Why Britain needs HS2

HIGH SPEED RAIL
INDUSTRY LEADERS

July 2019

Executive Summary

Britain has been a divided country for far too long.

While the headlines of our overall national economic performance tell one story, the reality is that they mask alarming and unjust disparities in wealth and opportunity between our cities and regions. London and the South east continue to thrive—although in itself that causes problems as the housing market overheats and millions find themselves priced out—while the great cities of the Midlands and the North, once Crown Jewels of the industrial revolution, have suffered decades of slow growth, low productivity and stagnant wages. The quality of their transport links is a critical causal factor in that malaise.

This report, developed as a submission to Government as it considers future spending priorities, sets out the fact that the completion of HS2—a project that has already been underway for a decade—is an essential part of bringing Britain back together again. Thankfully, this is a viewpoint that has an overwhelming mandate, with 626 of 650 MPs elected in 2017 having stood on a manifesto of delivering HS2 in full. Moreover, the leaders of every major city in the Midlands and North, Conservative and Labour alike, all back HS2. Whether in Birmingham or Bradford, Liverpool or Leeds, Manchester or Middlesbrough, each and every city leader recognises the irreplaceable part the project plays in their future.

Paradoxically, in recent months, the debate about whether the project should proceed has never been louder. So this report has been compiled by High Speed Rail Industry Leaders (HSRIL)—a group of organisations with relevant experience and an interest in high-speed rail, which is committed to supporting the successful delivery of a world-class high-speed rail network in Britain—to address this increasingly heated, and frequently misinformed, discussion. It is designed to provide readers with an overview of the benefits of HS2, which we consider overwhelming, and tackle some of the myths and falsehoods which have grown up around the project.

Among the key findings of this report are that:

HS2 is about "smashing the North–South divide"

- Britain suffers from huge regional economic imbalances, with productivity in London some 40% greater than in the North. As the Chair of Midlands Engine Sir John Peace has written, HS2 is fundamentally about smashing the North–South divide. Without HS2, the country has no strategy to achieve that. To give one example, the business connectivity improvements from HS2 range from 19–23% in the city regions of the North and midlands, compared to only a 9% improvement for London. It will make a huge difference.

City strategies and investments are predicated on HS2

› Cities across the country are already developing their urban strategies, and receiving private investment, on the assumption of HS2 being completed in full. To take just two examples, Birmingham has benefitted from huge inward investment, with companies like HSBC and PwC locating major parts of their business there; while Leeds' entire Southbank regeneration is predicated on HS2. Those plans would be in severe jeopardy should the project not be completed in full.

Dozens more towns benefit than people realise

› The benefits of HS2 go to dozens more towns and cities than simply those on the line of route. By freeing up capacity on existing railway lines, we estimate people in at least 22 places will benefit from better rail services as a result of HS2: Watford, Milton Keynes, Coventry, Wakefield, Rugby, Nuneaton, Tamworth, Lichfield, Doncaster, Retford, Newark, Peterborough, Stevenage, Shrewsbury, Telford, Wrexham, Blackpool, Middlesbrough, Hull, Wolverhampton, Grantham and Cambridge. This is in the addition to the 25 towns and cities set to receive HS2 trains directly: London, Birmingham, Manchester, Liverpool, Crewe, Wigan, Warrington, Preston, Lancaster, Oxenholme, Penrith, Carlisle, Glasgow, Edinburgh, Newcastle, Darlington, York, Leeds, Sheffield, Chesterfield, Stafford, Stoke-on-Trent, Macclesfield, Stockport and Manchester Airport

Pitting HS2 v NPR is a false choice

› The choice that has been presented between HS2 and better east-west links in the North (HS3 or Northern Powerhouse Rail (NPR)) is an entirely false one—akin to suggesting that the M62 should be built but not the M1. HS2 is a pre-requisite for NPR, and NPR services on two of the most important regional links (Liverpool to Manchester; and Leeds to Sheffield) will in fact run on HS2 infrastructure. Government policy is to deliver both projects and ensure that there is joined up thinking—so there is no sense in choosing, and no need to choose.

The costs are affordable and good value

› Like all nationally transformative infrastructure projects, HS2 comes with significant costs, but these are both affordable and good value. The benefits of HS2, based on Treasury appraisal techniques, are roughly double the costs, which amount to less than 0.4% of total public spending. For comparison, the Institute of Fiscal Studies has estimated that the fuel duty freeze in place since 2010 has cost the public purse in excess of £50bn.

HS2 is essential to net zero emissions and tackling the climate emergency

› If we are to deliver net zero emissions, HS2 is essential. As the extent of the climate emergency becomes better recognised, and with the Government committing to achieving net zero emissions by the middle of the century, Britain needs a better balance between domestic aviation and increasing rail use, providing a realistic option for many people to choose a sustainable travel mode rather than a short-haul flight. Research by Eurostar shows carbon emissions on a 2-hour high-speed rail journey can deliver a carbon saving in excess of 90% compared to flying the same route with today's technology. In future, travel on electrified railways—whether on local services or high-speed trains—will be a zero carbon activity.

It is essential to tackling the capacity crunch on our North–South railways

› Our existing North–South railway lines are approaching or at capacity, and are unable to accommodate more or longer trains. All of the options to address the capacity crunch have been assessed and reviewed many times over the last 15 years, and every time it is looked at HS2 emerges as the best option. It is the best way of tackling the capacity crunch on our North–South railways which have to accommodate expanding commuter volumes, connect our major cities and shift a huge proportion of our international trade that uses containers; all whilst improving service punctuality and alleviating crowding on trains.

Cutting it would cost thousands of jobs

› 9,000 people already work on the HS2 project. Before even considering the missed opportunity of the tens of thousands of jobs that will be created as the project proceeds, those who advocate its cancellation must evaluate the economic shock of every single one of these 9,000 jobs being lost if the project did not go ahead.

These eight reasons, based on the evidence set out in this report, lead to one inescapable conclusion. HS2 must be delivered in full. The evidence is overwhelming. There is no Plan B for tackling the North–South divide.

The country has been divided for too long. We need HS2 to begin the process of bringing Britain back together again.

A View from the Core Cities

Core Cities welcomes HSRIL's detailed and evidence-based analysis of HS2. We believe HS2 is both vital for our country's future and should be seen as a bold statement of ambition at a crucial time for our nation. We echo HSRIL's arguments that it will help us raise our country's productivity and boost our city economies.

We see HS2 as a stepping stone towards high-speed rail for the whole of the UK and it is a sign of our commitment that cities not directly connected to HS2 under its current route plan are fully in support of the project.

HS2 is more than just a railway line, it is unlocking future jobs, training and regeneration opportunities that will benefit many of our 20 million citizens. Its construction is key to the success of future infrastructure projects like Northern Powerhouse Rail and Midlands Rail Hub that will boost productivity and help us decentralise the UK.

Cllr Judith Blake CBE

Leader, Leeds City Council and Chair of the Core Cities Group

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Addressing the nation's economic imbalances

The benefits of HS2, calculated using appraisal techniques compliant with DfT and HM Treasury guidance, are roughly twice the scale of its net costs. Similar—although simplified—analyses were used in the past (the 1960s) to assess the cases for the M1 Motorway and the Victoria Line, and they have been used ever since to compare and contrast investment choices.

Estimates of HS2's benefits have been the subject of regular updates using these techniques, with extensive sensitivity tests. Yet little has been revealed from this work about the distribution of the project benefits, and the way the measured benefits translate into a stronger and more productive economy.

A study for the Department for Transport by independent economists five years ago concluded that transport investments: **"can deliver economic benefits over and above conventionally measured benefits to transport users [...] because transport fosters intense economic interaction that raises productivity, both within narrowly defined areas or more widely by linking areas"** and that **"transport shapes the level and location of private investment**. These conclusions confirm empirical evidence from the impacts of high-speed rail schemes elsewhere, but the published estimates of HS2 benefits remain essentially based on conventional transport techniques.

The need to rebalance national economic productivity

There is a significant and long-standing productivity gap between the South East (especially London) and the rest of the UK (see Figure 1), with underinvestment in transport infrastructure, both within and between the regions, acting as a constraint to growth and business productivity.

What will HS2 achieve across the regions?

HS2 will provide a step-change in connectivity to the English Midlands and North, to Scotland and to North Wales, with the potential to drive UK productivity, bringing people, their skills and businesses closer together, opening-up markets to create a more balanced economy.

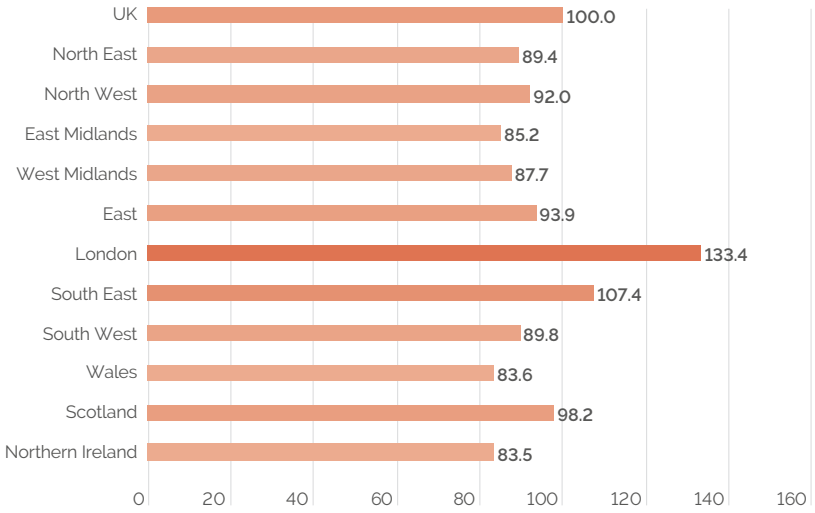

Figure 1: **Economic productivity by region**

Source: ONS

The change in business-to-business connectivity will be far greater for regions outside London, given that the capital already benefits from excellent all-round rail connectivity, This is shown in Figure 2 opposite.

How does better connectivity improve regional productivity and enhance specialisation?

Improving the productivity of UK city regions is critical to driving the economy and spreading prosperity. Ten English city[1] regions account for 35% of the country's population, 38% of employment and 41% of the nation's output (measured by Gross Value Added)[2]: Nine of these are served by HS2. HS2 will allow businesses to connect more efficiently, and provide better access to more specialised, higher quality and lower cost, inputs.

Successful cities, and their regions, attract businesses that benefit from locating in proximity to centres or clusters of economic activity. HS2 will improve productivity by increasing connectivity to specialised providers of industry inputs, expanding the market of specialised labour skills; generating new business networks and increasing trade; and fostering information and knowledge sharing in key growth sectors—the knowledge-based industries—see Figure 3.[3]

1. London, Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham, Sheffield and Derby. Data sources: Office for National Statistics, Annual estimates of NUTS3 regional Gross Value Added, 2013; Office for National Statistics census data 2011 and Annual Mid-year Population Estimates 2014; Business Registration and Employment Survey (BRES) 2014.

2. Department for Transport. Supplement to the October 2013. Strategic Case for HS2: HS2 and the Market for Business Travel. November 2015.

3. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/480649/annex-hs2-and-the-market-for-business-travel.pdf.

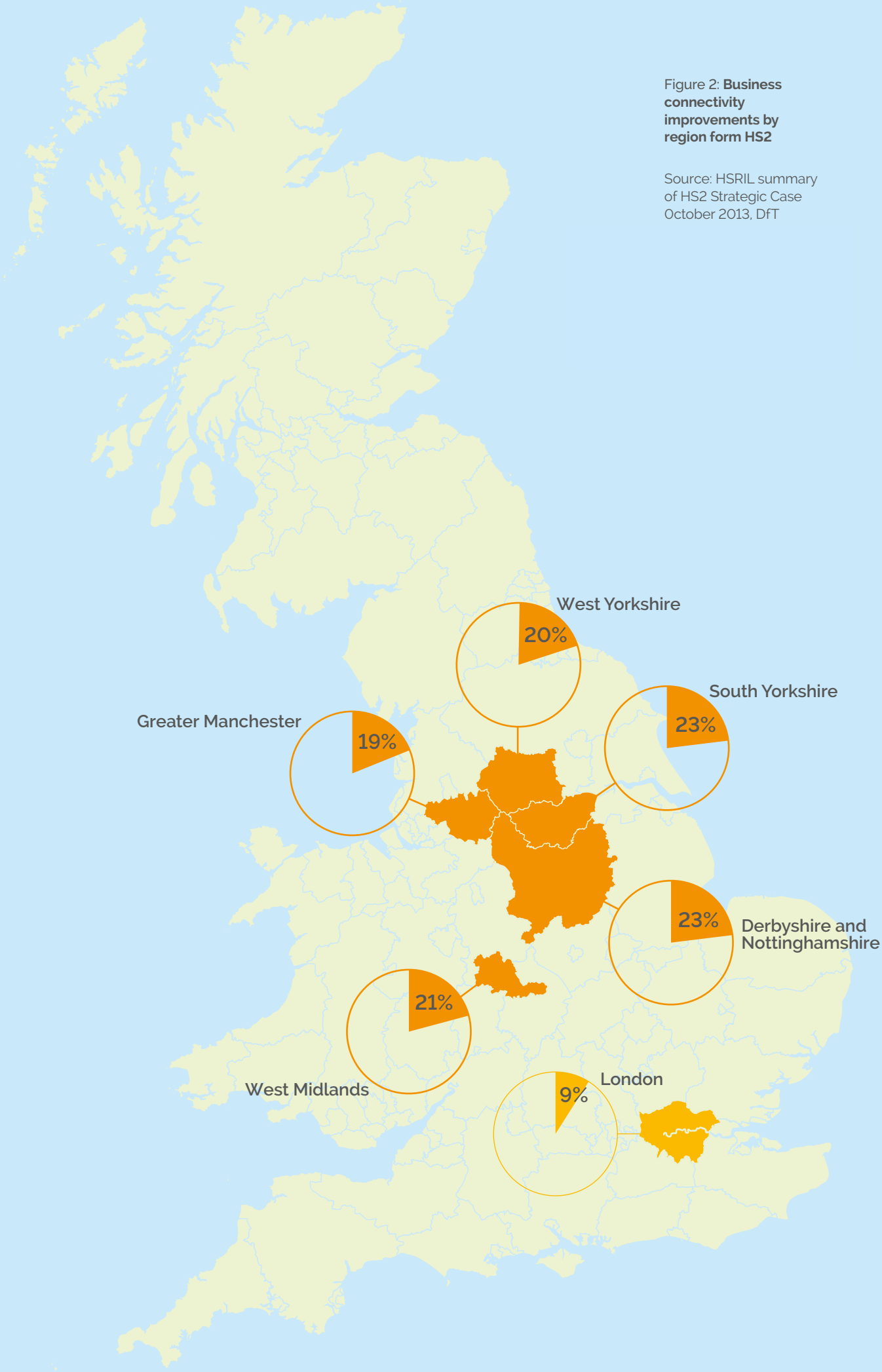

Figure 2: **Business connectivity improvements by region form HS2**

Source: HSRIL summary of HS2 Strategic Case October 2013, DfT

HS2 will improve the attractiveness of city regions outside the South East as places to do business, thereby promoting greater inward investment and innovation. New ideas and business are critical to driving productivity and reducing existing regional imbalances. The pace of change, as reflected in the number of business start-ups, is not evenly spread across the country—as the next diagram shows.

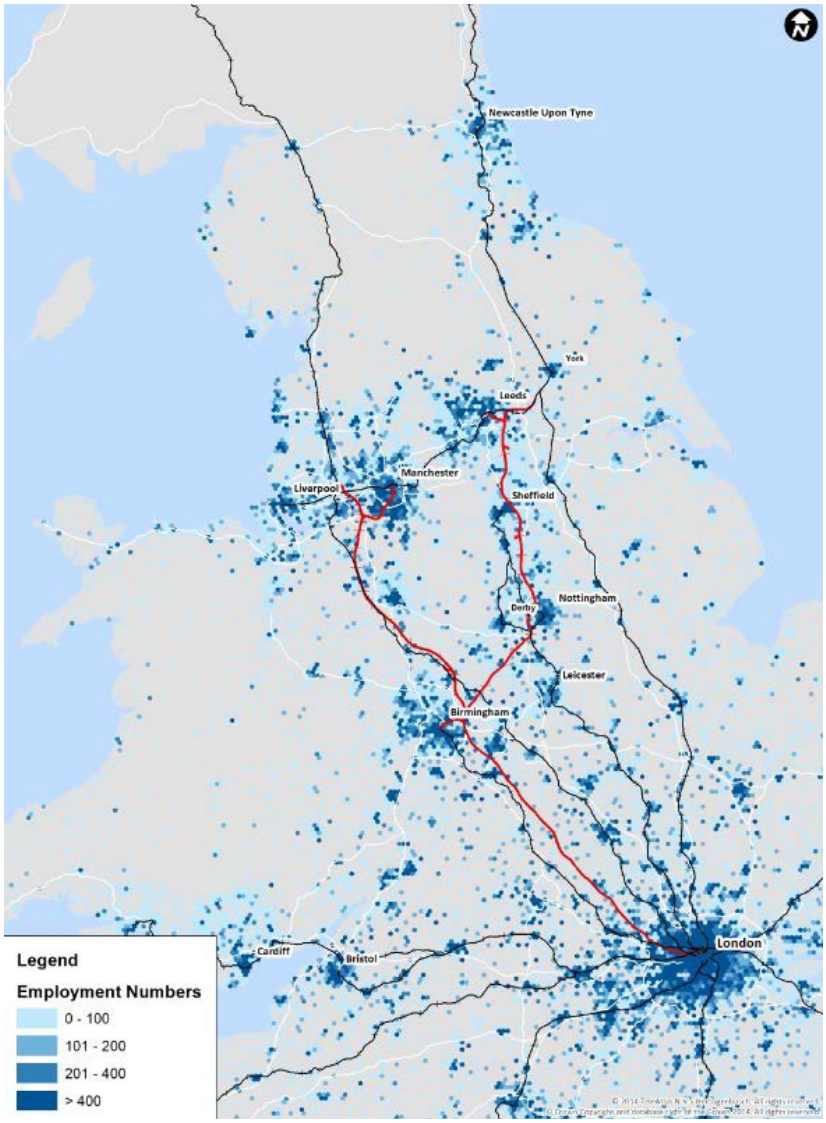

Figure 3: Location of jobs in knowledge-based sectors

Source: Dft 2015 and data source: BRES, ONS mid-year population estimates. HS2 shown in red

Improvements to connectivity shape the level and location of private investment. Good transport links influence the quantity and quality of economic activity. Appreciating this linkage, local authorities and business leaders in places that will be served by HS2 are rising to the opportunity the project will bring. They are each developing local HS2 Growth Strategies.

Business travel drives a growing economy

While business trips account for just over a tenth of all rail trips across the country, **currently almost half of the rail journeys between the city regions that will be connected by HS2 are for business**[4].

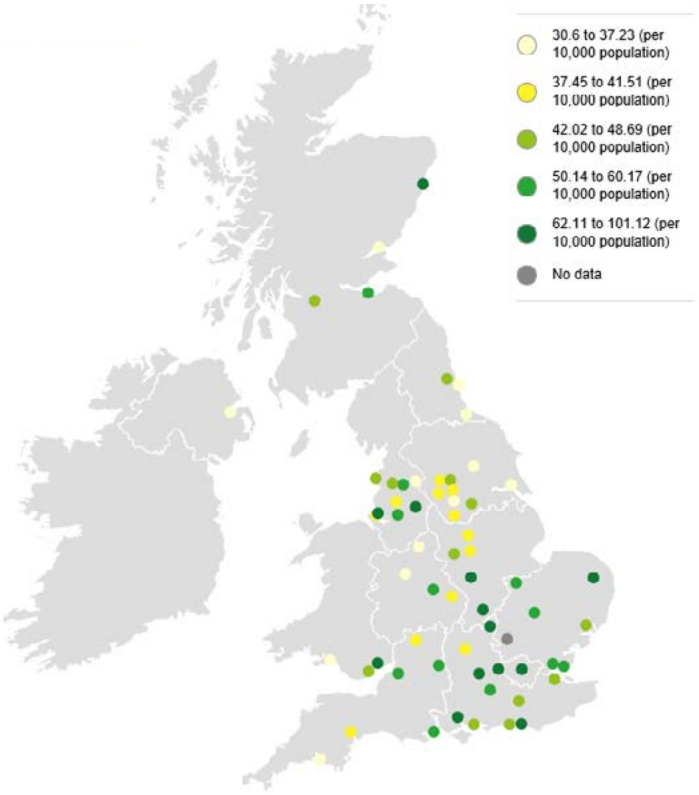

Figure 4: Number of Business Start-ups by region

Source: ONS, Business Demography, NOMIS, mid-year population estimates

The corridors to be served by HS2 include the country's six largest rail intercity business flows.

Jobs in advanced manufacturing, professional services and technology have grown at nearly three-times the rate of other sectors, and are concentrated in city regions. This upward trend is expected to continue. While these jobs currently make up less than one-fifth of total employment, they deliver around a quarter of all economic output and more than a third of the nation's total exports. Employment in these sectors gives rise to a large part of the business travel market.

4. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/480646/supplement-to-strategic-case.pdf.

Even with the growth of electronic communication and all the opportunities this brings, evidence suggests that face-to-face interactions continue to be particularly important for firms in these high-growth sectors. This is because with the complexity of information that is required to be exchanged, the desire to build relationships and trust with customers and suppliers is paramount.

Intercity rail travel has grown strongly over the last 25 years as the internet revolution has unfolded. It is sometimes suggested that the digital age will obviate the need to travel. But while commuter patterns are shifting, and car ownership and driving licence holding is much reduced amongst younger adults in cities, there is no sign of a let up in longer distance travel. The need for business meetings or college attendance, or for visiting family and friends and attending major events—concerts, sports, etc, continues to rise. Indeed, mobile technology makes long distance travel by rail more attractive; and being able to be in-touch remotely drives rather than hinders the desire to connect in person. The evidence is in Figure 5.

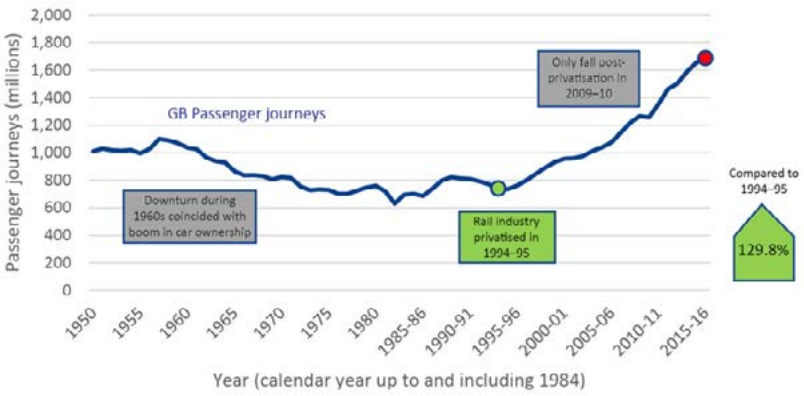

Figure 5: Great Britain rail passenger journeys 1950–2015

Source: Office of Rail and Road, Passenger Rail Usage 2015–16 Statistical Release, 26 May 2016

HS2 is ideally placed to deliver the intercity connectivity that is needed to maximise the future success of the nation's key business growth sectors.

By creating a more mobile labour force, by improving access to the pool of talent needed by firms to grow, by improving links between customers and suppliers and by fostering greater competition between firms, HS2 will have a significant and beneficial influence on the economic geography of the country.

HS2 not only benefits major cities but many towns too

While HS2 is designed to connect our major cities, it also brings wider network benefits. Smaller cities and large towns that would benefit from direct links to London can find that, disappointingly, there is no space on today's main line rail network to fit their services. HS2 can change this situation for the better.

Serving left behind places

Constraints on today's West Coast Main Line make it very challenging to provide direct London services to and from all of the places where there is significant demand—particularly in the peak when people want to travel.

Although some towns and cities such as Shrewsbury, Blackpool and Wrexham now have a limited direct service to Euston, other places do not. In 2013, Network Rail's "Long Distance Market Study" highlighted the following places from where there is likely to be sufficient demand to support new/enhanced services:

Already have some service, but would seek more:

- Shrewsbury
- Telford
- Blackpool

Not directly connected:

- Sutton Coldfield
- Blackburn
- Bolton
- Burnley
- Rochdale
- Barrow-in-Furness

"Experience on the East Coast Main Line is that opening up markets by providing new direct services to London has resulted in strong growth in passenger journeys—indeed faster than the growth from stations that are already directly served. Examples of this are services introduced between London and Hull, and London and Sunderland."

Source: Department for Transport, Oct 2015

Redressing the skewed distribution of tourist visits

An important and growing part of the UK economy is tourism (for both domestic and international visitors). Again, this is a sector where London dominates (see Figure 6). Long-standing policy has sought to spread the demand and increase visits to the regions, and HS2 will help achieve this aim.

By linking different tourist destinations in the Midlands and the North with London and the South-East as well as improving access to international airports (Manchester, Birmingham and Heathrow), HS2 will increase domestic and international tourist numbers.

Key rural tourist destinations, such as North Wales, Yorkshire, Lake District, and the Anglo-Scottish borders, will be able to offer increased car-free access to these much-treasured places.

Britain's existing high-speed rail line, High Speed 1, has had a much-welcomed positive impact on Kent's visitor economy through contributing an additional £70 million a year.[5]

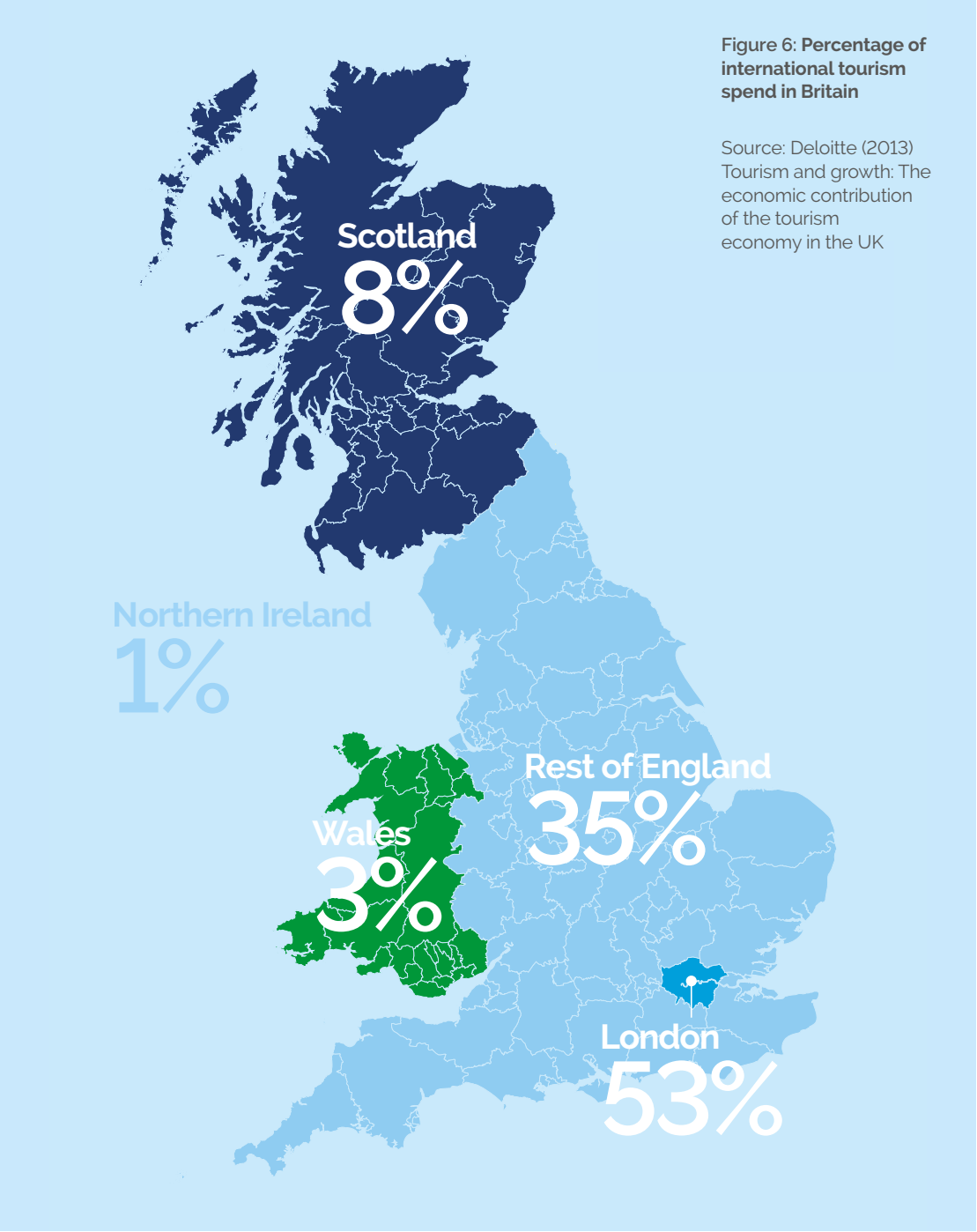

Figure 6: Percentage of international tourism spend in Britain

Source: Deloitte (2013) Tourism and growth: The economic contribution of the tourism economy in the UK

5. The Impact of HS1 on the Visitor Economy in Kent. https://highspeed1.co.uk/media/208950/hs1tourism-impact-study-final-report-external.pdf.

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Addressing the capacity shortfall

It is well known that rail use has been increasing at high annual rates for the last 25 years. Record levels of investment have seen more trains added to the network and longer trains too. A series of major station and junction improvements has unlocked bottlenecks, including those at Reading, London Bridge, Stafford and Rugby. The largest investment has been in London, with Thameslink and Crossrail approaching completion and the London orbital railway (the Overground) up and running. Commuters in Kent as well as international rail travellers between London and cities in France, Belgium and the Netherlands have benefitted from HS1 (the Channel Tunnel Rail Link).

While measures are in hand to address demand growth pressure in London and the Southeast, the North–South rail network from Scotland through northern England and the Midlands to London is struggling.

The main North–South rail arteries accommodate intercity, commuting and key freight flows to/from the nation's major ports—and are under great pressure. The most recent statistics show that both rail passenger and freight demand grew by 3% over last year, with passenger revenue up by 6%.[6] Relief is dependent on the delivery of HS2.

Overcrowding is sadly now common-place, but even with inflation-indexed fare increases year-on-year, demand pressure continues to grow. Formal punctuality targets set by the industry regulator have had to be eased back: network intensity is such that knock-on delays are much higher now than 10–15 years ago.

6. ORR statistics for 2018–19 Q4 released June 2019.

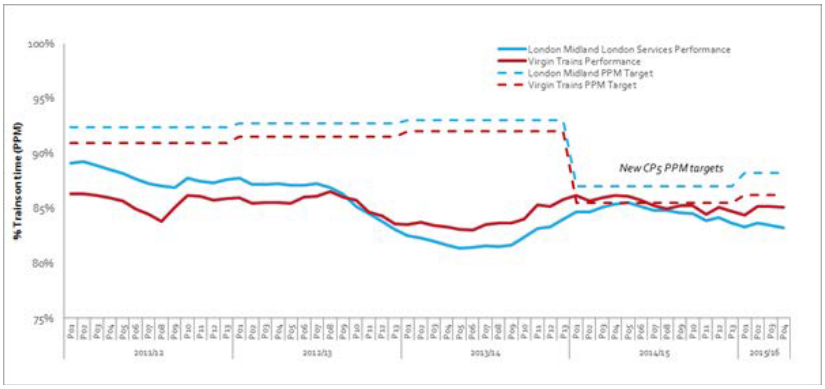


Figure 7: **West Coast Network reliability and resilience**

The initial studies on North–South high-speed rail were published by DfT 15 years ago

It is sometimes said by critics of HS2 that it is a project that lacks the necessary provenance of a comparative assessment of alternatives. But this is untrue.

In 2000, the shadow Strategic Rail Authority commissioned a major study to examine whether there was a case for North–South high-speed rail in Britain, to identify what problems it would address and, having identified what objectives it could meet, to examine all reasonable alternatives to it.

The crucial need identified in the study was that more capacity was needed for the main North–South transport networks (road and rail). By 2031, if not earlier, the main rail routes would be seriously overloaded, with a need for pricing action to suppress demand.

Initiation of the study had been prompted by a proposal from Virgin Stagecoach for a long-term (15 year) franchise for the East Coast Main line which recognised that the route would not be able to support the scale of demand for train paths in future years as passenger volumes increased. The long-term franchise proposition was not progressed at the time, following the Hatfield train crash. But the results of the subsequent Atkins study for the shadow SRA were set out in a major report with a full set of technical appendices, released by the Department for Transport in January 2004.[7]

The consultancy team led by Atkins developed a range of North–South high-speed rail propositions along with a set of alternatives that included:

- Building a new North–South railway to be operated at conventional rather than high line speeds
- Building a new line with MAGLEV technology rather than conventional high-speed rail

7. The work was carried out by Atkins, Ernst & Young, Roger Tym & Partners, Berwin Leighton Paisner, Faithful and Gould, University of Leeds. https://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/rail/researchtech/research/hspeedlinestudysummaryreport.pdf.

- Upgrading the existing North–South main railway lines (the West Coast Route Modernisation was under way at the time of the study)
- Widening existing highways
- Building new motorways
- A programme of airport investment and expansion
- Restricting demand growth (assumed to be achieved by fuel tax and fares price rises).

The study entailed consultation with key national, regional and local authorities to help specify the options and international case study comparisons (of France and Japan in particular). Environmental and land use implications were examined as well as feasibility and implementation timescales. This was an early, strategic, appraisal of options of the type that is properly called for by Government and others to avoid wasting time on badly-judged schemes.

Appraisal of the alternatives on a consistent basis following DfT and HM Treasury guidelines and criteria showed that the option that offered best value for money and that performed best overall was indeed the construction of a new high-speed railway. It was better value than building more motorways (two new motorways would be needed to provide the capacity of a new high-speed rail line); better than a programme of upgrades to airports or to existing road or rail networks; and better than building a new rail line for 'conventional' (slower) operating speeds or indeed for new technology (Maglev).

While the report was released in 2004, with strong warnings of the capacity pressures that lay ahead, the Government of the day did not immediately see fit to follow up and initiate development of the new high-speed line. But the opening by Her Majesty the Queen of what was to be called High Speed 1—the full channel tunnel rail link from Folkestone into a magnificently re-constructed St Pancras station in November 2007—prompted the question of whether the time had come to consider high-speed rail nationally. The Government moved to establish HS2 Ltd as a development company in January 2009, and it was able to draw upon all of the work carried out by Atkins in 2000/1 and on subsequent development work by Greengauge 21 on behalf of the English regional development agencies and others, and by Network Rail (who investigated the case for high-speed in its 'New Lines' study) in the intervening years.

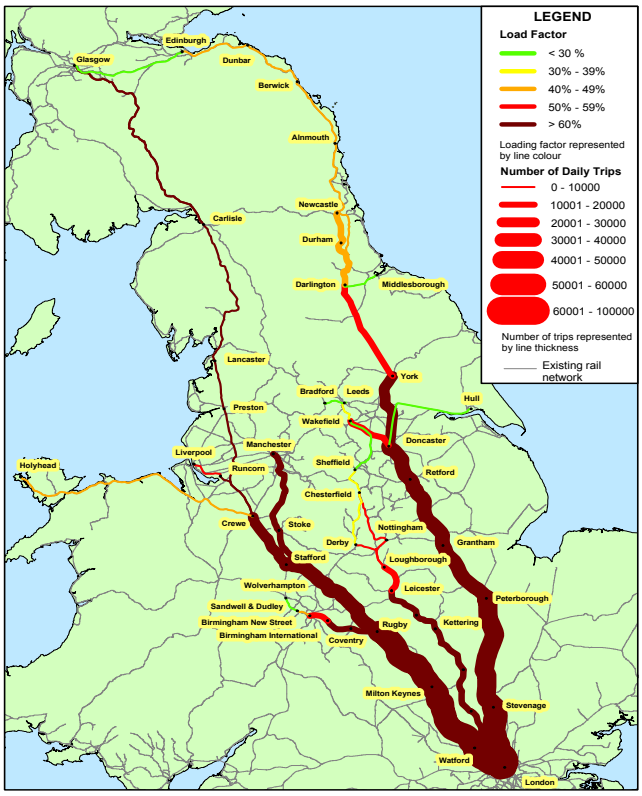


Figure 8: Projected rail demand on North–South main lines 2031

Source: High Speed Line Study, Summary Report, Atkins, 2003.

The Capacity Crunch

With increased disposable income, a revived economy, growth of jobs and re-balancing of the economy across the cities and regions—as intended by the Northern Powerhouse and the Midlands Engine—there will be further growth in the demand for intercity travel, including to and from the capital, as well as between major regional cities.

Existing lines are approaching or at capacity, and are unable to accommodate more or longer trains, constraints which will place a limit on the ability of firms to expand and do business. With Crossrail and Thameslink now coming on-stream, London will get a major transport network capacity boost. And so the attraction for businesses to expand in London—rather than elsewhere in Britain—will be all the greater. The need for the capacity increase that HS2 will bring is essential to create a more balanced growth pattern in Britain.

The recent House of Commons Library briefing on HS2[8] seems to discount the capacity problem (it was unfortunate in its timing, having just preceded the latest passenger numbers which showed a return to strong growth in rail passenger numbers after major service disruption during 2018). Its summary statements fail to note that:

› The annual growth in rail demand used in HS2 business case appraisals is only 2.2% but rail demand has grown much more strongly over the last 25 years (which means the benefits of HS2 are likely to have been seriously under-estimated)

8. https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-8601.

- The reason why Government hasn't proceeded with options cheaper than HS2 that entail upgrading existing lines is because of the high levels of disruption involved (noted in the body of the report but omitted from the headline summary)

- The use of generalised load factors on railways which serve multiple destinations is not fit for purpose and doesn't reflect the travel conditions that passengers actually experience.

High Speed 2 business case, costs and spending

Published by the House of Commons Library Thursday, June 20, 2019

This comprehensive briefing paper is misleading on the capacity case for HS2.

Capacity cannot usefully be looked at in aggregate over a route: it must be looked at train by train. If three 1,000-seat trains on a route from different origins carry 1,200, 900 and 600 people, the average load factor is indeed 90% but this does not mean there is usable spare capacity.

Undiscouraged, the report (p20) makes the point that the capacity produced by HS2 is **"arguably surplus to what is required to meet demand during the peak"**. But this is true only if demand growth tails off rapidly from the levels experienced over the last 25 years.

Even if it does, the capacity on HS2 will be used in Phase 2 to relieve congestion, and shorten journey times, for those using the Midland and East Coast Main Lines (for which demand for paths exceeds capacity as soon as 2021), as is pointed out in the briefing on p25.

In any event, the briefing paper prognosis for the West Coast Main Line is that it will become overloaded: p21 seems to show an average peak load factor of 84% in 2014 rising to 91% or 111% in 2033.

Whatever the exact numbers, if peak hour growth continues, eventually one of three realities will have to be faced:

- leaving people unable to get onto trains at commuter stations
- ending the price control/regulation of seasons and price commuters off
- reducing the number of long-distance paths to/from London in peak periods.

Better matching of people to jobs

As well as its direct connections, HS2 will release capacity on the existing rail network for new or more frequent local commuter services. HS2 therefore has the potential to improve the functioning of city labour markets, allowing businesses to access a wider pool of talent and expertise, and providing better matching between people, their skills and job opportunities.

By facilitating better local commuter services, HS2 will benefit further towns and cities, making them more attractive locations for business, and providing new employment opportunities that will reduce reliance on declining sectors of the economy such as traditional manufacturing.

All-round benefits

While the post-HS2 timetables remain to be written, the ways in which HS2 can benefit many more places than is commonly realised is illustrated in Figure 9.

With a new HS2 service	With better services on existing lines using capacity released by HS2	With existing direct rail connections to planned HS2 hub stations	With potential for HS2 service extensions	With scope for new direct rail connections to HS2 hub stations
London	Watford	Slough	Leicester	Mansfield
Birmingham	Milton Keynes	Maidenhead	Bristol	Derby
Manchester	Coventry	Heathrow	Nottingham	Worksop
Liverpool	Wakefield	Barnsley	Chester	High Wycombe
Crewe	Rugby	Bangor	Loughborough	
Wigan	Nuneaton	Llandudno	Cheltenham	
Warrington	Tamworth	Holyhead		
Preston	Lichfield	Bradford		
Lancaster	Doncaster	Harrogate		
Oxenholme	Retford	Skipton		
Penrith	Newark	Scarborough		
Carlisle	Peterborough	Rochdale		
Glasgow	Stevenage	Bolton		
Edinburgh	Shrewsbury	Huddersfield		
Newcastle	Telford	Runcorn		
Darlington	Wrexham	Blackburn		
York	Blackpool	Burnley		
Leeds	Middlesbrough	Accrington		
Sheffield	Hull	Barrow		
Chesterfield	Wolverhampton	Workington		
Stafford	Grantham	Whitehaven		
Stoke-on-Trent	Cambridge	Dumfries		
Macclesfield		Sunderland		
Stockport				
Manchester Airport				

Figure 9: **Places benefitting from HS2**

The challenge and opportunity for rail freight

Carrying freight on rail—especially predictable flows of heavy loads, over medium/long distances—is a much better option than the alternative of road haulage.

At least one extra freight train every hour in each direction could operate post-HS2 Phase 1/2a between London and Crewe and a second might be possible as well. The paths created would be particularly helpful to transport freight between ports in London and the South East and distribution centres in Midlands, the North West and Scotland, and could also help support the expansion of ports in northern England (at Liverpool and Teesport, for instance).

Each freight train could relieve the road network of 76 lorries[9]. On this basis, HS2 would lead to around 700,000 fewer lorry journeys on the road network each year, meaning less congestion and lower carbon emissions.

Commuting Capacity

HS2 provides a step change in commuter capacity on the WCML corridor. This is because capacity released by operating much of today's inter-city services on dedicated high-speed lines could allow the number of commuter services in the morning peak period to increase from 28 to 41, bringing a 59% increase in morning peak capacity into Euston—London's fastest growing terminus—from 25,000 to 41,000.[10]

9. https://www.networkrail.co.uk/industry-commercial-partners/rail-freight/.
10. DfT, HS2 Strategic Case update, 2015.

HS2 and housing

A recent analysis showed that people living in London will pay 9.4% more to live within 5 minutes of a railway station, and in Manchester, 7.8% more. In the London case, this is premium on average of £42,900*. As house prices increase, and the structure of the jobs market changes, people are commuting much longer distances. The City of London has a population catchment that extends over a 100-mile radius, a key advantage over its European rivals. A trend towards lengthier commuting patterns is also visible in our great regional cities. Rail is a critical factor in the housing market.

In the South East, services into London for commuters South of the Thames were developed most strongly, with a fully electrified network by the 1960s. As major housing development spread more widely North of London, commuter services were introduced in greater volumes on the long-distance lines to the Midlands and the North, lines which are shared with intercity trains. The West Coast, Midland and East Coast main lines which accommodate these flows are all relieved by HS2.

Places which can benefit from improved commuter services following completion of HS2 and the transfer of intercity services to it include those serving: Leighton Buzzard, Milton Keynes, Northampton, Macclesfield, Kettering, St Neots, Huntingdon, Peterborough and Cambridge—all areas expecting major increases in housing stock. Not all of those employed and living in new homes in these places will choose to commute by rail. But the environmental impact of a rail-based commuting lifestyle is much less than one based on car use. In this way, HS2 is a crucial factor in achieving a pattern of sustainable growth – across the Oxford-Cambridge prosperity arc which is centred on Milton Keynes, in particular.

Potentially more dramatic still, the implication of regional re-balancing that HS2 brings will help stimulate demand and house-building in the North rather than the South of the country, easing overall house price growth pressures.

Regional partners in the Midlands and North are keen to explore the deployment of 'Javelin' style train services to serve regional cities in the way that Kent has been served by HS1.

*Source: Nationwide Building Society, June 2019

Case Study: Southeastern's high-speed commuter service on High Speed 1

Ten years ago, Southeastern introduced Britain's first domestic high-speed rail service. The Class 395 Javelin trains provide the mainstay of services on the UK's first high-speed rail line, High Speed 1. The trains were built by Hitachi and utilise technology developed through decades of experience running trains on Japan's Shinkansen network,

Since June 2009, these 140mph trains have carried more than 100 million passengers between London's St Pancras International, and destinations around the county of Kent. Perhaps best known for its role in the success of the London 2012 Olympic games, the Javelin service shuttled 25,000 fans an hour to Stratford International in just 7 minutes. And the impact on communities served by Southeastern's Highspeed service has been transformational, with journey times cut by up to 49 minutes.

This service has delivered £3.8 billion in economic and social benefits since 2009, and the line's reliability is so great that delays average less than 5 seconds per journey. Kent's tourist economy has been boosted by more than £311 million since the line was built, with a nine-fold increase in leisure journeys and the creation of more than 5,700 jobs in tourism and hospitality.

Towns like Margate, Whitstable and Folkestone are regenerating and thriving - open for business, tourism and commuters alike. Canterbury can be reached from London in under an hour, and Ashford is now just 38 minutes from the capital, but with 73% lower office rents. This connectivity has been integral to the growth and regeneration of the town, with 7 major developments breaking ground around the station in recent years – including offices, a new cinema, outlet shopping, a new college and even a state-of-the-art brewery.

Today, Southeastern's Javelin fleet is among the UK's most reliable, with trains ready for service 99.7% of the time. The increased popularity of the Highspeed service has cemented a culture of continuous improvement known as 'kaizen' with over 600 modifications made to the fleet over the past decade.

Over the 10 years of service, Southeastern's high-speed trains have led the industry, averaging well over 90% passenger satisfaction and with growth significantly outstripping other train operators. Passenger numbers have increased by 12% year-on-year, and the service has proved so popular that it was extended to serve Maidstone, Sandwich and Deal in 2011, with all-day Kent coast "rounder" services introduced in 2015.

The Highspeed service truly is "Britain's Fastest", and this epithet is carried on the side of each 140mph train alongside the signature of a great British athlete, including Dame Kelly Holmes, Tanni Grey-Thompson and most-recently Dina Asher Smith. The trains have also been branded with poppies to commemorate the 100th anniversary of the First World War, recognising the important role played by communities such as Folkestone and Dover during the conflict. And in a celebration of the diversity of these communities, one Javelin is now permanently and proudly branded in rainbow livery as part of the #trainbow initiative.

The route of Britain's first high-speed railway was initially hotly debated, but one thing is clear after 10 years of Southeastern Highspeed: passengers and politicians alike see the service as integral to their communities, powering their local economy, and shaping where people choose to live and raise their families.

3

Jobs and careers

HS2 is providing opportunities to change the UK's construction workforce and increase the diversity of the transport infrastructure workforce. It is inspiring younger generations to take-up science, technology, engineering and maths subjects and pursue careers in relevant sectors.

Case study: the Align contract

In July 2017, Align won the 'C1 package' of the UK High Speed 2 line (HS2). Lot C1 consists of 21.6km of high-speed rail infrastructure in a rural environment. Align recruited 140 staff with females: **22%**, BAME: **15%**, under 30yrs: **23%**, 30–59yrs: **73%**, over 60yrs: **4%**.

Enabling works for Britain's new high-speed line have continued to pick up pace with HS2 Ltd revealing it now supports 9,000 jobs, a figure that is anticipated to rise to 15,000 by 2020 and double to 30,000 during peak construction in 2021/22.

Across 250 sites on the first phase of the route, works currently include land clearance, demolitions, tree planting, archaeology, utility diversions, and environmental mitigations. Much of this is centred around new station sites in Birmingham, Old Oak Common and Euston.

More than 2,000 firms now have contracts with HS2—70% of them SMEs and 98% of them British.

Creating valuable jobs in Britain

Much of the adverse comment on HS2 relates to its scale: it is a truly ambitious project – and not just in engineering terms. As a large project with lengthy assignments, contractors can make commitments in the realm of social, community and environmental responsibility. With HS2, they are already starting to show what's possible.

The way HS2 is built—HSRIL is confidently able to say—will become a source of national pride and a signal to other infrastructure schemes that may follow. The project is already:

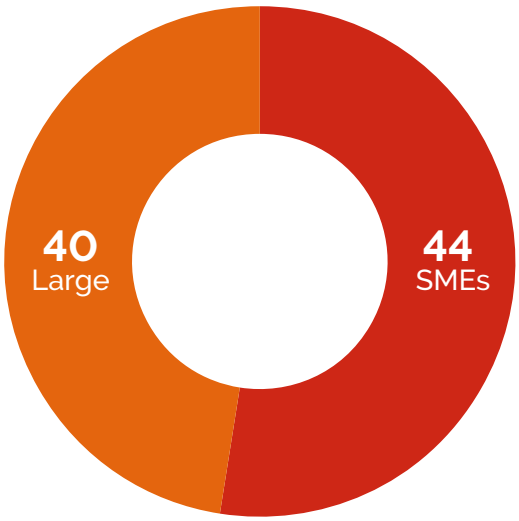
- Helping enhance skills
- Helping to attract people to pursue careers that centre on STEM know-how
- Helping address workforce diversity aims
- Working with local community and voluntary sector groups to tackle social problems in and around the areas of major HS2 works
- Employing the hard-to-employ—giving people a fresh start in life.

A regional, diverse, supply chain

The location of the first phase of HS2 in the South (where capacity pressures are greatest) has led to much debate given the relative lack of overall transport investment in the North.

But the immediate beneficial impact is a boost to the economy nation-wide through new jobs in the supply chain, and that is taking place now in 2019 as preliminary works have commenced.

Companies in the supply chain are, in practice, located across the country, and so new orders that bring new jobs are being experienced in many places. Many of the companies involved are Small/Medium sized (SMEs) and they cover multiple areas of expertise.



Excluding utilities work, CSjv has engaged 44 SME's to execute work directly on EWC.

What work scope?

- Archaeology
- Demolition (low value packages)
- Occupational health
- Secondary glazing
- Traffic management
- Testing services
- Hoarding and fencing
- Heritage conservation
- Exhumation
- Site security.

Total value of work by SME's: £62.2m

Case study: Costain Skanska STRABAG joint venture (SCS JV)

Alyssia Economides, Kelsey Barham and Mary Allen are all Apprentice Quantity Surveyors working for the Costain Skanska STRABAG joint venture (SCS JV). Since joining the project in October 2017, the three apprentices have been gaining experience through six-monthly rotations in various teams aligned to the Main Works Civil Contracts on HS2, including Commercial, Procurement and Project Controls. Their four-year and eight-month apprenticeships combine learning on the job while studying for a degree; they are all aiming to become fully qualified Chartered Quantity Surveyors.

Alyssia Economides describes the responsibility and opportunities that the project has presented, saying: **"...since leaving sixth form and coming here I have been given quite a lot of responsibility, for example, when I was in Project Controls, I was leading the internal JV Board review meetings with the Project Management Team (PMT). I think site experience is really key to our development, but because of the nature of the project we have also had to learn how to adapt and change quickly."**

Kelsey Barham describes the sense of achievement she felt at completing a project from start to finish while working with the Procurement team. Kelsey said: **"Along with my manager, we had to set up all the subcontract works information that we are going to give to our subcontractors. We had to liaise with every single department to make sure their requirements were included, and nothing was missed. It was a real challenge, and I had to ensure there were no conflicts. I have been exposed to so much while working here, and one of the great things is that if you ever need help with anything there is always someone who is willing to share their knowledge and experience."**

Mary Allen started her apprenticeship in the Procurement team, initially involved in material procurement, and then Project Controls where she helped to develop the JV Board report and provide monthly updates to our client through completing sections of the PMU. Mary said: **"I was producing the scoping documents for each area of the route, describing each asset and the proposed construction method"**. A huge opportunity for Mary was being invited as a member of the internal judging panel during the selection process for our nominees to enter into the Women in Construction and Engineering Awards. **"Being recognised for that position was really encouraging. I think one of the big benefits of doing my apprenticeship on this project is the level of inclusivity it offers."**

The Supply Chain stretches across the whole of the UK

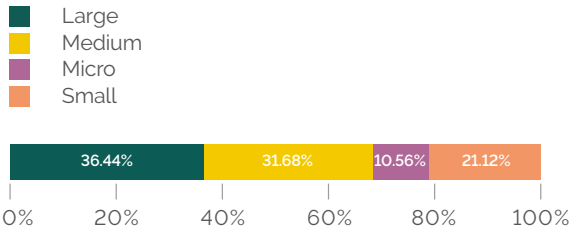
SCS Railways supply chain strategy is built around a fair and transparent approach dedicated to bringing value to the local community and the wider UK. This will be achieved by creating new opportunities for a diverse pool of suppliers, including SMEs.

Expression of interest

Expression of Interest (EOI) of works packages through CompeteFor allows SCS to capture the interest of a diverse supply chain.

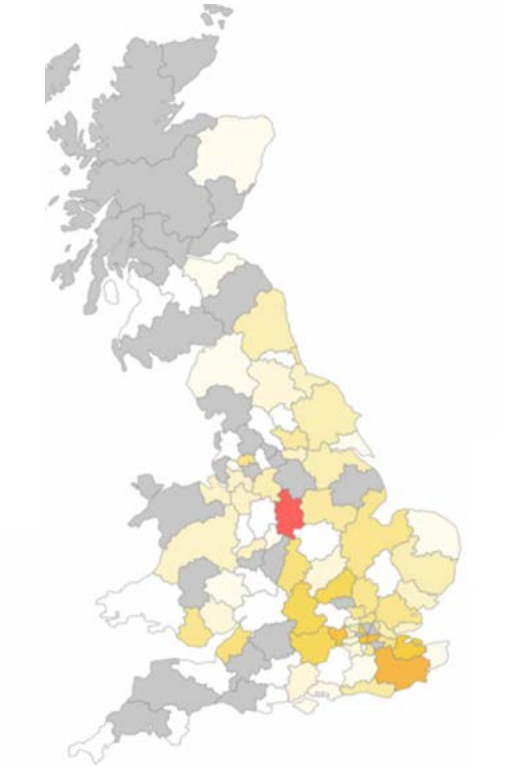
To date, we have **483** suppliers express interest, of which **63%** are SMEs.

SME expression of interest



EOI location heat map

Darker colours indicate more interest



Case study: Crowder's Nurseries

Crowder's Nurseries is a family-run SME in Lincolnshire and was awarded a contract in 2016 to provide saplings and trees for planting along the HS2 line of route. The business now employs 50 local people—the largest contract in the company's history—and is set to supply 7 million trees and shrubs which will create more than 650 hectares of new woodland between London and Birmingham along the HS2 Phase One route. The firm has also introduced a new apprenticeship programme, recruiting 3 apprentices already this year.

4

Creating a new export platform

High-speed rail provides an opportunity to develop UK-based skills and a viable proposition to win business in other markets. HS2 suppliers will play a key part in building up that expertise.

Headline projects are important to stimulate interest from overseas buyers. The Government's Industrial Strategy contains a rail sector deal, in which the delivery of HS2 will be a central feature.

Other nations' interest is usually sparked at an early stage in their own thinking and project development, when the requirement may be to seek advice on how to structure a project, or even more broadly, how to convert an idea into reality. We know that key agencies in other countries are attracted to visit and look at HS2 (just as they have been keen to visit and learn about Crossrail). Most recently, for example, HS2 Ltd hosted a visit from the Czech Republic, and HSRIL has been active, using early lessons from HS2 (and from the completed HS1), to promote UK-based expertise in other parts of Eastern Europe.

Throughout the various stages of HS2's construction and delivery, there are opportunities to develop expertise and to utilise new capabilities to develop the UK's international trade offer.

The UK Rail Export Market today

As the pioneer of railway development, the UK is at the forefront of building new, bigger and better rail systems, as well as managing and enhancing long-established networks. Currently, the UK rail market exports £800 million a year.[11]

The UK's experience of rail privatisation, market liberalisation, and significant investment in rail infrastructure over the last 20 years has fostered an open and competitive marketplace in a demanding domestic market. This has driven new product and service innovation, and uniquely places the UK and UK-based organisations in a great position to assist international rail clients.

11. Taken from https://www.riagb.org.uk/RIA/Newsroom/Publications%20Folder/Oxford_Economics.aspx.

The UK also has a world-class proposition in the areas of infrastructure design and planning, and frequently leads flagship projects overseas, a testament to their output quality. UK design firms have a circa 7% share of the $US65bn global design market, of which circa $13.5bn is transport design. Three UK headquartered technical and design firms rank amongst the top-10 overall design firms, highlighting UK's world-class proposition. Overseas headquartered companies also draw on UK skills to successfully deliver projects worldwide.

As other countries increasingly shift away from lowest first price procurement, the UK's experience and expertise in best-value whole life cost, and in asset management, is becoming progressively more important. The UK excels in skills linked to asset management and remote condition monitoring, which allows railways to develop a smart or intelligent driven regime of maintaining their assets.

The UK has a number of competitive advantages, including:

- Our industry works in a **multi-national** company context (many companies have their European or European/Middle East/North Africa HQs based in the UK/London) and have a track record of collaborative ventures
- The UK does **design and build** on a large scale meaning that procurement practices are very sophisticated, which is exportable
- Public sector clients feel comfortable with private sector delivery – a collaboration that is sometimes regarded as unique, with model behaviour in **procurement**
- A key strength is in the experience of leading multinational integrated consortia/joint ventures (with **English** speaking an advantage)
- Our financial sector is world-leading in terms of **project finance** and **the City** represents an opportunity to secure non-Governmental funding (subject to suitable guarantees). It is highly innovative in areas such as PPPs (a British invention, still routinely used internationally)
- The sector has an exceptionally good health and **safety** record (our railways are much safer than France, Germany and Spain for example)
- We are world-leading in promoting customer-facing private companies in rail service delivery—with a mix of UK-owned and off-shore owned businesses working harmoniously in an **independently regulated system** that provides the 'reasonable levels of assurance' commercial enterprises need—both train operating companies and infracos (such as HS1)
- There is a very significant skills base around **legal** services

- Network Rail's **Digital Railway** programme, using European standards, is already achieving some world 'firsts' such as the automated Thameslink core section

- **Upgrading** old/existing infrastructure in small challenging environments, whilst continuing to operate an intensively-used network, is arguably unique

- There is a lot of **innovation** in project creation and skills development; organisations like Young Rail Professionals (associated members of HSRIL) are able to feed up ideas especially around new tech solutions in the UK—which isn't the case in other countries where the hierarchical structure is stronger—and our SME sector is exceptionally rich and diverse, and we have a **residual research culture** in rail that is currently being expanded

- HS2 is at a leading edge in a number of respects, including designs for future **400kmph** operation

- The UK's approach to quality and **quality management** is unique

- Evidenced by projects such as St Pancras International for HS1, the UK has leading expertise in all aspects of **design**.

Selling HS2-based expertise, step by step

Phase 1: Planning & pre-construction	Phase 1: Construction period	Phase 1: Systems installation and rolling stock procurement	Post Phase 1: Commissioning
Pre-project planning to maintain stakeholder support.	Integration with the national railway—world beating 'brownfield' rail expertise.	Passenger-centred design—rolling stock and stations (ticketing, comms, etc).	Successful major project delivery.
Capturing wider economic benefit.	Integration with regional, city and local transport networks—funding allocations to capture integration opportunity.	Passenger-centred design—intelligent mobility as a service (end-to-end journeys).	21st Century HSR.
Project delivery approach.	Maximising development potential—funding allocations to capture opportunity.	A 'cyber secure' railway.	Transport-orientated development gains—stations become their own destinations.
Procurement models/ approach—D&B, ECI to exact greatest taxpayer benefit.	Access to private finance and novel sources of funding, including from development gain.	A 'quiet' railway.	Legacy and national pride—the envy of the world ('we want one of those').
Shaping the project—by area, by asset type.	Masterplanning the cities to achieve transformational change.	World-class reliability.	Skills.
Open and collaborative working behaviours.	Self-certification in construction.	Fully accessible.	The Eurostar 'Lille' effect on a national scale.
No national 'one-size fits all' approach—independent brokers.	A benchmark in occupational health.	Integrated public/private sector leadership in project and engineering delivery.	Carbon neutrality.
Effectively harnessing 'best' worldwide expertise, through UK multi-national leadership.	Early release of development sites.		A railway for everyone.
Leadership in Health & Safety.	Track technologies.		A connected nation.
Setting new design standards, e.g. design requirements/ specifications for 400kph and off-site build.	The best of neighbours.		Integrated public/private sector leadership in project and engineering delivery.
Engaging the nation and industry—everyone wins, from the city regions to local SMEs.	Logistics expertise.		
R&D 'hot bed'—necessity is the mother of invention—a game changer, driving technology and industry to another level.	Budget and programme-beating through collaborative and incentivized working—joint ownership to deliver projects of this scale.		
Upskilling the national workforce.	BIM (3,4,5...) enabled design and consultation, designing twice, building once/VR in design.		
Whole life cost and value approach and associated asset management costing.	Carbon neutral construction and sustainable resourcing.		
Design visioning—'what good looks like' and standing the test of time.	Integrated public/private sector leadership in project and engineering delivery.		
Integrated public/private sector leadership in project management.			

Opportunities internationally

The world's high-speed rail revolution started in Japan and has since been taken up most extensively in China. After the early success of the Shinkansen in Japan, Europe adopted the new technology and did so country by country with the support of the EU.

The next country to make high-speed rail available to the public was France in 1981; Germany began operation of its Inter-City Express (ICE) high-speed trains through several German cities in 1991. The Eurostar service, connecting Paris to London via the Channel Tunnel, began operation in 1994.

Over the ensuing years, several European countries built extensive high-speed rail networks that include several cross-border international links.

The table overleaf compares countries/economies according to their level of deployment of HSR railways, in order from most development to least, based on data from the International Union of Railways (UIC) and from other sources that provide updated data. A number of other countries are listed as having long-term planning for HSR, but no funding has been allocated to their programs to date. In addition, other sources indicate that some countries have HSR systems in place even though UIC has indicated that they do not.

There are several opportunities currently being pursued by UK suppliers, including:

- On 22 May 2019, Government officials from Poland, Czech Republic, Slovakia and Hungary—known as the Visegrad 4—signed a declaration to build a high-speed rail link between the four countries;

- Thailand is working on the construction of the first section of the Thailand-China railway. The 253-km first phase of the railway links Bangkok with Nakhon Ratchasima province. China is responsible for design of the railway, supervision of construction and manufacturing of trains and signal systems. Once completed, the railway with a maximum speed of 250 km per hour will be the first high-speed railway in Thailand.

Country	Length of lines in operation (km)	Lines under construction (km)	Approved but not started construction	Max speed (kmph)
China	26,869	10,738	1,268	350
Spain	3,100	1,800	0	310
Japan	3,041	402	194	320
France	3,220	125	0	320
Germany	3,038	330	0	300
Sweden	1,706	11	0	205
United Kingdom	1,377	230	320	300
South Korea	1,104	376	49	305
Italy	999	116	0	300
Turkey	802	1,208	1,127	300
Russia	845	0	770	205
Finland	609	0	0	220
Uzbekistan	600	0	0	250
Austria	352	208	0	250
Taiwan-China	354	0	0	300
Belgium	326	0	0	300
Poland	224	0	484	200
Netherlands	175	0	0	300
Switzerland	144	15	0	250
Luxembourg	142	0	0	320
Norway	64	54	0	210
U.S.A.	54	192	1,710	240
Saudi Arabia	0	453	0	300
Denmark	0	56	0	200
Thailand	0	0	615	300
Sweden	0	11	0	205
Russia	0	0	770	250
Iran	0	0	1,351	300
Indonesia	0	0	712	250
India	0	0	508	250
Malaysia/Singapore	0	0	350	250
Israel	0	0	85	250
Portugal	0	0	550	250
Czech Republic	0	0	660	250
Greece	0	500	200	250
Hungary-Romania	0	0	460	250

The Rail Sector Deal

The Rail Sector Deal is a partnership between industry and HM Government to develop benefits for the industry and wider economy, as part of the wider Industrial Strategy agenda.

For the first time, the rail supply chain developed a common strategy to address the industry's priorities and concerns and to position the UK as a global railway leader. As part of the Deal to grow manufacturing capacity and productivity, and to capitalise on export opportunities, it identified a series of core aims. These included commitments to, by 2025:

- More than double exports
- Harness the energy, drive and innovation of smes to meet the needs of the global railway market
- Be a global leader in high-speed rail
- Attract the very best uk talent to create a sustainable skills base and to develop new technologies
- have an entrepreneurial supply chain that constantly innovates to meet customer needs.

Industry has committed to deliver a detailed analysis of overseas rail opportunities and of barriers to taking those opportunities, and of the UK's global competitors. Together with the capability and capacity analysis above, the assessment could:

- Enable the Government and industry to focus effort on the opportunities where uk supply chain strengths best fit demand needs, including on data or digital projects
- Enable the Government and industry to prioritise markets where the combined efforts of the Government and industry can open doors to opportunities that might otherwise be inaccessible
- Create a pipeline of rail opportunities for consideration by the sector and for support through infrastructure exports: uk, and overseas rail market overviews for companies looking to export
- Identify future opportunities that might justify the development of new uk capability
- Identify rail sector issues for prioritisation in discussion about new Free Trade Agreements.

To improve exporting capability, industry will deliver an exporting secondment and mentoring programme. This programme should:

- Improve exporting capability throughout the supply chain
- Facilitate better links between current exporters and non-exporting companies with which they might be able to collaborate on overseas opportunities
- Facilitate use of industry insights in Government delivery of export and inward investment promotion work
- Provide an industry element to Government engagement with governments in key overseas markets.

HS2 is crucial to the delivery of the Rail Sector Deal aims. Its significance to the export sales ambition is already being felt. But it has a wider significance too: releasing capacity on existing lines compounds the scope for conventional fleet expansion to provide better services and relieve overcrowding on existing lines.

5

Driving private sector investment in regional economies

Some critics of HS2 have painted an either/or picture, suggesting perhaps that regional economies would be better served by a renewed focus on urban transit systems and that rather than proceeding with the project in full, it would be better to implement the Transport for the North plan for Northern Powerhouse Rail along with the Midland Connect programme.

But this view misses three important points:

- HS2 is providing a key stimulus to regional economies that in turn strengthens the case for regional (or city-wide) transport investment
- In some cases, HS2 is providing the sought-after links between regional cities: it isn't just a fast link with London
- HS2, where it is built into city centres, will free up capacity for better services on existing lines, especially for commuters.

The regions are crying out for HS2.

The way that HS2 provides the 'missing jigsaw piece' with Northern Powerhouse Rail and the Midlands Rail Engine is illustrated overleaf.

But the most important point of all is this: **HS2 is ready to build** (in phases). It has been through a ten-year planning programme. Projects like Northern Powerhouse Rail—or city-based light rail schemes (which cities such as Leeds sadly lack, despite powers, now lapsed, having been obtained in the early 1990s)—will take many years to reach the same build-ready status. So, these are not alternatives in a sense that have the same bearing on economic performance. And remember, HS2 is attracting private sector investment into our great regional cities already.

HS2 is today facilitating the movement from less productive to more productive jobs (such as advanced manufacturing, automotive, financial services, information technology and biotechnology).

Figure 12: **Joining up Britain; HS2 is the missing piece of the jigsaw.**

On HS2 Ltd's current plan, there are 18 stations with HS2 services in the North; 5 in the Midlands; 3 in Scotland and 2 in London/South east—see Figure 13 below.

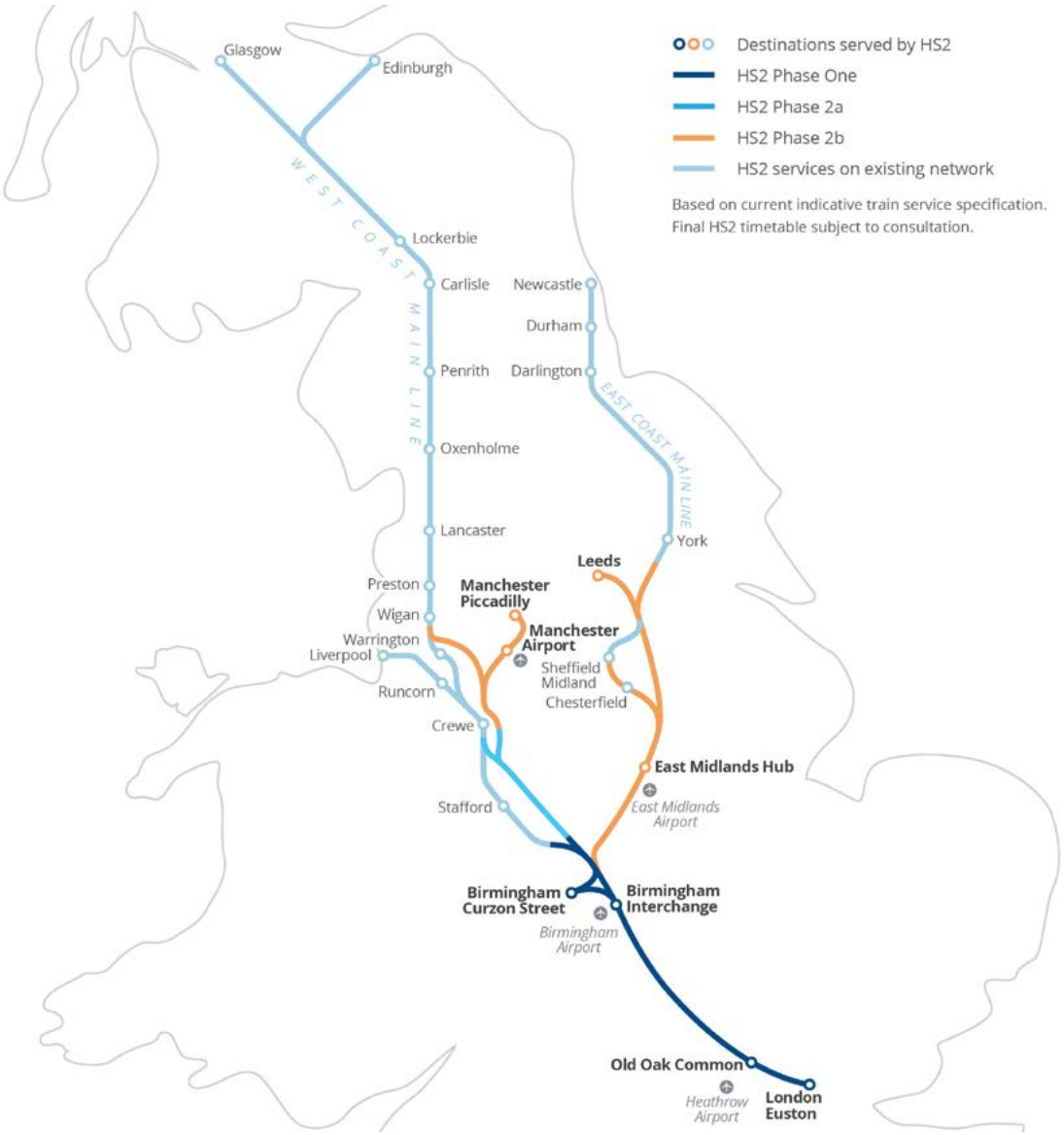


Figure 13: **HS2 network**

HS2 serves a wide number of cities and towns across the Midlands, the North of England and Scotland

HS2 all the way

Large connectivity benefits will flow to these cities that will gain direct HS2 services:

From Phase 1/2a onwards

Birmingham Airport/Solihull, Birmingham, Stafford, Stoke-on-Trent, Crewe, Liverpool, Warrington, Macclesfield, Stockport, Manchester, Wigan, Preston, Lancaster, Oxenholme, Penrith, Carlisle, Lockerbie, Glasgow and Edinburgh

From Phase 2 onwards

Toton (Derby/Nottingham), Chesterfield, Sheffield, Leeds, York, Darlington, Durham, Newcastle.

In each of these places, strategic developments are already at the planning stage. The lesson learned from the French experience with TGV is that local authorities that ignored the arrival of TGV services derived little wider benefit; those that embraced the opportunities its connectivity gains offered gained a positive economic impulse. And just as happened in France, development investment stares around 7 years ahead of service commencement.

Birmingham and the wider West Midlands economy

Birmingham Curzon Street Station, one of the planned HS2 stations for Phase One of the Project, sits at the heart of the UK's new high-speed route. It unlocks significant housing and employment development and is already bringing forward investment and regeneration opportunities to facilitate the city's growth.

Curzon Street Station will create construction and operational employment and the wider Curzon Masterplan supports 600,000sqm of employment generating uses, over 36,000 additional jobs and up to 4,000 new homes. The Masterplan will also create an estimated £1.4 billion of GVA per annum.

The establishment of Curzon Street Station strengthens the potential for regeneration opportunities surrounding the station including key developments at Paradise Circus (162,000sqm office and 11,000sqm retail & leisure uses), Arena Central (93,000sqm mixed-use development) and the Colmore Business District.

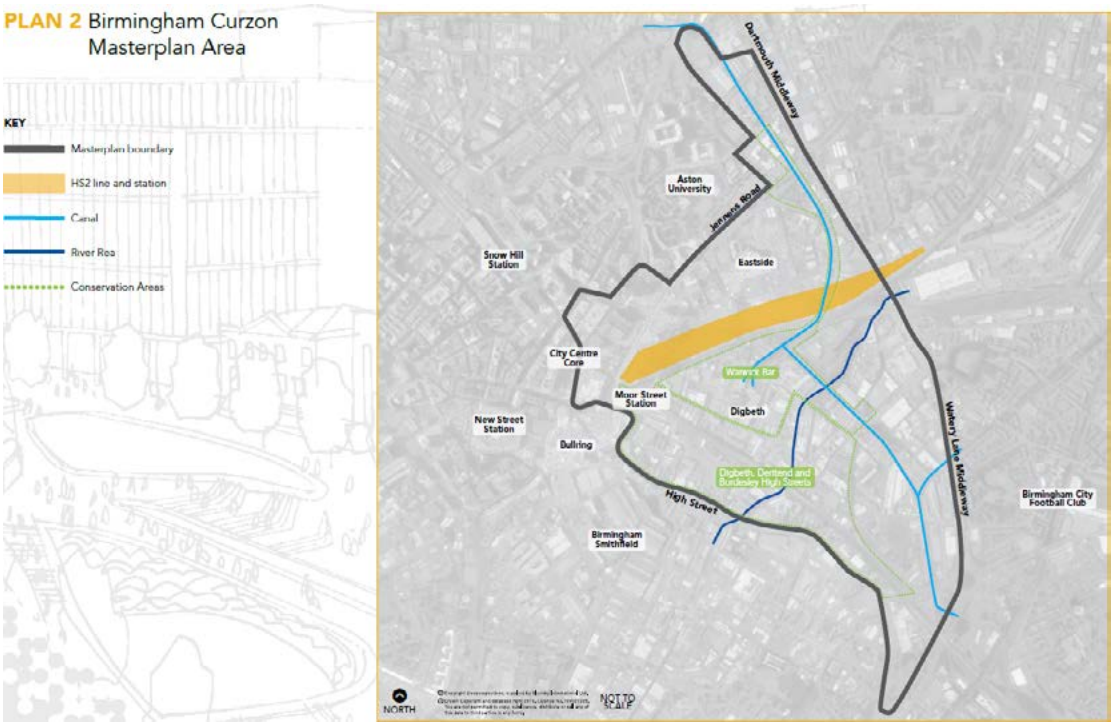


Figure 14: Birmingham Curzon Masterplan Area Source: Birmingham City Council, (2015); Birmingham Curzon HS2: Masterplan for growth.

One of the UK's largest regeneration opportunities, the Birmingham Smithfield development, will be located within ten minutes' walk of the station. The development will include 300,000sqm of employment floorspace for markets, culture, retail and leisure uses, 2,000 new residential units and sustainable, green space.

The impending arrival of HS2 has been a major factor in attracting major business to the City. HSBC opened its headquarters in Birmingham in 2018, currently employing circa 2,500 employees while PwC is making Birmingham its regional headquarters taking the entire commercial office space at One Chamberlain Square, with circa 1,000 employees.

The delivery of Curzon Street Station will also increase connectivity to Birmingham City Centre through the provision of better links to Birmingham Airport and London, which will stimulate growth opportunities in surrounding areas, particularly in East Birmingham and North Solihull.

Midlands Connect has published its plans for new rail services centred on Moor Street station which is adjacent and directly linked into Curzon Street. Together the development of these new services and HS2 services will create the Midlands Rail Hub. New direct trains from locations such as Hereford, Worcester and Leicester will add to the vitality of this new regeneration opportunity. What is happening today in Birmingham is starting to show as well across the other cities that HS2 will serve—both directly and indirectly.

Figure 15: **Birmingham Moor Street station (right) with its connection to the HS2 station (Curzon Street, left)**

East Midlands

The East Midlands Hub Station will be a new high-speed rail station built on existing railway land at Toton, located between Nottingham and Derby. Its strategic location, serving the whole of the East Midlands region will unlock significant additional jobs and growth opportunities, with the new network potentially contributing to the equivalent of 74,000 additional jobs and almost £4 billion of GVA by 2043.

Two specific growth zones will significantly benefit from HS2 connectivity. The East Midlands Hub Growth Zone which surrounds the Hub station at Toton will benefit through the establishment of a new **"innovation campus"** while the North Derbyshire Growth Zone will seek to transform links between Chesterfield railway station and the town centre, alongside a Staveley depot that will feature mixed-use housing and employment development.

The HS2 station will unlock up to 10,000 high quality jobs through the establishment of a new innovation campus. These jobs would be based in offices for high-growth businesses and laboratories building on universities' research in areas such as bioscience, energy and medicine—while about 500 homes are also planned in a major redevelopment on the site.

Surrounding the site would be a chain of **"garden villages"** in Nottinghamshire and Derbyshire, accommodating between 10,000 and 15,000 homes on mainly brownfield sites, including at Chetwynd Barracks once it has closed and in Stanton, near Ilkeston—each site providing hundreds of homes, community facilities and employment sites.

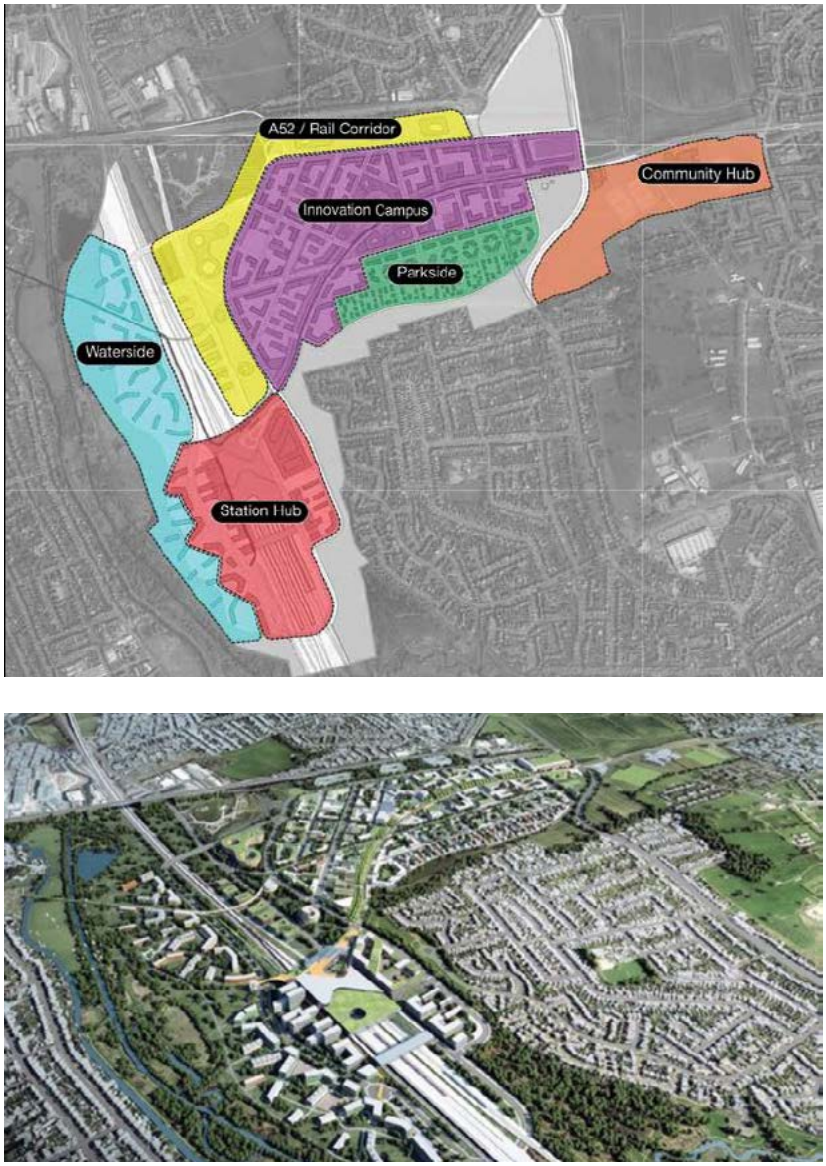


Figure 16: Toton Area (Hub Station) Development

Source: East Midlands HS2 Growth Strategy

The East Midlands Hub station will be the most well-connected on the high-speed network outside London, with plans to strengthen local links to Nottingham and Derby city centres, including a 10-minute shuttle train service to Nottingham railway station, as well as connecting with East Midlands Airport—and potentially Kirkby in Ashfield and Mansfield too.

The North of England

HS2 and Northern Powerhouse Rail (NPR) are being planned together, which is why discussion on which project is preferred always draws the same response: they are both needed.

Some of the specific arrangements for inter-connecting the two projects are now in public consultation. Two are of particular importance since they would allow for:

- The creation of a new route from HS2 via Warrington to Liverpool; and
- The use of HS2 infrastructure by NPR trains between Liverpool, Manchester Airport and Manchester Piccadilly (and cities to the east such as Leeds and Newcastle).

Crewe will be reached by HS2 in Phase 2a, and will be the first station in the North to be rebuilt to accommodate HS2 services. While the full HS2 project is needed to deliver all of its benefits, it should not be overlooked that cities such as Manchester, Liverpool and Glasgow will get new HS2 services from the start of operations under Phase 1/2a, with very substantial journey time benefits for travel to London and Birmingham. But Phase 2b is needed before places to the east of the Pennines benefit and capacity relief is extended to the Midland and East Coast Main Lines.

City leaders with whom HSRIL has discussed the project in general understand the need to phase the implementation of HS2. But two points are often made to us:

- There is no reason why some of the construction could not 'start in the North'—for instance that needed between Leeds and Sheffield—as a phased implementation of an overall agreed plan
- Phasing is acceptable as part of implementing the overall programme because then it builds certainty and investor confidence.

Wales

Wales is served by a main railway line along the North Wales coast from Holyhead and Bangor to Chester and Crewe. Crewe will be 55 minutes from London when Phase 1/2a opens, creating a transformation in accessibility by rail to/from North Wales.

And with most of today's fast intercity services taken off the West Coast Main Line, the scope to re-introduce a direct London-Aberystwyth service can be reconsidered, a service that provides connectivity for the key route across mid Wales.

Suggestions in some quarters that Wales gets no benefit from HS2 are wide of the mark. Both North and mid Wales benefit strongly.

In October 2017, Government committed £300m to integrate NPR and HS2, thereby reducing the amount of infrastructure required to deliver the NPR network and avoiding disruption to HS2 in the future. Following technical design work, we are now consulting on two of these interface points. These are in line with TfN's proposals for NPR and are included in TfN's Strategic Transport Plan2 which was formally adopted by TfN in February 2019.

The Government has been working with TfN and HS2 Ltd to integrate the designs for a series of **"touchpoints"**, which are pieces of infrastructure to enable future connections between NPR and HS2 to future-proof the Phase 2b route for NPR. In the 2017 Budget, the Chancellor granted additional funding to ensure HS2 infrastructure can be built to accommodate future NPR and Midlands Connect services.

The Secretary of State has decided to consult on the provision of two touchpoints for NPR within this consultation. These will facilitate future junctions that could connect to a potential new line from HS2 towards Liverpool. One junction would allow future Liverpool Manchester NPR trains to use the HS2 line into Manchester; the other would allow future London-Liverpool HS2 trains to use any future new NPR route into Liverpool. This would enable improved capacity and connectivity between Liverpool, Warrington and Manchester Piccadilly while significantly reducing journey times between Liverpool and Manchester Airport, and a faster route between Liverpool, Warrington and London.

Source: https://www.gov.uk/government/consultations/hs2-phase-2b-design-refinement-consultation.

Scotland

HS2 brings huge benefits for Scotland. Recent Transport Scotland studies into creating faster links by rail across the central belt and to the South to link with HS2, have shown the potential to get Glasgow/Edinburgh–London journey times closer to the 3-hour target set by Westminster and Holyrood Minsters in 2016.

The recent Glasgow Connectivity Commission provided a further stimulus by identifying how Central station could be developed to accommodate 400m long HS2 trains.

Ministers Brown and Goodwill sign up to the best value from HS2 at Waverley station Edinburgh, 2016 (photo Jim Steer)


Tree planting image?

6

The environmental contribution of HS2

HS2 will provide a national transport system for the 21st Century—one that delivers large-scale social and economic benefits. Once built, HS2 is also part of the solution to move to a zero-carbon future.

With electrical power generation de-carbonised, HS2 provides a major capacity uplift to the electrified part of the national rail network. So it has an important role to play in meeting the Government's 2050 carbon reduction targets, (currently a commitment to an 80% reduction on 1990 levels, and potentially to achieve zero carbon by the same year).

HS2 will deliver a range of carbon reduction benefits:

- Allowing for more freight/goods to be transported by rail rather than HGV/other road;
- Increased network capacity means higher level of modal shift from private car and air travel to rail;
- The carbon benefits of HS2 will increase as the national grid is decarbonised in line with government strategy (i.e. the move to renewable energy/nuclear); and
- Carbon benefit of planting trees (7 million trees for Phase One).

Our transport system is at capacity; we need expansion of public transport, particularly railways, to help avoid the congestion that damages business efficiency and exacerbates environmental impacts. Expanding existing railways is helping, but in the long term this will not be enough, will not always offer value for money, and will cause delays and disruption.

We need to give people a viable low carbon alternative to air travel and car for longer distance national travel between the major UK urban centres. HS2 will provide significant extra capacity for passengers and freight within the UK (and also to continental Europe), along with other significant predicted national and local economic benefits that will come from a more even distribution of the UK's wealth, which is currently centred in the South East.

Providing the capacity for travel between our key centres opens the door to avoid the congestion that is constraining the roads and existing railways and so unlocks the catalyst for regional regeneration.

High-speed rail has lower emissions than other modes of transport. Even on current estimates for 2030, with electrical power generation only partially de-carbonised, high-speed rail has emissions per passenger-km that are only 36% that of conventional rail, only 12% of those incurred by private car use and just 5% of those generated by air travel[12]. While some improvements might be expected between 2030 and 2050 in reducing emissions from cars and from air travel, **high-speed rail travel—with electrical power generation fully decarbonised—will be a carbon zero activity**. Combining this with the significant passenger capacity of HS2 makes it an incredibly effective transport solution in environmental terms.

HS2 will significantly expand the proportion of travel that is electrically powered; whereas there is (as yet) no plan to provide the infrastructure necessary to electrify the national private car fleet (over 30 million vehicles), and testing of hybrid and battery powered aircraft is only at an early developmental stage. Britain simply needs a better balance between domestic aviation and increasing rail use as research by Eurostar shows carbon emissions on a 2-hour high-speed rail journey can deliver a carbon saving in excess of 90% compared to flying the same route with today's technology.

Balancing the various economic, social and environmental demands requires a clear judgement of our national needs. As former HS2 Ltd Chairman, Sir David Higgins, said:

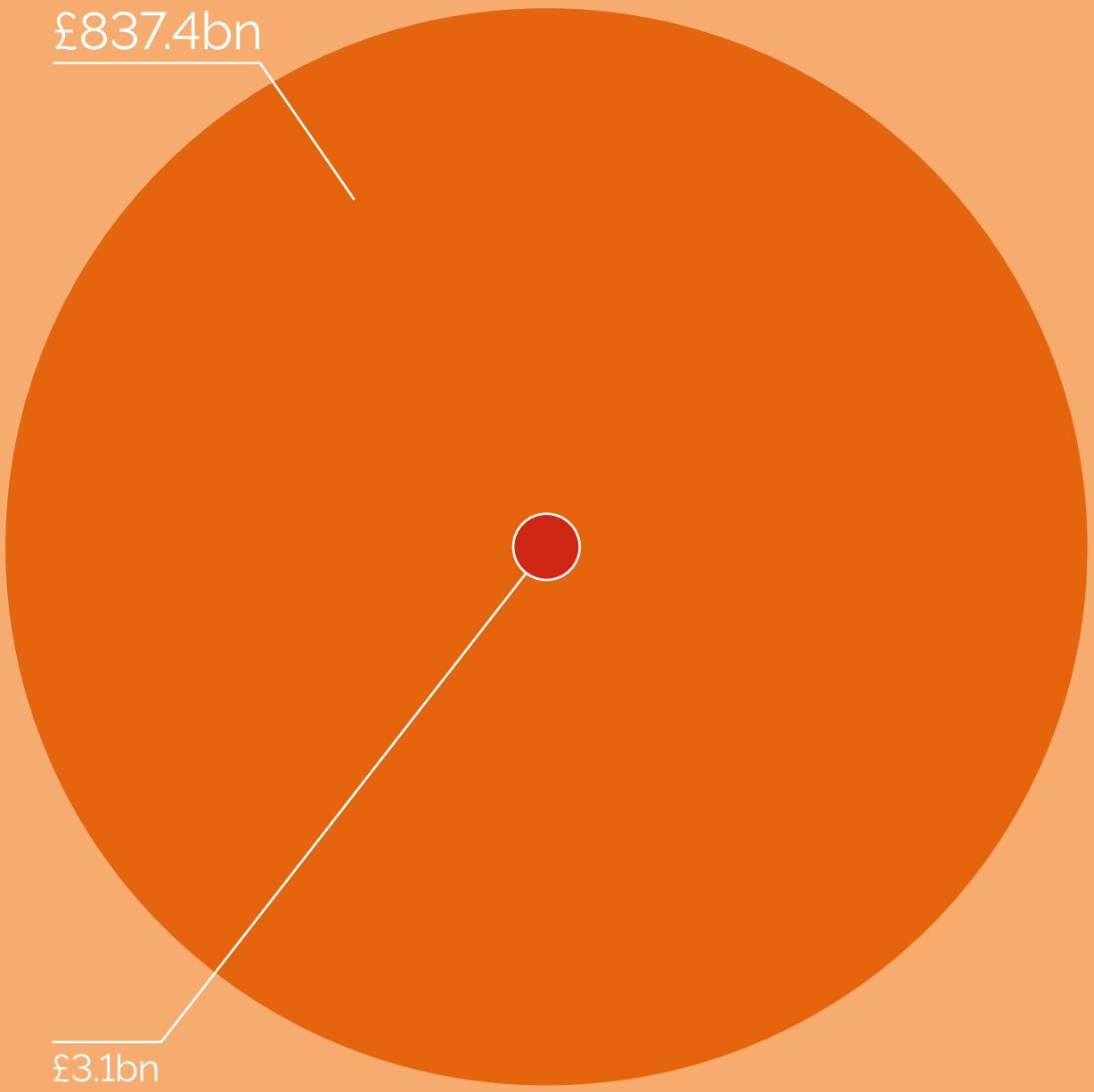
> **"The environmental challenge facing any proposal to enhance transport links on that corridor is daunting. But we should, as a nation, be prepared to undertake a sober, considered and ambitious conversation about how to release untapped economic prosperity in the North, to strengthen prosperity while protecting its valued environment."**[13]

HS1 has shown us that we can build a high-speed line successfully. It is fact that the steady stream of public complaints about the noise impacts of Eurostar trains when they operated over existing lines across Kent in the 1990s, disappeared totally when Eurostar was switched to operating over HS1 where noise mitigation measures were more than enough to outweigh the impacts of much higher operating speeds.

12. Rebalancing Britain: From HS2 Towards a National Transport Strategy, David Higgins.
13. Ibid.

HS2 became the UK's first infrastructure project to be awarded a BREEAM (Building Research Establishment Environmental Assessment Method) Infrastructure (pilot) Scheme Certificate for its ambitious sustainability strategy on Phase One of the project. It includes features such as working in harmony with communities, putting health and wellbeing at the heart of the project, and building economic benefits for the UK, such as skills and job opportunities. HS2 was the project first to engage with BRE in the development of BREEAM Infrastructure, working with BRE to pioneer a new approach to a sustainability strategy. The assessment shows that HS2 is committed to going beyond enhancement and protection of the environment, but also sets the standard for creating the most sustainable high-speed railway of its kind in the world.

There's a popular Chinese proverb that says: **"The best time to plant a tree was 20 years ago. The second best time is now."** When is the best time to prepare for our future?


£837.4bn
£3.1bn

7

A proportionate and managed budget

HS2's cost, as currently budgeted is around £3.1bn **per annum**[14] over the next 15 years (2020–2035). This represents only 0.4% of the UK's estimated annual public expenditure budget of £837.4bn (based on 2020 expenditure profile).

Of that overall expenditure, transport in total accounts for only 4.25%, ranking 8th out of the 10 main expenditure items. We spend £17.5bn less on transport than we do on interest to finance the Public Net Debt (£35.2bn vs £52.7bn).[15]

In the period when transport funding needed a boost, ahead of last year's October budget, it was announced that, for the ninth year in a row, fuel duty would be frozen, which the Institute for Fiscal Studies think-tank estimated costs the Treasury about £9bn a year. HSRIL believes there needs to be a better balance between fuel duty freezes and the need to cover the annual cost of HS2, NPR and Crossrail 2 put together[16], which which is roughly the same amount.

14. National Infrastructure Commission, National Infrastructure Assessment, July 2018.
15. https://www.ukpublicspending.co.uk.
16. https://www.google.co.uk/amp/s/amp.theguardian.com/politics/2018/oct/03/theresa-may-pledges-to-freeze-fuel-duty-for-ninth-consecutive-year.

HS2's Spend Profile in Context

The Table below summarises the spend profile of HS2 over the life of the programme.

	2009–2016/17	2017/18	2018/19	2019/20	2020–2025	2025–2030	2030–2035
Spend (£bn)	**2.3**	**1.82**	**3.06**	**4.2**	**4.5**	**3.9**	**0.9**
Notes	(3) (4)	(3) (5)	(3) (6)	(3) (6)	(7)		

Notes:

(1) Sourced from HS2's annually published Corporate Plans as referenced in the House of Commons Briefing Paper (No. CBO 8071), High Speed 2 (HS2) Phase 2b and beyond, dated 18 September 2018

(2) Government response to written question, 16 March 2018

(3) Actual from HS2's 2018–20 Corporate Plan

(4) Forecast from HS2's 2018–2020 Corporate Plan (which also includes a forecast for 2020/21 of £4.82bn

(5) Average annual expenditure over the 5-year periods, sourced from (1), and in 2018/19 prices Connecting people: a strategic vision for rail, presented to Parliament by the Secretary of State for Transport, November 2016.

(6) ORR

(7) Average annual expenditure over the 5-year periods, sourced from (1), and in 2018/19 prices.

To put this into context, Network Rail's CAPEX spend in Control Period 6 (CP6-2019-2024) is £15bn or on average £3bn per annum as illustrated in Figure 17. It should be noted that the CAPEX figure is for renewals only and therefore excludes enhancements. The overall CP6 budget is £48bn which is itself over £10bn greater than the CP5 budget. This budget includes a provisional cost allowance of around £10bn for future enhancements subject to a Department for Transport business case process to secure the additional funding. As we go into CP7 and CP8, Network Rail CAPEX spend on renewals continues to rise as shown below, with CAPEX spend in CP8 (2029–2034) reaching around £21bn or on average £4.2bn per annum.

Trying to expand capacity on an already heavily used rail network operating within existing route corridors is a major undertaking, the cost of which is not just in the CAPEX but in the disruption to passengers with potentially considerable delays during the work.

Expanding capacity on the existing network is highly constrained. A step change is needed to make additional provision through new sections of route, freeing up capacity on the existing network for local services and freight. That is what HS2 provides. Meanwhile, today's network needs to be renewed and where possible modernised.

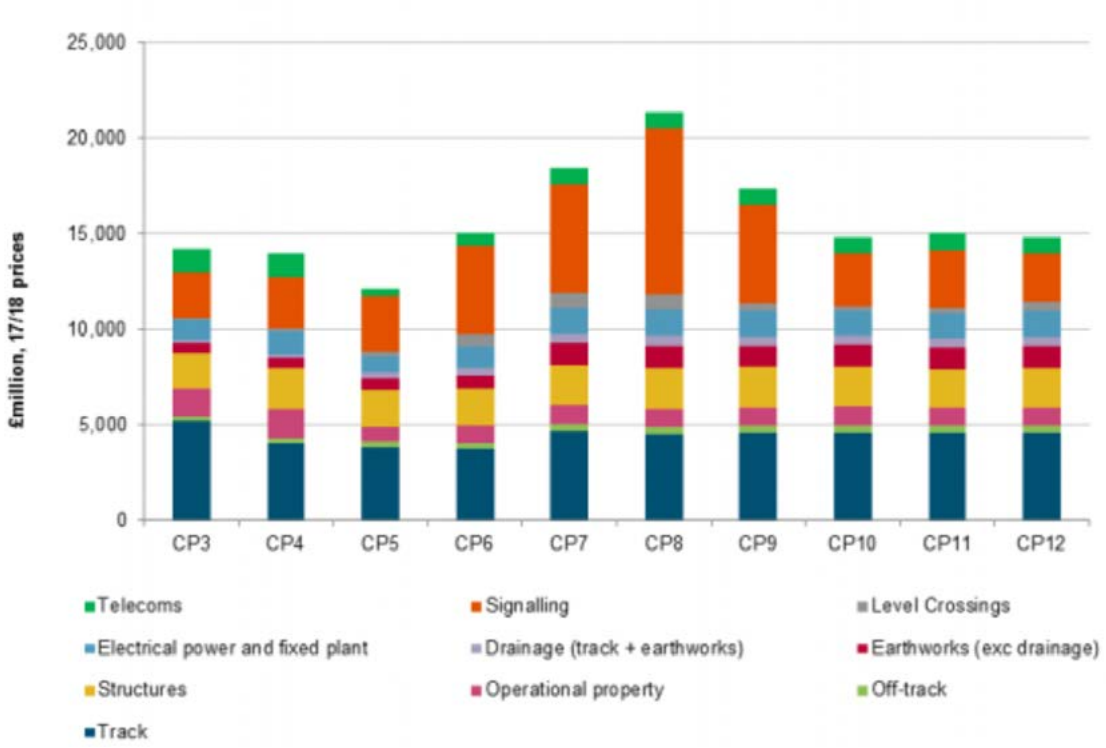


Figure 17: **Network Rail capital expenditure programme by control period**

HS2 Scrutiny and Governance

A major project such as HS2 is the subject of extensive oversight and routine review, through:

- The Hybrid Bill process, including Parliamentary review through both Houses of Parliament
- DfT oversight of HS2 Ltd, including with a Project Representative (P-Rep) and through Notification to Proceed stage gateways
- Transport Select Committee
- National Audit Office reviews

- National Infrastructure Commission major projects annual review
- IFA review
- Public Accounts Committee
- Transport Infrastructure Efficiency Strategy.

The Potential to Recover the Public Sector Outlay

While HS2 represents a significant investment by the UK Government, it should also be recognised that in future there may be the opportunity to recover that outlay by adopting the approach followed for HS1.

In 2010, the Government was able to recover a significant part of its investment when the operation of the HS1 infrastructure was sold on a 30-year concession for £2.1 billion to a consortium of Canadian investors. This did not include the freehold (which remains with Government). This concession was in turn acquired by another consortium in 2017. HS1 Ltd, under the concession, has the rights to sell access to track and to the four international stations (St Pancras, Stratford, Ebbsfleet and Ashford) on a commercial basis, under the scrutiny of the independent Office of Rail Regulation. At the end of 30 years, ownership of the assets will revert to Government.

The £2.1bn payment was equivalent to about one third of the Government outlay on the project. Given that HS2 is expected to be more intensively used than HS1, and that the train paths will offer greater commercial value than those operated over HS1, the scope for cash returns to the Treasury from HS2 may be judged to be considerable. Of course, if the project was to be abandoned (or cut back) this financial prize would be lost (or curtailed),

8

Conclusions

What would happen if HS2 were to be cancelled now?

Some impacts are certain:

- 9,000 people working on the project today would be out of a job
- Jobs in the supply chain, including in train manufacturing sites across Britain—for high-speed trains and for new trains needed to make use of the capacity that HS2 will release on the existing network—would all be lost
- The development strategies and private sector investments building up in Birmingham, in the East Midlands; in Manchester, Liverpool, York, Darlington, Newcastle and Leeds; in key cities across Lancashire, and in Crewe and across the key industrial Mersey-Dee area that straddles the North Wales/England border, would disintegrate
- The economic stimulus that HS2 is already giving to the economies of the Midlands and the North of England would be lost
- The prospect of curtailing short-haul domestic air travel (especially between Glasgow/Edinburgh and London) would be lost
- The scope to switch significantly more long-distance road freight to rail would be lost
- There would be greater pressure on the M1, M40, M6 motorways
- The scope to realise the vision of the Rail Sector deal as part of the national industrial strategy would be severely damaged
- Plans for Northern Powerhouse Rail, linking the northern cities and for Midlands Connect with its new rail hub, would have to return to the drawing board: both are predicated on HS2

- The opportunity to return a significant proportion of the project capital outlay in HS2 to HM Treasury (as was achieved with HS1, just three years after it opened for business) would be lost: few if any other capital expenditures offers a prospect of generating a positive cash revenue stream.

Others are likely:

- Travel restrictions—probably enforced by fares increases—would be needed on North–South intercity trains and on commuter trains in the South East and Midlands—which would be inevitably and perpetually very crowded at peak times
- The prospect of higher levels of productivity in the English regions that stand to benefit most from HS2 will most likely disappear
- An increase in carbon emissions from transport (which accounts for a third of the nation's greenhouse gas emissions)
- A loss of confidence among investors in the UK in general and in engineering businesses at such a high-profile reversal of the policy of successive governments breaking the continuity needed to implement strategic planning choices
- While other ambitions that might be hoped for may not or will not come to fruition:
- A transfer of the funding for HS2 to other projects (such as urban transport or hospital/school building) is unlikely to follow and even if it did, HS2 has a ten-year lead time advantage in terms of implementation timescales
- The money that has been spent on the project (of no concern famously to economists—'sunk costs') cannot be returned.

HS2, Northern Powerhouse Rail or both?

In 2015, Government and partners in the North of England published a joint Northern Transport strategy—'The Northern Powerhouse: One Agenda, One Economy, One North' which showed HS2 to be an integral part of a shared vision between Government and Transport for the North to support the creation of the Northern Powerhouse.

In June 2019, the Department for Transport initiated a public consultation on Phase 2B of HS2 and showed how it planned to accommodate Northern Powerhouse Rail services between Liverpool, Manchester Airport and Manchester (and thence onwards to Leeds and Newcastle) using the HS2 route planned to serve central Manchester.[17] The 'eastern limb' of HS2 provides a new fast connection between Sheffield and Leeds, which is another high priority city-city pairing in Transport for the North's plans.

17. See [web ref] which also showed how a connection would be accommodated to provide a new faster route Warrington for London HS2 services from Liverpool.

HS2, as planned, provides key elements in the North's ambitious plans to transform the northern economy by creating transformed fast and reliable connections between the North's major cities. So HS2 is central to the Northern Powerhouse ambition, and not an alternative to it—see Figure 18.

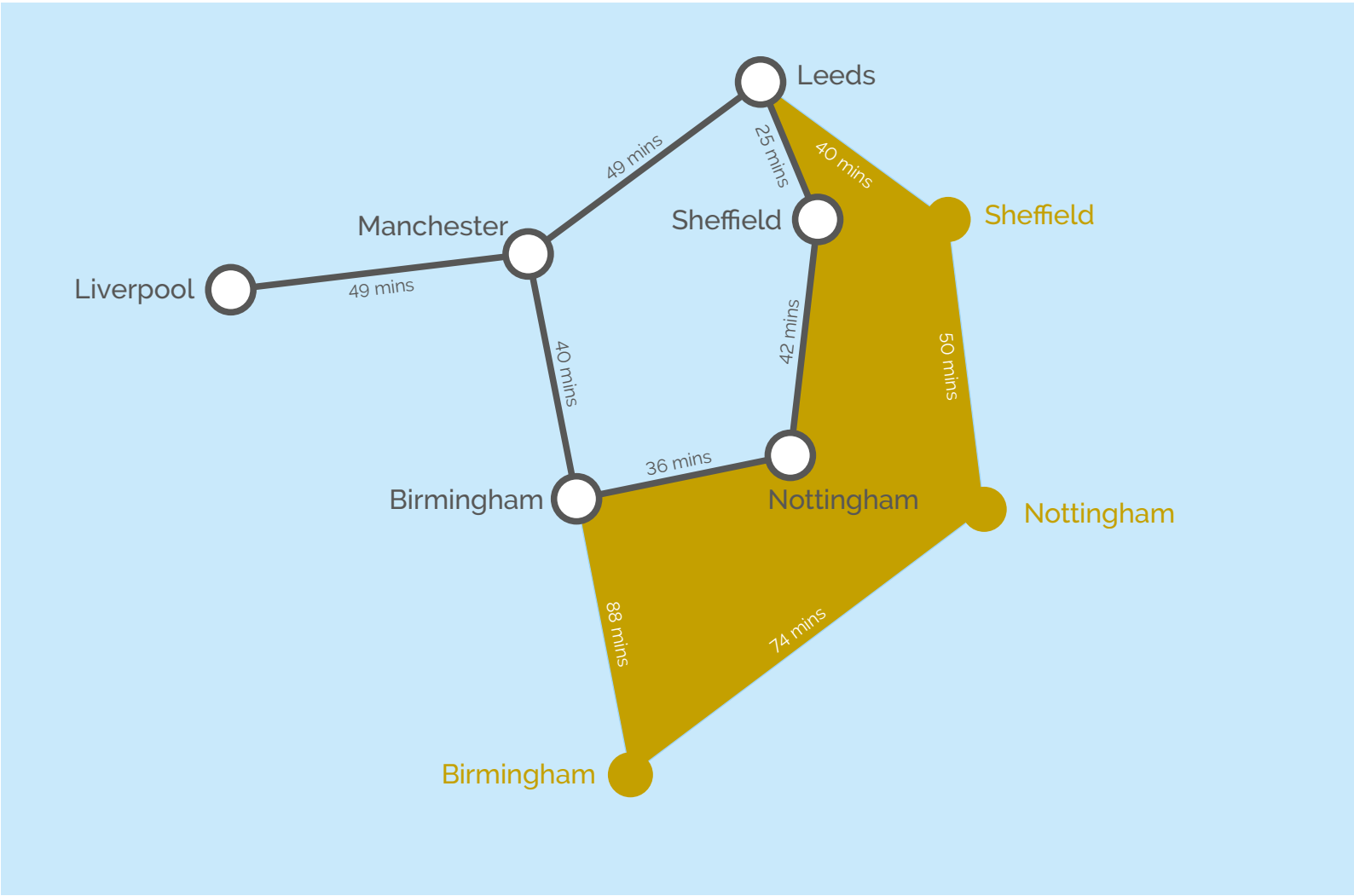


Figure 18: **HS2 shrinks the geography of the Midlands and the North**

Yet the importance of North–South links to the nation's capital cannot be overlooked. The volume of rail business trips between London and Manchester, the largest intercity business flow, is nearly six times bigger than the largest non-London business flow (which is between Glasgow and Edinburgh). The London-Manchester business flow is eight times bigger than the business flow between Manchester and Leeds. The London–Leeds business flow is four times that between Leeds and Manchester.

As well as improving links to and from London—a truly global city that presents unparalleled access to an international marketplace—HS2 has an important role to play in supporting the vision to create the Northern Powerhouse. Alongside other projects HS2 will help to bring together city regions in the North. Changing their economic geography will help create the economic mass needed to better compete on the global stage.

The Midlands too

The long-term transport strategy of the Midlands Connect Partnership, launched in October 2015, has equivalent aims and principles, placing a strong emphasis on better connectivity, both via HS2 and across the Midlands more generally. Therefore, HS2 has become an integral part of the shared vision between the Government, Transport for the North and Midlands Connect.

The aim of High Speed Rail Industry Leaders is to support, promote and champion the principles of high-speed rail in the UK. Our members come together to coordinate and share expertise and experience within the industry and help assure that Britain's national high-speed rail network is delivered successfully to world-class standards.

A list of our current members, and details of how to join can be found here:

www.rail-leaders.com

You can follow us on Twitter: **@RailLeaders**

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