically offering journey time savings of 30-45% over today's rail journeys.



This reduction in journey times is important for a number of reasons:

- Improving links between city regions by bringing them effectively 'closer together' and providing better connectivity will improve regional economic performance and help narrow the north-south divide.
- Operating at speeds of at least 300 km/hour will allow the railway to offer journey times of 3 hours or less between London and Scotland, which will result in a major mode shift from air to rail travel, with consequential environmental benefits.

Evidence Base

A national HSR network for Britain, as put forward in **Greengauge 21's Fast Forward strategy**¹, would see HSR services operating at 300 km/hour or more over a dedicated HSR network. Assuming operating speeds of 320 km/hour, as is now achieved in other countries, we could expect to see journey times between Britain's major cities reduce dramatically. Such journey time reductions are not achievable even by upgrading the existing rail network for a number of reasons:

- Even the faster train services have to call at intermediate stations as well as the major cities – there is not enough route capacity for separate non/limited stop fast services as well as the slower commuter services and freight services;

High-Speed Rail Journey Times



- The geometry of existing railway alignments limits linespeeds and this cannot readily be addressed without huge disruption and cost given the physical constraints on development around many routes.

Possible HSR journey times from London to Britain's major cities are set out below, assuming a national HSR network is constructed in the long term.

Journey time reductions to/from London

	Current rail journey time (typical)	Journey time on High Speed Rail	Journey time saving
London to Edinburgh	4h 30	2h 40	1h 50
London to Glasgow	4h 30	2h 40	1h 50
London to Newcastle	2h 55	1h 45	1h 10
London to Leeds	2h 25	1h 25	1h 00
London to Sheffield	2h 10	1h 20	0h 50
London to Manchester	2h 10	1h 20	0h 50
London to Cardiff*	2h 05	1h 45	0h 20
London to Bristol*	1h 45	1h 25	0h 20
London to Nottingham	1h 50	0h 55	0h 55
London to Birmingham	1h 25	0h 45	0h 40

* The journey times shown for HSR from London to Bristol and Cardiff are based on the route upgrade option identified in *Fast Forward* rather than a full new high-speed line.

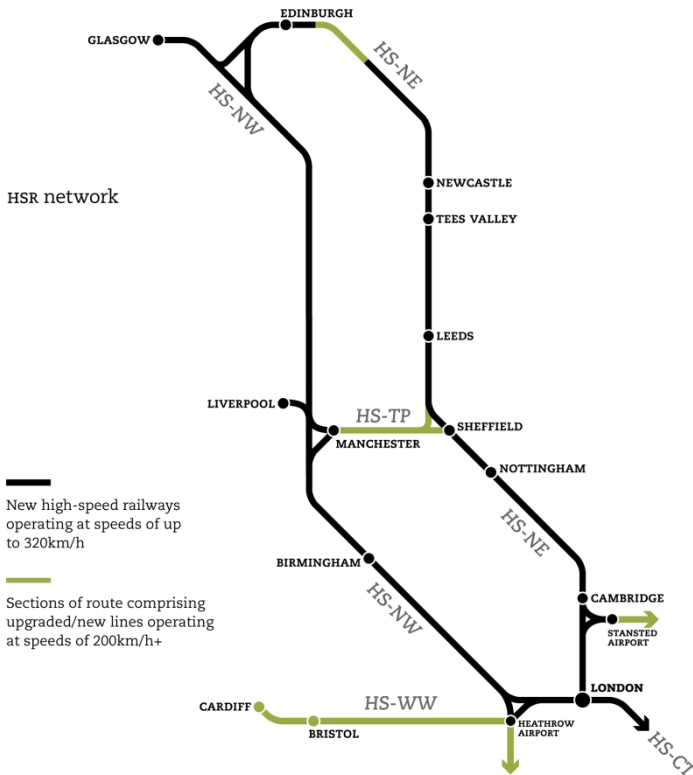
Some of the journey time improvements between other cities could be even more impressive, where HSR can provide fast links where connections are currently poor.

Journey time reductions between major cities

	Current rail journey time (typical)	Journey time on High Speed Rail	Journey time saving
Paris to Manchester	5h 50	3h 30	2h 20
Paris to Birmingham	5h 00	3h 00	2h 00
Heathrow to Leeds	3h 20	2h 25	0h 55
Heathrow to Manchester	3h 05	1h 20	1h 45
Heathrow to Cardiff	2h 50	1h 30	1h 20
Bristol to Newcastle	5h 00	3h 20	1h 40
Leeds to Glasgow	4h 20	2h 15	2h 05
Manchester to Newcastle	2h 35	1h 35	1h 00
Birmingham to Manchester	1h 35	0h 50	0h 45
Sheffield to Manchester	0h 55	0h 25	0h 30
Edinburgh to Glasgow**	0h 50	0h 35	0h 15

** Edinburgh-Glasgow classic rail journey times will reduce with completion of the Edinburgh-Glasgow Improvements Programme, the journey time depending on stopping patterns.

High-Speed Rail Journey Times



The national HSR network that these journey time reductions are based on is set out left, from Greengauge 21's *Fast Forward* strategy.

A national HSR network could therefore deliver journey times of three hours or less between London and Edinburgh/Glasgow and between Birmingham and Paris, sufficient to attract the majority of travellers away from air services. Substantial journey time savings for medium distance journeys will also deliver mode shift from car to HSR. See Greengauge 21's '*HSR and carbon emissions*' fact sheet for further information on the environmental benefits this would bring.

The improved connectivity between the major cities of England, Wales and Scotland will allow businesses to operate more efficiently and productively, generating economic benefits, particularly outside the wider south east. See Greengauge 21's '*HSR and the economy*' fact sheet for further information on the economic impacts of HSR. The construction of HSR lines will also deliver benefits to passengers travelling on the existing rail network. These are set out in Greengauge 21's fact sheet '*HSR and the existing rail network*'.

The proposals set out in HS2 Ltd's report² for Government for an initial **London – West Midlands HS2 route** are based on maximum operating speeds of 360 km/hour. The journey time between London and Birmingham city centres under these plans would be 49 minutes, with stops at both Old Oak Common and Birmingham Interchange.

The HS2 route would connect in to the West Coast Main Line and deliver journey time savings to destinations in the north of England and Scotland:

- London-Manchester: 29 minute saving, with a new best time of 1hr 40mins
- London-Liverpool: 20 minute saving, with a new best time of 1hr 50mins
- London-Glasgow: 30 minute saving, with a new best time of 4hrs

HS2 London to Birmingham journey times

Station	Arr.	Dep.
Euston		10:00
Old Oak Common		10:07
Birmingham Interchange	10:38	
Birmingham Curzon Street	10:49	

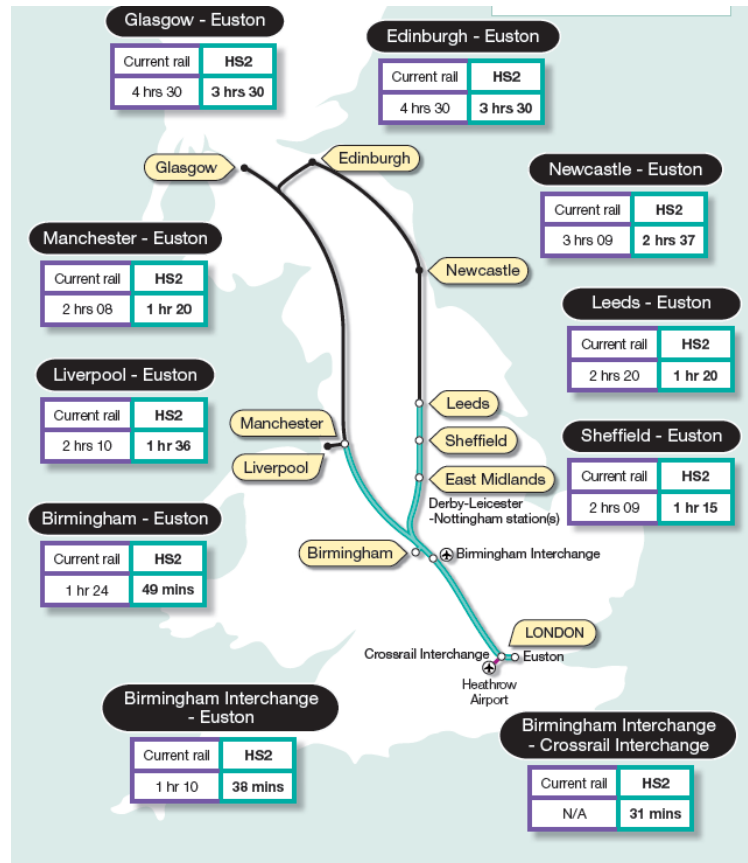
High-Speed Rail Journey Times



The Coalition Government has endorsed plans for a **'Y'-shaped HSR network**, building on the initial London – West Midlands route. This network, with branches to both Manchester and Leeds, would reduce journey times further. An indication of the potential gains from the Y network can be seen from the plans of the previous administration³, as set out right.

The journey times shown assume that connections are made to existing main lines in the vicinity of Preston and York. HSR journey times between London and Glasgow/Edinburgh depend on the location of these connections. The version of the 'Y' shaped network recently modelled by HS2 Ltd⁴ assumes they are made near Warrington and Leeds, and in these circumstances these journey times would be 3h 47min.

A further advantage from reducing journey times is that the shorter the journey, the smaller the fleet size needed to run a given frequency of service – an important resource cost saving.



Data sources

1. Greengauge 21 (September 2009), Fast Forward – A High Speed Rail Strategy for Britain. Available at: http://www.greengauge21.net/assets/FastForward_Greengauge21.pdf
2. High Speed Two Ltd (December 2009), High Speed Rail - London to the West Midlands and Beyond: a report to Government. See chapter 3.10. Available at: <http://www.dft.gov.uk/pgr/rail/pi/highspeedrail/hs2Ltd/hs2report/pdf/chapter3e.pdf>
3. High Speed Rail Cm7827 (March 2010). Available at: <http://webarchive.nationalarchives.gov.uk/+http://www.dft.gov.uk/pgr/rail/pi/highspeedrail/commandpaper/>
4. High Speed Two Ltd (December 2009), High level assessment of the wider network options – Reverse 'S' and 'Y' network. Available at: <http://www.dft.gov.uk/pgr/rail/pi/highspeedrail/hs2Ltd/networkoptions/pdf/report.pdf>