

# Fast Track Scotland

Making the Case for High Speed Rail Connections with Scotland





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# Ministerial Foreword



The argument for a high speed rail network in the UK is strong, but is stronger when Scotland is included. That is the clear message from this report, published by Scotland's Partnership Group for high speed rail.

Scotland stands together in its support for high speed rail. The Partnership Group brings together colleagues representing the broadest spectrum of Scotland's interests. It speaks for communities and business across Scotland's diverse geographical and economic landscape.

We see the benefit of high speed rail to Scotland. It will stimulate our industry sectors and improve Scotland's attractiveness to inward investment.

And, we are convinced of the benefit of Scotland's inclusion to the rest of the UK. Better connections with Scotland's strong economic sectors will benefit cities across the UK. High speed rail will substantially reduce the need for domestic aviation between Glasgow, Edinburgh and London; the potential for environmental benefits is huge.

I established the Scottish Partnership Group to develop and promote Scotland's case for inclusion in a UK-wide, strategic high speed rail network. It has done so in a spirit of close co-operation and with a clarity of purpose, and it has set challenges for both the UK and Scottish Governments. I thank all of those involved.

I endorse this report, and I am pleased to present it on behalf of the group.



**Keith Brown MSP**  
Minister for Housing and Transport



- **Scotland stands united in support of high speed rail. It is vital that a high speed rail network be established across the UK to secure its future competitiveness and economic prosperity.**
- **The investment case for high speed rail is strong, but is stronger when Scotland is included.**
- **Scotland supports a high speed rail strategy which brings Edinburgh and Glasgow closer to London and the UK's great cities, and which preserves and enhances aviation links with London's airports for the north of Scotland.**
- **A new high speed line must be built to Scotland to realise the fullest economic and environmental benefits for the UK.**

This report sets out Scotland's case for high speed rail. It has been prepared by the Scottish Partnership Group for High Speed Rail, formed by Keith Brown MSP, Scotland's Minister for Housing and Transport, in June 2011. The group has been established to develop and promote Scotland's case for inclusion in a UK-wide, strategic high speed rail network, and comprises partners from across Scotland's Business, Civic and Transport Communities. It speaks with one voice in its support for Scotland's inclusion in a full British high speed rail network.

The Scottish Partnership Group brings together the following organisations:

- CBI Scotland
- City of Edinburgh Council
- Glasgow City Council
- Glasgow Edinburgh Collaboration Initiative
- Nestrans
- Network Rail
- Scottish Chambers of Commerce
- Scottish Council for Development and Industry
- Scottish Enterprise
- Scottish Futures Trust
- Scottish Trades Union Congress
- SESTran
- Strathclyde Partnership for Transport
- Transform Scotland
- Transport Scotland

The group's principal conclusion is that the investment case for high speed rail is strong, but is stronger when Scotland is included.

This report demonstrates the clear benefits which Scotland's inclusion in a full UK high speed rail network could bring for the whole of Scotland. It also demonstrates the benefits to the rest of the UK when Glasgow and Edinburgh are directly connected to the network, and that Scotland's inclusion improves the overall business case for high speed rail in the UK.

A high speed rail link to Scotland provides significant economic and environmental benefits to Scotland and the rest of the UK. It will:

- Increase rail capacity to comfortably accommodate future demand
- Significantly reduce journey times between Scotland and the UK's major cities
- Encourage modal shift from air and road to rail
- Support and benefit businesses throughout Scotland and, in particular, enable Glasgow and Edinburgh to remain competitive in attracting inward investment.

However, it is not only the scale of the benefits but the timing of when they are delivered that is important. It is essential that Scotland is included in the construction programme north of Birmingham.

Therefore, it is the position of the Scottish Partnership Group that planning for high speed rail in the UK does not go far enough; planning must continue beyond Manchester and Leeds. The remit of HS2 Ltd<sup>1</sup> must be extended to include detailed planning for high speed rail to Scotland.

This report recognises that demand for long-distance rail travel continues to grow, and that without additional capacity the UK rail network will be severely constrained. With appropriate integration with the existing network, high speed rail will deliver better rail connections for all of the country.

A high speed line to Scotland is required. Only a new line will deliver the benefits that Scotland needs, and deliver journeys fast enough to ensure that rail replaces aviation's dominance of the Scotland-London travel market. Although there are carbon impacts in the construction of any new line, the inclusion of Scotland in the UK's high speed rail network is essential for realising significant reductions in UK carbon emissions and is vitally important in achieving major levels of modal shift from air to high speed rail.

Only rail journeys significantly below 3 hours will achieve this objective. It is unclear that the proposed operation of 'hybrid' or 'classic-compatible' trains running to Scotland on existing lines will deliver journey time improvements for Anglo-Scottish services.

Similarly, it is vital that a new line releases additional rail capacity for both freight and regional passenger services. Routes to Scotland are significantly constrained; running 'hybrid' trains will not improve that position.

Inclusion in a UK high speed rail network will allow Scotland greater economic equity with other areas of the UK. If Scotland is not included Glasgow and Edinburgh will be comparatively further away, in terms of journey times, from London than their main competitors who are served by high speed lines.

It is imperative that high speed rail is developed in the UK. It is also imperative that Scotland is included if the UK is to see the full benefits of its contribution to the economy.

<sup>1</sup> High Speed Two Limited (HS2 Ltd) is the company set up by the Government to consider the case for a new high speed rail network in the UK. It is charged with developing recommended routes between London and the West Midlands, and onwards to Manchester and Leeds.



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## 1.1 High speed rail is needed in the UK

DfT and HS2 Ltd argue that “for the UK and its major cities to compete effectively in the 21st century, it is vital that the right infrastructure is in place”<sup>2</sup>. A high speed rail network will form a key part of this infrastructure.

The rail network in the UK faces sharp increases in demand resulting in increased pressure on rail capacity and increased crowding on services. Between 1994/95 and 2009/10, total passenger journeys rose by 71%, from 735 million to 1,258 million<sup>3</sup>. The fastest growth of all has been in demand for long-distance travel, with long-distance journeys more than doubling in this period.

### Key Message

Demand for long-distance rail travel continues to grow, and high speed rail will deliver better rail connections for all. Without additional capacity the UK rail network will be severely constrained.

The ability to meet the rising levels of demand by running additional services and longer trains is significantly reduced as the use of the network increases. Consequently, forecasts show that key rail routes in the UK will be full in peak periods over the next 15-20 years. Despite the West Coast Route Modernisation programme providing increases in capacity, services are regularly found to be overcrowded. Network Rail has come to the conclusion that “the West Coast Main Line, particularly at the southern end of the route, is effectively full [by 2024] and subsequent additional capacity could only be provided by exceptionally expensive infrastructure solutions”<sup>4</sup>. These findings are supported by Atkins (2008) who forecast a growth of 104% from 2006 to 2026 on the West Coast Main Line. The East Coast and Midland Main Lines are also suffering from overcrowding, with Atkins (2008) estimating a growth in passenger demand of 69% on the East Coast Main Line over the period to 2026.

This increased pressure on capacity will have consequences for reliability and punctuality, both of which are highly valued by passengers. As the number of services using the existing network increases the ability to maintain current levels of punctuality and reliability will diminish.

<sup>2</sup> HS2 Ltd (2011a)

<sup>3</sup> Department for Transport (2010a)

<sup>4</sup> Network Rail (2010)

### Key Message

Scotland stands united in support of high speed rail. It is vital that a high speed rail network be established across the UK to secure its future competitiveness and economic prosperity.

A further challenge to the UK is its dependence on oil to fuel its transport. Currently 98% of the fuel used for transport is oil-based. In the short to medium term the UK economy is sensitive to the price and availability of oil, while in the longer term the UK faces the prospect of having to find alternative sources due to the finite supplies of oil. Consequently, high speed rail can provide a viable alternative to car and air travel on key routes thus helping to secure our future transport options.

The final point is particularly relevant for Scotland given its geographical position. A high speed rail network is key piece of infrastructure which will increase the accessibility of Scotland, offering a step-change improvement in connectivity with the rest of the UK and Europe.

## 1.2 The benefits of a UK high speed rail network which includes Scotland

A high speed rail network which includes Scotland offers an opportunity to transform the transport system in the UK, helping to meet the challenges outlined above as well as creating a wide range of benefits.

### Key Message

The investment case for high speed rail is strong, but is stronger when Scotland is included. This gives a better return to the UK economy and its taxpayers.

In August 2009 Network Rail published their *New Lines Study*<sup>5</sup> which examined options to deal with increased capacity constraints on the existing UK rail network. The report concluded that a new line, capable of carrying high speed trains, would provide additional capacity in two ways: by providing capacity on the new line, and by freeing capacity on the existing 'classic' rail network. Various options and alignments were appraised, with Network Rail concluding that the best option was a new high-speed route from the centre of London to Scotland, delivering passengers to the centre of Birmingham, Manchester, Liverpool, Glasgow and Edinburgh with calling points at Warrington and Preston.

Greengauge 21<sup>6</sup> has also published their ambition for a UK-wide high speed rail network. This examined various options and alignments and recommended a phased approach to the introduction of a full high speed rail network across the UK. This network would include trains operating at speeds of 200 mph (320 kph), with lines built to EU regulatory standards for high speed rail, allowing European compatibility and the potential for future use of duplex trains to enhance capacity further. It recommended a phased construction of a high speed rail network over twenty years, beginning with a line from London to the West Midlands and beyond.

Significantly, both Network Rail and Greengauge 21 reports make firm conclusions that high-speed rail must include Scotland in order to maximise economic and environmental benefits to Scotland and the rest of the UK. These will be outlined in more detail in section 3.

<sup>5</sup> Network Rail (2009)

<sup>6</sup> Greengauge 21 (2009a)

"Our findings indicate that the extension of any line to Scotland would significantly improve the benefit-to-cost ratio [for high speed rail in the UK]. London-Scotland is a substantial market currently dominated by aviation; a high speed rail line would reduce carbon emissions and time and offer substantial improvements to connectivity."

Network Rail

Written evidence to Transport Select Committee (TSC) (HSR 186)

As well as maximising the economic and environmental benefits from a high speed rail network, the inclusion of Scotland would fulfil the following objectives:

- Provide additional capacity to accommodate the significant increases in forecast demand
- Improve journey times, reliability, resilience and connections between Scotland and London, other UK cities and continental Europe
- Support sustainable economic growth – given the UK's Climate Change commitments
- Maintain competitiveness by keeping pace with developments in other countries
- Provide a viable alternative to oil-based transport thus helping to secure our future transport options.

## 1.3 Learning from others

Since the first Shinkansen line between Tokyo and Osaka in 1964 countries throughout Europe and Asia have developed high speed rail as a means of transforming their transport network. These developments were first motivated by the predicted shortage of capacity on their existing services. Evidence across these countries has shown that high speed rail has been successful in meeting these capacity challenges. As well as resulting in increased levels of capacity on both the new and existing lines, the high speed rail networks have significantly reduced rail journey times – reducing the time taken to travel between Paris and Lyon from over 3 hours to 2 hours and cutting the Tokyo-Osaka journey from 7 hours to 2 hours 25 minutes.

In addition to successfully meeting the capacity shortages, new high speed rail links have also been shown to support economic growth and regeneration of cities<sup>7</sup>. High speed rail can both support growth in cities which already have a strong competitive position, such as Lyon, and improve the economic potential of previously declining urban centres, such as Lille. In Lyon, high speed rail has benefitted businesses by enhancing the access to the Paris market, and expanding tourist travel to Lyon, despite it already being a popular destination. Lille's position at the nodal point between Paris, Brussels and London has also made an important contribution to the transformation of its economy, with significant regeneration transforming the urban area around the high speed rail station into a major commercial centre.

## 1.4 The network currently planned for the UK

In March 2010 DfT announced a proposal for the construction of a high speed rail line between London and the West Midlands, and the continuation of the proposed line, following a 'Y' configuration, to Manchester and Leeds. Following the General Election of that year, the UK Coalition Government stated its commitment to the development of a 'truly national high speed rail network'<sup>8</sup>.

"We will establish a high speed rail network as part of our programme of measures to fulfil our joint ambitions for creating a low-carbon economy. Our vision is of a truly national high speed rail network for the whole of Britain."

The Coalition: our programme for government (May 2010)

<sup>7</sup> Greengauge 21 (2006)

<sup>8</sup> UK Government (2011)

Following consideration of whether onward connections to Manchester and Leeds would be better provided by a 'S' or 'Y' configuration<sup>9</sup>, the Secretary of State for Transport outlined his intention to continue the development of the proposed line. The route proposals were for London to Birmingham, separate connections to Manchester and Leeds, following the 'Y' alignment, and with direct links to both Heathrow Airport and the High Speed One line.

### Key Message

The remit of the High Speed Two Company must be extended to include detailed planning for routes to Scotland. The Scottish Government must work in close cooperation with the UK Government to bring high speed rail to Scotland.

In February 2011 the Secretary of State for Transport published the DfT consultation. This included questions on both the national strategy for high speed rail, and on the detail of the route for the proposed first phase of development.

The Consultation closed on 29 July 2011, and the Secretary of State for Transport will announce the outcome of this consultation process and the UK Government's final decisions on its strategy for high speed rail in January 2012.

It is proposed that the initial phase of construction between Birmingham and London will be completed by 2026, with separate extensions to Manchester and Leeds completed by 2032.

The initial HS2 line (2026) will interface with the West Coast Main Line near Lichfield in the West Midlands. It is proposed<sup>10</sup> that this will allow the provision of high speed rail services from London to Scotland, using trains capable of operation on both high speed and conventional lines. It is claimed<sup>11</sup> that this will provide faster journey times between Scotland and London. Once new lines to Manchester and Leeds are developed, further journey time benefits will be realised on high speed services that could continue to Scotland following either East Coast or West Coast Main Lines.

Figure 1 shows the initial high speed rail network and potential extensions as proposed by HS2 Ltd.

<sup>9</sup> The 'S' shape would connect Leeds via Manchester and Birmingham; the 'Y' shape would serve Leeds and Manchester independently, with lines splitting at Birmingham.

<sup>10</sup> Department for Transport (2010b)

<sup>11</sup> Ibid.

Figure 1  
HIGH SPEED RAIL NETWORK AT 2032







At present there is no proposal from DfT to extend high speed lines north of either Leeds or Manchester, and HS2 Ltd has no remit to develop options for new lines to Scotland.

If the decision is made to continue with the development of a UK high speed rail network, the planning for the first stage of development – to Birmingham – will be subject of a hybrid Bill to be put before the UK Parliament in its current session; a second hybrid Bill would follow in the subsequent session (from 2015), considering planning of the routes to Leeds and Manchester. It is only after this stage that the Secretary of State for Transport envisages commencing the planning for a full Scottish high speed rail connection<sup>12</sup>:

“The Government have made it clear that their long term commitment is to a truly national high speed network. We have discussed with Scottish Government Ministers the continuation of the dedicated high speed line to Scotland, and we have made a commitment to them that, once we have got the second hybrid Bill into Parliament, we will then start serious work with the Scottish Government.”

Rt Hon Philip Hammond MP, Secretary of State for Transport

<sup>12</sup> In evidence to the Transport Select Committee's Inquiry into the Strategic Case for High Speed Rail, 13 September 2011

## 1.5 The implications for Scotland's connectivity

High speed rail has the potential to transform how people travel in the UK, and will bring cities closer together.

### Key Message

Scotland should be included in the construction programme north of Birmingham.

Table 1, below, shows the future journey times envisaged by HS2 Ltd as a high speed rail network is developed across the UK. (Note that only Glasgow is shown as these times are based on HS2 Ltd plans for the West Coast Main Line.) The journey times show that if Scotland is not included in the UK high speed rail network then the Scottish cities will be comparatively further away from London than their main competitors who are served by high speed lines. A more comprehensive network would make both Scotland and the UK as a whole more attractive for inward investment.

Table 1  
INDICATIVE FUTURE JOURNEY TIMES

Journey Time	2012	2026	2033
04:30	Glasgow		
04:15			
04:00		Glasgow	
03:45			
03:30			Glasgow
03:15			
03:00			
02:45			
02:30	Manchester		
02:15			
02:00		Manchester	
01:45			
01:30			Manchester
01:15	Birmingham		
01:00			
00:45		Birmingham	Birmingham
00:30			
00:15			
00:00	London Euston	London Euston	London Euston

### 1.5.1 HS2 Ltd proposals for Scotland's connectivity in 2026

The introduction of HS2 services on a new high speed line between London and Birmingham in 2026 will allow journey time improvements, from 1 hour 25 minutes in the current timetable to around 50 minutes. Long-Distance High Speed<sup>13</sup> (LDHS) services beyond Birmingham will be provided by 'hybrid' or classic compatible trains, capable of running on both high speed and conventional lines. Overall journey times between Euston and Manchester will be improved as a significant proportion of the journey would be made on high speed lines. A smaller proportion of the overall journey to Scotland would be made on high speed line, and it remains to be demonstrated that non-tilt hybrid rolling stock would be capable of the same levels of performance as today's Class 390 Pendolino trains on routes north of Manchester, i.e. journey times between North West England and Scotland could be potentially longer than at present.

### 1.5.2 HS2 Ltd proposals for Scotland's connectivity in 2033

By the early 2030s, journey times between Manchester and London would be cut further by the completion of a full high speed line between the cities. Services to Scotland would continue to be operated by hybrid rolling stock on conventional lines. There would be no improvement in journey times on the route between Manchester and Scotland.

At this stage, Manchester would see some 40% improvement on today's journey times to and from London; the equivalent improvements from Scotland are in the region of 15-20%.

Although there will be a marginal benefit to Scotland through faster journey times between London and Manchester the Scottish economy will be at a comparative disadvantage compared with the Midlands and North of England. Only a full network with a link to Scotland will deliver the significant benefits identified elsewhere in this document.

<sup>13</sup> Services between Scotland and London, and other centres within the UK, can run at speeds of up to 200kph/125mph, where permitted, and only across specific sections of track. These services are frequently described as 'Long-Distance High Speed'

## 2. Strategic and Economic Context

## 2.1 EU Policy Context

Establishing an efficient trans-European transport network (TEN-T) has constituted a key element in the relaunched Lisbon Strategy for competitiveness and employment in Europe and will play an equally central role in the attainment of the objectives of the Europe 2020 Strategy. The European Commission argues that to “fulfil Europe’s economic and social potential, it is essential to build the missing links and remove the bottlenecks in its transport infrastructure, as well as to ensure the future sustainability of the transport networks by taking into account the energy efficiency needs and the climate change challenges”<sup>14</sup>. A national high speed rail network which includes Scotland will clearly contribute to the TEN-T objectives.

## 2.2 UK Policy Context

The UK Government’s economic policy objective is “to achieve strong, sustainable and balanced growth that is more evenly shared across the country and between industries”<sup>15</sup>. While many of the UK Government’s regional economic development policies<sup>16</sup> are restricted to England, its overall growth policy “aims to create growth in all parts of the UK”, and it is committed to working “closely with the devolved administrations to achieve this aim”<sup>17</sup>.

### Key Message

A new high speed line must be built to Scotland to realise the fullest economic benefits for the UK. As Britain’s cities are drawn closer together, all will benefit.

The UK Government’s *Plan for Growth* includes an overarching ambition “to encourage investment and exports as a route to a more balanced economy”. Progress towards that ambition will be measured by “an increase in private sector employment, especially in regions outside of London and the South East”<sup>18</sup>.

The National Infrastructure Plan<sup>19</sup> firmly positions high speed rail as making a transformational contribution to the goal of sustainable and balanced economic growth:

“investment in a high-speed rail network that would make rail increasingly the mode of choice for inter-city journeys within the UK, and for many beyond. A new high speed rail network could transform journey times on key inter-urban routes and radically reshape the UK’s economic geography: connecting this country’s great cities and international gateways and helping to bridge the North-South divide that has, for too long, limited growth outside London and the South East.”

<sup>14</sup> European Commission - [http://ec.europa.eu/transport/infrastructure/index\\_en.htm](http://ec.europa.eu/transport/infrastructure/index_en.htm)

<sup>15</sup> HM Treasury and the Department for Business Innovation and Skills (BIS) (2010)

<sup>16</sup> UK Government (2010)

<sup>17</sup> HM Treasury and BIS (2010)

<sup>18</sup> HM Treasury and BIS (2011)

<sup>19</sup> HM Treasury (2010)

## 2.3 Scotland's Strategic Vision

The Government Economic Strategy<sup>20</sup> (2011) sets out the core Purpose for the Scottish Government:

*To focus Government and Public Services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth.*

It sets out six Strategic Priorities:

- Supportive Business Environment
- Learning, Skills and Well-being
- Infrastructure Development and Place
- Effective Government
- Equity
- Transition to a Low-Carbon Economy.

Three of these in particular highlight the importance of Scotland's inclusion in a UK high speed rail network. These are shown below, together with their key strategic approaches.

### Infrastructure Development and Place

- To focus investment on making connections across and with Scotland better, improving reliability and reducing journey times, seeking to maximise the opportunities for employment, business, leisure and tourism
- To provide sustainable, integrated and cost-effective public transport alternatives to the car, connecting people, places and work across Scotland.

### Supportive Business Environment

- Targeted support to business in the pursuit of opportunities outside Scotland and the development of internationally competitive firms
- A particular policy focus on a number of key sectors with high growth potential and the capacity to boost productivity.

<sup>20</sup> Scottish Government (2011)

## Transition to a Low-Carbon Economy

- Support innovative low-carbon technologies
- Decouple trends in emission levels from trends in economic growth
- Policy focus on resilience against commodity and energy price volatility.

The Scottish Government's National Transport Strategy (2006)<sup>21</sup> sets a long term vision for the future of transport in Scotland: a transport system fit for the 21st century that provides everyone in Scotland with integrated, modern, reliable and environmentally efficient transport choices.

The strategy identifies three strategic outcomes as being central to achieving this vision:

- Improving journey times and connections, to tackle congestion and lack of integration and connections in transport
- Reducing emissions, to tackle climate change, air quality and health improvement
- Improving quality, accessibility and affordability to give a wider choice of public transport, better quality services and value for money.

The political, social and economic landscape has changed significantly since publication of the National Transport Strategy in 2006. However, the Strategy's priority of achieving a higher level of sustainable economic growth for the whole of Scotland remains. The National Transport Strategy outcomes, which directly contribute to securing sustainable economic growth, are consistent with Scotland's ambitions for high speed rail.

### 2.3.1 National Planning Framework 2

A high speed rail link to London is recognised as a national priority development within Scotland's National Planning Framework 2<sup>22</sup>. Developments designated as national developments will still require to secure planning permission and other relevant consents, but the Scottish Ministers may intervene at any stage of the process to ensure that decisions are made expeditiously.

<sup>21</sup> Scottish Government (2006)

<sup>22</sup> National Planning Framework 2 (NPF2) was published on June 25 2009. It sets the spatial strategy for Scotland's development to 2030, and designates 14 national developments of strategic importance to Scotland. The Planning etc. (Scotland) Act 2006 requires Scottish Ministers to prepare a national planning framework. It also requires planning authorities to take NPF2 into account in development plans and development management decisions.

## 2.4 Economic context

Scotland has a population of just over 5 million (forecast to rise to 5.5 million by 2030<sup>23</sup>) and output with a value in excess of £102 billion in 2008. This is equivalent to around 8% of the UK economy. The service sector is the largest sector in the Scottish economy, accounting for 79% of all employees, followed by the production (12%) and construction sectors (8%)<sup>24</sup>. The largest sub-sector within services is public sector, education and health while Scotland also has strong business and financial services sectors. The largest sub-sector within manufacturing is electronics and electrical engineering, followed by food & drink.

Table 2, opposite, provides an overview of key economic indicators for the Scottish economy overall, and split by region. UK values are also provided for comparison.

Taken together, wider Edinburgh and wider Glasgow have a population and working age population of a similar magnitude to each of West Midlands and Greater Manchester, but a GVA per capita that is significantly higher than both<sup>25</sup>. The wider Edinburgh and wider Glasgow areas, collectively known as the Central Belt, represents the heart of the Scottish economy.

A recent study by Aecom<sup>26</sup> suggests that Glasgow and Edinburgh have complementary strengths in all the Scottish Government's key sectors to the extent that together they provide an important counter-balance to London's dominance in some key sectors such as Financial Services and Creative industries, thereby helping to secure the growing strength of these sectors in the UK. The research also highlighted the fact that Glasgow and Edinburgh each have strong links with London and beyond; more so than any other parts of the UK, suggesting that intercity rail investment that excludes Scotland will jeopardise the growth of key sectors and impact on Scotland's overall competitiveness.

Strategic Development Plans are being developed for Glasgow and the Clyde Valley and South-East Scotland which predict population growth and increases in economic activity. This reinforces the need for greater connectivity with the rest of the UK.

<sup>23</sup> General Registers of Scotland (2010):  
<http://www.gro-scotland.gov.uk/files2/stats/population-projections/2010-based/proj-pop-scot-2010.pdf>

<sup>24</sup> Scottish Government (2010a)

<sup>25</sup> Glasgow Edinburgh Collaboration Initiative (2011)

<sup>26</sup> <http://www.glasgow-edinburgh.co.uk/read-more/publications/geci-economic-linkages-report.html>



Table 2

Overview of the Scottish economy by region

	Eastern Scotland <sup>1</sup>	South Western Scotland <sup>2</sup>	North Eastern Scotland <sup>3</sup>	Highlands & Islands <sup>4</sup>	Scotland	UK
Population (000s 2010)	2,011	2,281	463	468	5,222	62,262
GVA £m (2008)	41,691	42,583	12,376	6,883	102,552	1,234,445
GVA per head £ (2008)	21,061	18,587	27,388	15,426	20,031	21,103
Employment % Apr 2010 – Mar 11	72.9%	68.3%	80.3%	77.7%	71.0%	70.2%
Unemployment % Apr 2010 – Mar 11	6.9%	9.4%	4.7%	6.0%	7.8%	7.6%
No. of businesses* (2010)	70,785	73,220	23,695	25,590	193,305	2,574,230
Business per 1000 population 2010*	35.2	32.1	51.2	54.7	37.0	41.3
Business birth rate (new businesses per 1000 population in 2010)*	2.7	2.5	3.5	2.7	2.8	3.8
Business Expenditure on Research and Development (BERD) £m (2009)	293	237	76	3.9	644	15,600

\* Refers to VAT registered businesses only

<sup>1</sup> Includes Angus and Dundee City, Clackmannanshire and Fife, East Lothian and Midlothian, Scottish Borders, City of Edinburgh, Falkirk, Perth & Kinross and Stirling, West Lothian.<sup>2</sup> Includes East Dunbartonshire, West Dunbartonshire and Helensburgh & Lomond, Dumfries & Galloway, East Ayrshire and North Ayrshire Mainland, Glasgow City, Inverclyde, East Renfrewshire and Renfrewshire, North Lanarkshire, South Ayrshire and South Lanarkshire.<sup>3</sup> Includes Aberdeen City and Aberdeenshire<sup>4</sup> Includes Caithness & Sutherland and Ross & Cromarty, Inverness & Nairn and Moray, Badenoch & Strathspey, Lochaber, Skye & Lochalsh, Arran & Cumbrae and Argyll & Bute, Eilean Siar (Western Isles), Orkney Islands, Shetland Islands.

Source: Scottish Government, ONS, GROS

## 2.4.1 Wider Edinburgh economy

The wider Edinburgh economy has an annual output of over £32 billion (32% of the Scottish total) and a population of 1.6 million (31% of the Scottish total). The region is made up of nine local authority areas – Edinburgh; East, West and Midlothian; Falkirk; Clackmannanshire; Stirling; Fife and the Scottish Borders.

The wider Edinburgh region has a unique mix of characteristics, such as its culture, geography and history that make it a dynamic and attractive location to reside for both businesses and individuals. Businesses are attracted by the strong pool of highly skilled labour within the region. Over a third of working-age residents of Edinburgh are graduates compared to a fifth for Scotland. The higher skills mix leads to higher earnings and productivity within the region, with GVA per employee in the wider Edinburgh region being 12% above the Scottish average.

The wider Edinburgh region is home to a large number of highly innovative companies, investing in research and cutting edge technologies such as biotechnology, electronics and renewable energy technologies. Businesses in the region spent £246 million on research and development in 2009 (38% of the Scottish total). Four of the UK's 50 fastest growing technology companies are based in the region, which has received an Award for Excellence for Innovative Regions from the European Commission.

The key sectors of the wider Edinburgh region include financial services, tourism, energy, life sciences, electronics, textiles and creative industries.

The wider Edinburgh region employs more than 85,000 people in financial services – over 50% of the Scottish total – with critical mass in banking, fund management, asset servicing and insurance and pensions. Edinburgh has been ranked the most competitive financial centre in the UK outside of London and the seventh most competitive in Europe. Eight of the world's 10 largest banks have a presence in the region, including the Royal Bank of Scotland Group, which has its global headquarters in west Edinburgh. Other global financial services firms with operations in the region include AEGON, State Street and BNY Mellon.

Edinburgh is the most popular destination amongst overseas visitors to the UK after London<sup>27</sup>. The city's year-round festivals are attended by over 5 million people each year generating more than £260 million for the Scottish economy. The National Galleries of Scotland are the most popular visitor attraction in the UK outside of London.

<sup>27</sup> Office for National Statistics (2010)



## 2.4.2 Wider Glasgow economy

The wider Glasgow economy accounts for 35% of Scottish output, at over £35 billion, and contributes to over 36% of Scotland's exports. Glasgow City Region is home to more than one in three Scots, supporting 1.76 million people. The region comprises the local authority areas of Glasgow, East and West Dunbartonshire, Renfrewshire, North and South Lanarkshire, East Renfrewshire and Inverclyde.

The city region is an important provider of further and higher educational opportunities on a national and increasingly international stage and there are important commuter flows from Argyll and Bute, Ayrshire, Stirling and Edinburgh City Region.

The region is a focal point for the Scottish Government's key growth sectors. It is home to nearly 40% of all jobs in financial services, aerospace, defence and marine as well as accounting for one in three of all jobs in the tourism, food and drink and construction sectors.

Glasgow City alone supports nearly 600,000 people. Its key sectors are life sciences, tourism and events, financial and business services, engineering, design and manufacturing and low-carbon industries. The creative industries (digital media, TV & film production, music and design) are also recognised as making an important contribution to Glasgow's quality of life and investment offer.

Glasgow is the UK's second most popular city after London for inward investors and the UK's second largest retail centre outside the West End of London. Although the city's manufacturing base has contracted it retains high value-adding specialisms in areas such as ship-building and marine (naval shipbuilding, commercial ship management and training) and enabling technologies (optoelectronics).

The development of Glasgow's International Financial Services District (IFSD) has contributed to Glasgow becoming one of the UK's largest financial services sectors, employing more than 30,000 people. The IFSD has also played a major part in Glasgow's inward investment success, attracting international players to set up in the city. Glasgow provides a specialised labour pool for: banking and insurance; fund management; stockbroking; technology support for financial services companies and back office functions. The Clydesdale Bank is headquartered in Glasgow while a number of other key banking sector companies have also relocated some of their services to the city. Global companies within the banking sector who have a considerable presence within Glasgow include Barclays Wealth, Morgan Stanley, BNP Paribas, AON, ACE Insurance, JP Morgan, Lloyds Banking Group and HSBC.

With five higher education institutions in the city (Glasgow, Strathclyde and Glasgow Caledonian Universities, Glasgow School of Art and the Royal Conservatoire of Scotland), investors have access to a highly talented labour force. The city's efficient public transport network also enables the 1.76 million living in the wider Glasgow area to access the city centre.

In Glasgow City tourism provides employment for 7% of the workforce. Growth has been driven by Glasgow's emergence as a business conference centre, its status as the second largest retail centre in the UK, the development of new visitor attractions

and the expansion of the events and festivals portfolio to an all-year programme. In the financial year ending March 2011, Glasgow City Marketing Bureau's Convention Bureau secured £155 million in conference sales, equating to 509,240 delegate days. Confirmed major conferences being hosted in Glasgow in 2012 – and their forecast local economic benefit – include the International Convention on Science, Education and Medicine in Sport (ICSEMIS) in July (£5.4 million), the European Federation of Immunological Societies in September (£7.2 million) and the Renewable UK Annual Conference & Exhibition at the end of October (£4.4 million).

### 2.4.3 Wider Scotland

The population of Aberdeen City was around 217,000 in 2010, accounting for 4% of Scotland's people. The city and surrounding shire produces approximately 12% of Scotland's output and ranks second in the UK, only to Inner London, in terms of GVA per head, equalling £27,388 per head in 2008. A key cross-border flow for the city is to Newcastle, with Aberdeen accounting for almost 10% of Scotland – Newcastle journeys. High speed cross border links have the potential to strengthen the knowledge economy clusters on the east coast.

Aberdeen is the energy capital of Europe and its buoyant modern economy is driven by the oil industry, which is expected to support growth for decades to come. Aberdeen City has become increasingly dominated by the service sector, accounting for 78% of jobs in the city in 2008. The tourist industry is also becoming increasingly important in Aberdeen, with 7.1% of jobs being tourism related. The region has also been re-branded 'Aberdeen City and Shire' to reflect its strong regional offering which also includes distilling, life sciences and traditional industries such as fishing and farming.

Dundee is the fourth largest city in Scotland, with a population of around 144,000. It currently contributes approximately 4% of Scotland's GVA, and the Dundee Waterfront has been identified as offering substantial strategic growth potential due to the opportunity to exploit knowledge economy linkages. Dundee's economy is also dominated by the service sector, which accounted for over 84% of jobs in 2008. It is buoyed by biomedical and technological industries, in which the University of Dundee plays an important role. The city is also well known for its leadership of Britain's digital entertainment and computer games industry.

Tourism plays an important role throughout Scotland, especially in more rural areas. Tourism related employment, for example, accounted for approximately 9.5% of employment in Argyll and Bute and the Highlands and Islands, where key visitor attractions include the Isle of Bute Discovery Centre, Urquhart Castle and James Pringle Weavers of Inverness. In Dumfries and Galloway, tourism accounts for approximately 6% of employment, and attractions include the World Famous Old Blacksmith's Shop Centre at Gretna, the seventh most popular attraction in Scotland<sup>28</sup>.

While it is not envisaged that all areas in Scotland will be directly accessed by high speed rail services, the construction of high speed rail lines between the Central Belt and London will provide the whole country with greater connectivity to the rest of the UK and vice versa. This is discussed in more detail in section 4.2.1.

<sup>28</sup> Visit Scotland (2010b)

# 3. The vision for high speed rail in Scotland

The Partnership Group's current vision for high speed rail in Scotland is the construction of one twin track, cross-border HSR line, serving both Edinburgh and Glasgow and contributing to enhanced connectivity between these cities. Although a dual line network would connect both Edinburgh and Glasgow to a greater range of destinations, with potential to realise substantial economic welfare and environmental benefits, this would also entail a significantly higher cost.

At this stage, the Partnership Group is keeping an open mind on the eventual alignment of a high speed line within Scotland, and whether it will progress northwards from either Leeds or Manchester. We will need to discuss with DfT and HS2 Ltd the design of routes to and beyond those cities before determining the preferred route. The final preferred alignment will not be determined until a detailed economic, environmental, and operational analysis has been undertaken.

It will be important to ensure that the design of a new line and stations are future-proofed, with the potential for later expansion incorporated into the design. This will include the development of new or expanded stations for high speed rail services. As part of its route alignment work, the Partnership Group is also considering options for station locations in Edinburgh and Glasgow.

## 3.1 Channel tunnel rail link

Scotland's National Planning Framework 2 sets out the Scottish Government's aspiration to provide improved rail links from Scotland to the continent via High Speed One and the Channel Tunnel. The Partnership Group's preference is consistent with this aspiration: for an alignment which allows through journeys from Scotland to continental Europe, or one which allows an easy interchange to the existing Eurostar services.







## 3.2 Integration with the Scottish rail network

It is important that the inclusion of Glasgow and Edinburgh in a high speed rail network results in improved journey opportunities for rail passengers across Scotland and improved connections throughout Britain.

### Key Message

Scotland supports a high speed rail strategy which brings Edinburgh and Glasgow closer to London and the UK's great cities, and which preserves and enhances aviation links with London's airports for the north of Scotland.

Currently direct services from Scotland to the rest of the UK are available not only from Glasgow and Edinburgh, but also from Lockerbie and Motherwell in the west, and Aberdeen, Dundee, Inverness and many local stations on the east coast. High speed rail and existing rail services must be fully integrated to ensure no degradation of services to these areas as a consequence of introducing high speed rail.

While it is unlikely that a case could be made to run high-capacity high speed trains north of Glasgow and Edinburgh, continued investment in existing rail lines will improve connecting journey times, and ongoing work to determine the location of new stations in Glasgow and Edinburgh will include, as part of its remit, the opportunities that these stations will allow for the greatest integration and connectivity with the existing rail network and other modes and services.

There is a significant amount of air travel between Scotland's northern cities and London. This is likely to remain the dominant mode of travel to London for business communities in the North. Even with high speed rail to Scotland's Central Belt, landing slots at London's airports must be protected for flights from Aberdeen and Inverness.



In order to assess the potential benefits that could be delivered by improved cross-border links, a review of the existing evidence base has been carried out, together with an assessment of the potential benefits. This has covered the following areas:

## **I Economic**

- | Economic welfare benefits
- | Wider economic benefits
- | Inward investment
- | Key growth sectors
- | Benefit to UK economy
- | Passenger demand and revenue

## **I Benefits to passengers and rail operators**

- | All of Scotland will benefit
- | Capacity
- | Punctuality and reliability

## **I Environment**

# 4.1 Economic

## 4.1.1 Economic welfare benefits

Within transport, the economic welfare benefits of projects are typically valued in terms of a reduction in travel time. High level analysis of the potential economic welfare benefits that would arise from including a high speed rail link to Scotland from Manchester has been undertaken by Greengauge 21. This high level modelling estimates user benefits totalling £24.8 billion<sup>29</sup> (2002 Present Value (PV)/prices) over the 60 year appraisal period. The majority of these benefits come from journey time savings, as the introduction of the high speed rail link to Scotland has a significant impact on the journey times to and from Scotland, and the generation of new journeys.

In comparison HS2 (2011) estimates transport user benefits arising from a high speed rail link between London and the West Midlands at £17.5 billion<sup>30</sup> (2009 PV/prices) over 60 years, which is equal to £14.6 billion (2002 PV/prices). This suggests that the user benefits arising from the Manchester to Scotland section are £10 billion higher than that of the London to West Midlands section. However, caution does need to be taken with comparing these two different estimates as they arise from two different modelling techniques and a different set of assumptions, which are discussed in more detail in section 5.3. Despite this caveat, the estimates clearly highlight the significant benefits available from a high speed rail link to the UK and emphasise the view that in order to maximise the economic benefits from a high speed rail network it is essential to include Scotland.

<sup>29</sup> Greengauge (2009b)

<sup>30</sup> HS2 Ltd (2011b)



"Dell established its UK and EMEA Headquarters in Bracknell in 1988 and since then has grown throughout the UK to include main locations in Glasgow, Nottingham, Central London and Edinburgh. Any alternative/improved form of transport which can reduce travel time, as well as allow more flexible travel to either customer sites or Dell office locations, clearly has the potential to be beneficial. If journey times between Glasgow/Edinburgh to London can be reduced to 2 hours 40 minutes, it gives greater flexibility and options when considering travel plans."

Dell

## 4.1.2 Wider economic benefits

In addition to the standard economic welfare benefits associated with transport improvements, there is the potential for significant wider economic benefits as a result of the introduction of a high speed rail link to Scotland. These can arise from the following:

- Reduced business costs
- Agglomeration benefits
- Improved labour supply.

**Reduced business costs** – The introduction of a high speed rail link will have a significant impact on businesses and development throughout Scotland. The new transport link is likely to impact current business costs, attract new businesses and encourage development around any new stations. Current businesses with activity in Scotland will benefit as the reduced journey times will result in a reduction in the cost of travel for businesses. This reduction will not only provide a direct benefit by reducing costs, but also means that they are able to increase productivity.

**Agglomeration benefits** – The term agglomeration refers to the concentration of economic activity over an area. Transport can act to increase the accessibility of an area to a greater number of firms and workers, thereby impacting on the level of agglomeration, enabling firms to take advantage of spillovers and synergies. Empirical evidence demonstrates that the level of agglomeration affects the productivity of firms and workers in an area, even after controlling for characteristics specific to firms and workers in that area. As new high speed rail termini will encourage redevelopment in the surrounding areas, a number of firms who value the high speed rail link will move to the vicinity of the termini, which may create agglomeration benefits which did not exist previously.

**Improved labour supply** – As high speed rail is mainly targeting long-distance journeys it is unlikely to have a significant impact on the labour supply. However, high speed rail does have knock on impacts on local routes, as discussed in 4.2.1, which may have a positive impact on the labour supply. A high speed rail link to Scotland will also raise the possibility of commuter travel between the North of England and Scotland with the significantly reduced journey time. This view is supported by evidence from Italy where the introduction of high speed rail has resulted in a shift from weekly commuting between Naples and Rome to daily commuting<sup>31</sup>.

Table 3 presents the results of a Scottish survey of leading businesses in key sectors aimed to highlight perceived business benefits from high speed rail.

<sup>31</sup> Cascetta, E. and Coppola, P. (2011)

Table 3

Responses from businesses in Scotland to a survey of opinions on high speed rail<sup>32</sup>

Key Cities for Connectivity	
London	90%
Manchester	60%
Birmingham	55%
Newcastle	40%
Leeds	32.5%
Key Regions for Journey Time Reductions	
London	80%
North of England	60%
Benefits for your Business	
Reduced time travelling	85%
Strengthening existing business links	65%
Greater frequency and reliability	57.5%
Making new business links	37.5%
Expand labour market	27.5%
Access to new markets	25%
Benefits for the Scottish economy	
Attract new investment	72.5%
Tourism	72.5%
Retain existing investment	65%
Expand existing investment	62.5%
Current mode of travel to London	
Air	57.5%
Air & Rail	25%
Rail	7.5%
Air & Road	2.5%
Potential for some modal shift with journey time improvements	
Yes	82.5%
No	2.5%
N/A	5.5%
Potential modal shift for journeys to Europe	
Yes	42.5%
No	22.5%
Possibly	20%

Source: Scottish Council for Development and Industry

<sup>32</sup> Forty businesses were surveyed. Among those that undertook the survey and expressed support for high speed rail including Glasgow and Edinburgh were BT, Biggart Baillie, World Club HQ, Gillespie Mcauliffe, Jones Lang Lasalle, Oracle, Brodies, First Group and Turcan Connell.

The following conclusions can be drawn from the survey results:

- There is good support from the Glasgow and Edinburgh city-regions' business communities, certainly from larger businesses
- London is the highest priority destination, although shorter journey times to the north of England are also supported, especially those on the west coast alignment
- Reducing time travelling, strengthening existing business links, and greater frequency and reliability are viewed as the biggest business benefits
- There is a strong belief that high speed rail will be positive for inward investment and tourism
- There is great scope for modal shift from air on some journeys due to productivity, convenience and environmental considerations, but costs would be a factor
- There is interest in using high speed rail and the Channel Tunnel Rail Link for some journeys to the near continent, but only if journey times and costs are competitive.

"Siemens supports the development of HSR, linking Scotland's main cities of Edinburgh and Glasgow with the proposed network across England... We believe that a network which includes central Scotland would maximise the economic and environmental returns for Scotland from this national investment and would be of significant long-term benefit to businesses in Scotland and the UK economy overall."

Siemens



**Regeneration benefits** – Regeneration and development around the new railway stations in Edinburgh and Glasgow is also a likely consequence of the new high speed rail link. Experience of new high speed rail lines and stations in other countries has shown that redevelopment of land around stations has enabled substantial new building of offices, retail, hotels and housing, whilst the combination of office space and good transport networks has led to significant investment through the relocation of businesses. Lille is cited<sup>33</sup> as a good example of how high speed rail and the creation of a new station has brought about the development of a major commercial centre in the area between the new station, Lille Europe, served by TGV and Eurostar services, and the old, main railway station, Lille Flandres. HS2 Ltd (2011a) also highlight Cologne, Germany, as an example of the realisation of regeneration benefits. The arrival of high speed rail in Cologne has supported a major programme of redevelopment, including office, hotel, retail and leisure developments, as well as new housing and the redevelopment of the city's main exhibition and conference venues. Furthermore, in Japan, research undertaken in the 1980s on the effects of the development of the Shinkansen network suggested that land values in commercial areas with a Shinkansen station rose by as much as 67% over the period 1981-85.

Greengauge 21 (2009a) suggests that a key lesson from international experience is that the local economic benefits are much greater if the station development is integrated within a visionary city master plan that provides for and encourages complementary urban development, particularly if this is based on an economy which relies on personal contact such as the major knowledge-based industries which make up the broadly-defined service sector. Thus, a major consideration in selecting sites for HSR stations in both Glasgow and Edinburgh will be to ensure that they are well placed to reap the sort of benefits which have accrued to other urban high speed rail locations.

In addition to the potential regeneration benefits in the vicinity of new stations, businesses throughout Scotland will also benefit from the high speed rail link with section 4.2.1 outlining how rail connections will be developed throughout Scotland, improving economic connectivity.

<sup>33</sup> Greengauge 21 (2006)

### 4.1.3 Inward investment

Transport infrastructure availability is one of a range of factors likely to contribute to the relative attractiveness of investing in a particular country. Established transport infrastructure will assist in:

- Attracting new investment, particularly foreign direct investment (FDI)
- Retaining existing investment
- Expanding existing investment in face of competition from other areas.

Levels of investment are determined by a variety of factors such as access to skilled labour and the presence of clusters of similar firms and suppliers. Transport has a key role in contributing to the value of these attributes as an effective and efficient transport system can broaden access to the labour pool and bring firms closer together.

#### Key Message

Inclusion in a UK high speed rail network will allow Scotland greater economic equity with other areas of the UK. If Scotland is not included Glasgow and Edinburgh will be comparatively further away from London, in terms of journey times, than their main competitors who are served by high speed lines.

Edinburgh and Glasgow have performed strongly both in terms of attracting FDI and in nurturing indigenous companies that have successfully entered global markets. *FDI Magazine* in 2008 identified Edinburgh as the most attractive small European city in which to locate and the fifth most attractive across all European cities or regions while Glasgow was rated eighth most attractive. Scotland as a whole was also named the European Region of the Future<sup>34</sup>.

The Ernst & Young European Investment Monitor (EIM) which is used to identify trends and significant movements in jobs, business and investment also ranks Scotland highly as a destination of inward investment. The 2008 EIM ranked the UK top in Europe in terms of the number of FDI projects attracted in 2007, while a regional breakdown showed that Scotland was second only to the South East as a destination for FDI each year since 2004/05<sup>35</sup>.

<sup>34</sup> FDI Magazine (2008)

<sup>35</sup> Ernst & Young (2008)

However, a recent Cushman and Wakefield's European Cities Monitor 2011, a survey of senior executives from 501 European companies, reveals that Glasgow and Edinburgh are lowly ranked on easy access to markets, being the lowest ranked UK cities. Edinburgh is 32nd out of 36 of the major European cities listed, while Glasgow is ranked 25th. Glasgow and Edinburgh are also seen as having relatively poor external transport links being ranked 18th and 25th out of 36 respectively. This is important as it highlights the need for the UK high speed rail link to Scotland to aid Glasgow and Edinburgh retain current levels of inward investment and attract new investment. If this does not exist then this risks marginalising the Scottish economy and leading to a shift in investment to the regions that do have the high speed rail links. Furthermore, given the specialist and global nature of many businesses in Scotland, including research and university based activities, effective external links are essential to retain and develop these activities. A high speed rail network which includes Scotland would provide this through a fast and easy link between Scotland, the rest of the UK and Heathrow.

"A high speed rail link will make Glasgow more accessible for regular commuters and also for people who are considering re-locating to have increased options for travelling to their home towns. This may also help convince organisations to consider re-locating to Scotland."

Barclays Bank

#### 4.1.4 Key growth sectors

While connectivity infrastructure is seldom provided for a single sector, the relative importance of different forms of connectivity for different sectors should help inform priorities for investing in connectivity to boost Scotland's competitiveness. Out of the seven key sectors (Creative Industries; Energy; Financial & Business Services; Food & Drink; Life Sciences; Tourism; and Universities), all seven list international air connectivity in their top four connectivity priorities. In addition, the Creative Industries and Financial & Business Services both list easy access to London as a priority, whilst Tourism highlights easy access to the English market. A high speed rail network has the potential to bring significant benefits to these sectors. A direct link to Heathrow airport would improve Scotland's international air connectivity and the high speed rail network would enhance connectivity with the entire English market.

**Creative Industries** – Scotland has a thriving Creative Industries sector which contributes £2.4 billion to the Scottish economy and supports over 60,000 jobs. There are a number of highly innovative companies in all areas of digital media, from international leaders in games development and interactive platforms to national broadcasters, successful production companies and some of the most creative digital agencies in the UK. This is supported by global centres of research excellence developing next generation technologies to support ongoing growth in the digital media environment.

In Scotland, the Creative Industries comprise a number of sub-sectors: advertising; architecture; the art/antiques trade; crafts; design; designer fashion; video, film, music and photography; music and the visual and performing arts; publishing; computer games, software and electronic publishing; radio and television.

City centre to city centre travel is particularly important to the creative industries, in particular to the television and advertising sectors. London is the dominant location in the UK for most creative industries activities and so access to this market is vital. Both the cost and time of access to this market have been identified as a barrier and is a major complaint of companies in this sector. In addition to London, Manchester is also important. Consequently, there are significant benefits to Creative Industries from a high speed rail link to Scotland.

**Tourism** – Scotland's tourism industry is made up of around 20,000 businesses, and supports nearly 204,000 jobs directly and indirectly. The sector generates nearly £4.1 billion for Scotland's economy every year, accounting for approximately 4% of Scotland's GDP. Tourism expenditure is forecast to grow at an annual real growth rate of 3% per annum over the period 2010 to 2020 with spending by inbound visitors forecast to grow at a faster rate than spending by domestic residents (4.4% versus 2.6%). Business tourism accounts for 20% of total tourism spend, worth around £827 million to Scotland's economy<sup>36</sup>. Furthermore, 29% of all international association meetings held in the UK are hosted by Scotland, with Glasgow and Edinburgh both ranked among the top 30 cities in the world for conferences<sup>37</sup>.

<sup>36</sup> Visit Scotland (2010a)

<sup>37</sup> International Congress and Convention Association (ICCA) (2010)

"Glasgow tourism sector is significantly constrained by the lack of available capacity servicing the West Coast main rail line, with overcrowding on services at the weekends. The immediate result is the limiting of the expansion of the tourism industry in Glasgow and the West Coast of Scotland.

For Scotland and the rest of the United Kingdom to flourish, it is economically essential that the Central Belt is not just serviced adequately, but is serviced by HS2."

#### Glasgow City Marketing Bureau

Scotland, and the UK in general, is facing significant competition from mainland Europe for the domestic visitor, which is a hugely important component of both Scotland and the UK's tourism revenue, with 12.4 million tourist trips to Scotland in 2010 being made by people from within the UK, spending over £2.6 billion. Of this, English residents recorded 5.5 million overnight trips. The North West and Yorkshire represented the largest English resident markets, although visitors from the East Midlands showed the greatest growth. Of the 12.4 million tourists, only 14% of these tourists travel to their destination by rail, with 65% of tourists driving to Scotland. Therefore, a high speed rail link to Glasgow and Edinburgh has significant potential for modal shift and the improved accessibility will increase the tourism competitiveness of the whole of Scotland. Connectivity is currently viewed as a weakness in Scottish tourism and the possibility of high speed rail to Scotland from a major international hub such as London would also assist in attracting international tourists, many of whom will first arrive in London. Transport infrastructure can particularly support the development of urban tourism, especially for short stays which are an important market for Scotland, and a major driver of visits to Glasgow and Edinburgh. The high speed rail link will also benefit the rest of the UK as it increases the accessibility of tourist attractions throughout the UK for the people of Scotland.

"The University of Edinburgh provides considerable support for the Edinburgh Festivals and tourism. The advent of high speed connections between UK cities will help sustain the existing visitor population and is likely to facilitate further growth in visitors to Edinburgh. Edinburgh is a major location for conferences and the University is one of the city's important venues. The largest gateway for international visitors to the UK is London, hence the ability for visitors to get quickly and easily to Edinburgh via high speed rail would significantly improve Edinburgh's and the University's opportunities to attract visitors across all markets."

#### University of Edinburgh

Tourism plays an important role throughout Scotland. The boost to tourism brought about by the new high speed rail link will not be restricted to Glasgow and Edinburgh. The improved journey times to these two cities will shorten rail journeys between England and tourist destinations throughout Scotland, resulting in increased levels of tourism. The improvements in connectivity will be supported by the projects outlined in the Strategic Transport Projects Review (STPR) which are complements to the high speed rail link to Scotland. These projects are outlined in section 4.2.1.

**Financial & Business Services** – Despite recent events in the global banking sector, Scotland remains an attractive and highly competitive location for both indigenous and international financial services businesses and there is still huge potential for growth, particularly in asset management, asset servicing and the insurance sector. Financial services account for more than 4% of Scottish jobs, directly employing 96,000 people, with 70,000 more employed indirectly. This represents 8% of total employment in the sector across the UK. However, recent developments within the sector will have an impact on this. The industry contributes more than 7% of the Scottish GDP and accounts for around 6% of total international Scottish exports.





"The Barclays Campus in Glasgow runs with approximately 1500 staff supporting Barclays Capital, Wealth and Corporate. This includes colleagues supporting our client facing, finance, IT and operational activities. Our business supports the Barclays business which is based in Canary Wharf in London and we also support a UK wide branch network including locations in many UK cities including Newcastle, Birmingham and Edinburgh. The nature of this support requires a number of colleagues to visit these cities on a regular basis. At the current time for many of these locations the only available quick option to maximise visiting colleagues time in the relevant offices is by flying".

#### Barclays Bank

Despite the challenges, financial services still remains an important sector for Scotland, with real potential and expertise in areas such as asset servicing and fund management. London is the main market in this sector and so city centre to city centre links are paramount. Therefore, the reduced journey times and increased journey time reliability, brought about by the introduction of a high speed rail link, will bring significant benefits to the financial and business services.



"Dundas and Wilson is a UK commercial law firm with offices in London, Edinburgh and Glasgow. We understand the importance of sustainable economic growth and the critical role played by our transport infrastructure in supporting such growth. Connectivity is a key requirement for our business. Of course we utilise modern IT communication systems but face to face contact will always underpin a successful solicitor-client relationship. To operate in a UK market means travelling between our offices and to our clients' offices.

A high speed rail service connecting our three home cities would offer a competitive and sustainable travel alternative. This would save valuable time, which would benefit our clients and our staff. We want to deliver an efficient service to our clients - and efficiency involves many things, including travel. We also want our staff to get home to their families at the end of the day without unnecessary delay."

Dundas and Wilson CS LLP

**Life Sciences** – Scotland is home to the second largest life science cluster in the UK and one of the most sizable clusters in Europe, with a significant international presence. There are over 630 organisations in Scotland employing over 32,000 people. Scotland's main focus is on human healthcare with over 70% of the core life science organisations involved in this area.

**Universities** – Scotland has 19 higher education institutions, with 16 of these having university status. A high speed rail link would be particularly beneficial by enabling greater collaboration between academic institutions throughout the UK. The new link would make it easier and quicker for universities to develop relationships and collaborate on research propositions.

**Food & Drink** – Scotland is home to some of the best natural produce and most skilled food and drink producers in the world. The vibrant food and drink sector includes internationally famous whisky brands, premium seafood and meat producers and innovative speciality products.

Food & Drink was Scotland's top exporting industry in 2009. The improvements which could be seen to freight services on the existing network would support the industry which relies on good freight and logistics for product supply.

"There is no doubt that an improved and higher speed rail link to the major cities in England, including London, would be of huge benefit to Life Sciences companies in Scotland. With the developing complexity of air travel and the proximity of train stations to major centres of commerce it is clear that the competitiveness of the Life Sciences industry in Scotland would be enhanced significantly by improvements to rail travel including reductions in time. Communication technology has enhanced business interaction with customers but business is still heavily dependent on people meeting face-to-face and reducing the time it takes to go between the major centres of industry will only improve Scotland's commercial competitiveness.

We must maintain our position in the world and better communication and transport infrastructure are key parts in ensuring that this will be possible."

#### 4.1.5 Benefit to the UK economy

A high speed rail link to Scotland will strengthen connections between the UK's major cities, bringing 5.2 million people and 2.4 million jobs closer to the rest of the UK. As highlighted in section 2.4 the Scottish economy is 8% of the UK economy, with the wider Glasgow and Edinburgh regions providing around two-thirds of that output and therefore, a link with Scotland will provide significantly improved connectivity between key economic centres.

#### Key Message

The investment case for high speed rail is strong, but is stronger when Scotland is included. This gives a better return to the UK economy and its taxpayers.

Analysis undertaken for the Glasgow Edinburgh Collaboration Initiative (2011) shows that "linkages between wider Edinburgh/wider Glasgow and metropolitan areas in England and Wales generally indicates that connections to cities in the north of England are more important than would be expected". With the introduction of high speed rail these connections would be strengthened and would grow, benefitting all of the UK economy.

There is support for Scotland's inclusion in a high speed rail link from London, Manchester and Liverpool, as demonstrated by the quotes below.

"For HS2 to improve the country's connectivity and infrastructure Capacity, it must reach the whole of the UK. Only then will the expected business and transport benefits be enjoyed by the entire country.

Consequently, the line should also be planned and thought of in its totality, rather than independent and isolated sections."

London Chamber of Commerce and Industry  
'Connecting opportunities: making the most of HS2'

"Glasgow and Greater Manchester are two of the UK's largest economies and the third and fourth biggest population centres in the country. Strong economic development within these cities will be essential for countering the economic dominance of London and providing the driver for growth within their respective regions. As such, high quality links between these centres is essential for developing trade, tourism and expanding the knowledge, opportunities and labour catchment areas for these conurbations.

Significantly though, the benefits of high speed rail are greater over longer distances and therefore the time savings between Manchester and Glasgow would be significant enough to help deliver a shift in mode of travel and generate passenger demand on the new rail network."

Greater Manchester Chamber of Commerce

"The Government should aim to extend High Speed coverage to Scotland and other areas of the UK over the longer term as a strategic development priority. Improved rail links between the North West and Scotland would benefit both regions. Liverpool is an increasingly popular destination for international travellers and we would welcome improved links with other key tourist destinations such as Glasgow and Edinburgh."

Liverpool Chamber of Commerce

#### 4.1.6 Passenger demand and revenue

As highlighted in section 1.1, forecasts show substantial growth in demand for long-distance rail trips and substantial increases in crowding on the West Coast Main Line in the absence of high speed rail. With a high speed rail line these increases in passenger numbers are estimated to be significantly greater, but without the capacity constraints. The substantial increases can be driven by three impacts:

- Faster journeys and more access to other locations will attract more people to travel, and travel more often
- Reductions in journey times will make rail more competitive with other modes (particularly air travel) driving modal shift
- Additional demand can be generated by better use of capacity freed up on existing lines.

"The further extension of the national high speed rail network northwards from Leeds to Scotland, via York and an eastern route to Edinburgh, would certainly offer advantages by providing journey time benefits for our respective cities and for those centres of population along the route, including in the North East. It could thereby improve significantly business links between Edinburgh and Leeds, two of UK PLC's major financial centres"

Leeds City Region LEP Board

### Key Message

High speed services must deliver journey times which will capture the existing air market between Scotland's Central Belt and London. This will free capacity at London's airports, protecting and enhancing air links to the North of Scotland [as well as freeing up international route slots and facilitate London's continuing key role as a global centre of trade and a financial services hub].

Modelling undertaken for Greengauge 21 (2009b) emphasises the potential impact of including Scotland in the high speed rail network as their estimates show an incremental increase in passenger numbers of 28.8 million by 2055 from extending from Manchester to Scotland. The demand analysis breaks the high speed rail demand down into sources, with a significant proportion being abstracted from air.

Table 4

Incremental increase in demand in 2055 of extending from Manchester to Scotland

	Incremental Increase in Annual Rail Passengers (million)	Contribution to Incremental Increase in Annual Rail Passengers (%)
High speed rail demand	28.8	
Of which is:		
Abstracted from classic rail	9.5	33%
Abstracted from air	15.6	54%
Abstracted from car	2.1	7%
New generated high speed users	1.6	6%

Source: Greengauge 21 (2009b)



Evidence from France suggests that the increase in demand of extending the high speed rail network to Scotland will be impacted by fuel prices<sup>38</sup>. Analysis of demand between Lille and Nice and Lille and Brussels shows that fuel prices have a significant impact on the levels of demand for long-distance trips, Lille to Nice, but not on demand for journeys over shorter distances, Lille to Brussels. This is significant as it shows that if fuel prices were to rise then the increase in demand for high speed rail journeys between London and Scotland is likely to rise.

These estimates of increased passenger demand are highly significant for a variety of reasons. One consequence is the new high speed rail line generates significant levels of revenue. HS2 Ltd (2011b) estimate that the high speed rail link from London to the West Midlands would generate an increase of £13.7billion (2009 PV/prices) in revenue over the 60 year appraisal period (which is equivalent to £11.5billion (2002 PV/prices). However, to achieve the greatest increases in revenue the high speed rail network needs to include Scotland because a significant proportion of the increased revenue will be new to rail, i.e. abstracted from the aviation market. Greengauge 21 (2009b) estimate that the marginal increase in revenue of including a Manchester – Scotland section in the network is £10 billion (2002 PV/prices) over 60 years.

## 4.2 Benefits to passengers and rail operators

### 4.2.1 All of Scotland will benefit

Although the proposed high speed rail network would only link directly with Glasgow and Edinburgh the network would bring benefits to the whole of Scotland. The Scottish Government's Economic Strategy sets out how a more successful country will be created through increasing sustainable economic growth. Scotland's National Transport Strategy (NTS) provides an overarching strategy for transport and introduced three key strategic outcomes i.e.

- Improved journey times and connections
- Reduced emissions
- Improved quality, accessibility and affordability.

These outcomes are being delivered through the STPR (10 December 2008) which sets out 29 investment priorities over the period to 2032 which will be delivered subject to the transport allocation within future Spending Reviews and affordability.

The STPR interventions will support the case for a high speed rail link to Scotland by allowing all of Scotland to share in the economic benefit of the network by providing onward rail connections from the Edinburgh and Glasgow termini. The key recommendations are:

**Intervention 13 – Rail Enhancements in the East of Scotland** will increase rail capacity between Edinburgh, the Lothians and Fife.

<sup>38</sup> Steer Davies Gleave (2011)

**Intervention 15 – Edinburgh to Glasgow Rail Improvement Programme (EGIP)** has been prioritised for delivery by 2016 and will electrify the lines between Edinburgh and Glasgow and up to Stirling improving journey times and capacity.

**Intervention 17 – Rail Enhancements on the Highland Main Line between Perth and Inverness** has also been prioritised for delivery and will see improvements in journey time and frequency between Inverness and Edinburgh and Glasgow.

**Intervention 23 – Rail Service Enhancements between Aberdeen and the Central Belt** will improve journey times and frequency between Aberdeen, Dundee and Edinburgh and Glasgow. Related to this is Intervention 28 – Inverkeithing to Halbeath Rail Line.

**Intervention 26 – Rail Enhancements between Inverclyde/Ayrshire and Glasgow** will increase rail capacity between Glasgow and south and west areas in Scotland.

There are also recommendations which will be enabled by the provision of the new High Speed Rail line.







**Intervention 24** (also National Planning Framework – National Development 2) – **West of Scotland Strategic Rail Enhancements** recognises the need to improve public transport capacity and connectivity in Glasgow and the West of Scotland. The provision of the high speed rail terminus in Glasgow provides opportunities to improve this capacity and connectivity.


**Intervention 27 – Enhancements to Rail Freight between Glasgow and the Border via the West Coast Main Line (WCML)** recognises the need to increase the number of freight paths on the WCML. A new high speed rail line will allow a greater use by freight of the existing WCML. Transfer of long-distance passenger services to a new high speed line will release capacity to develop better regional rail links under the ScotRail franchise, meeting the needs of communities such as Lockerbie or Dunbar, which are principally served by existing cross border operators.

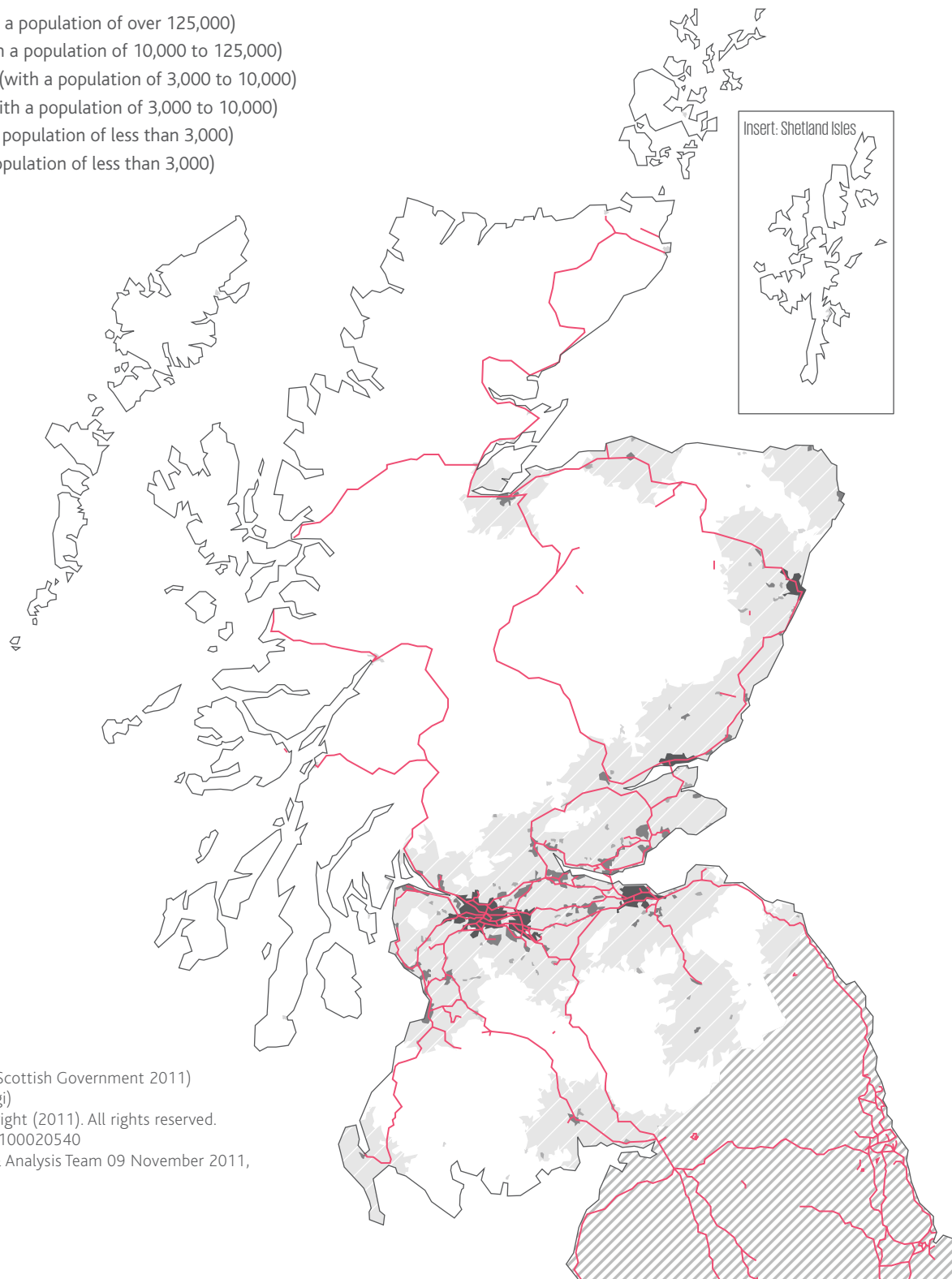
The Scottish Government, through Transport Scotland, is continuing the programme of new rail build, and with completion of the Borders Rail Project will bring greater connectivity between Edinburgh and communities in the South of Scotland.

## RAILWAY NETWORK & SCOTTISH GOVERNMENT URBAN RURAL CLASSIFICATION

### Urban rural classification 2009-10 - 6 fold

-  Large Urban Areas (with a population of over 125,000)
-  Other Urban Areas (with a population of 10,000 to 125,000)
-  Accessible Small Towns (with a population of 3,000 to 10,000)
-  Remote Small Towns (with a population of 3,000 to 10,000)
-  Accessible Rural (with a population of less than 3,000)
-  Remote Rural (with a population of less than 3,000)

 Railways



Sources:  
Urban Rural Classification 09-10 (Scottish Government 2011)  
Railways (Ordnance Survey Strategi)  
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Ordnance Survey Licence number 100020540  
Scottish Government GI Science & Analysis Team 09 November 2011,  
Job: 5186cm

"High speed rail will also provide opportunities to enhance flights to London and Europe from domestic markets which will benefit less directly from HSR, for example northern parts of Scotland. It is essential that a proportion of released slots at London "hub" airports are protected for domestic flights to/from these more peripheral regions of the UK."

Transport Futures

Written evidence to TSC (HSR 144)

Even with greater rail connectivity across Scotland, the Partnership Group recognises that areas of northern Scotland will still be reliant on aviation as the principal mode of connectivity with London. High speed rail will reduce demand for air travel in the UK's busiest domestic aviation market, between Scotland's Central Belt and London. Capacity will be released at London's airports. It is vital that the availability of landing slots for connections to Scotland's northern airports is maintained at current levels, at a minimum.

"A proper end-to-end HSR system offers transport which is faster, more environmentally friendly, more comfortable, more central and better economically than air. The freeing up of London landing slots would enable access from more northerly airports such as Inverness, Aberdeen and the Northern Isles which struggle to get access now."

Edinburgh Chambers of Commerce  
Written evidence to TSC (HSR 95)

## 4.2.2 Capacity

A new high speed rail line to Scotland will create additional capacity across the network and, by removing long-distance services from existing lines, create new opportunities for local, interregional passenger and freight service provision.

## 4.2.3 How would additional capacity benefit Scotland?

Network Rail's West Coast Main Line Route Utilisation Strategy<sup>39</sup> (WCML RUS) notes that there are increasing demands of freight and passenger traffic on the line leading to restricted capacity in the short term. It reports that the line will be nearly full by 2024, and that the development of the proposed high speed line represents the best solution for addressing additional demand for services over the West Coast 'corridor'.

The initial development of HS2 will release capacity on the southern reaches of the West Coast Main Line.

The bullet points below outline the line capacity constraints that the West Coast Main Line RUS identified in Scotland, and how a high speed rail link to Scotland would successfully overcome these:

- *Long-distance on-train crowding to/from London Euston*
- *On-train crowding between Birmingham and Scotland*
- *Friday to Sunday on-train crowding between Manchester and Scotland*

High speed rail will introduce significant on-train capacity between Scotland and destinations in England, alleviating problems of overcrowding and providing for passenger growth.

- *Insufficient freight capacity north of Preston*

Moving all existing LDHS journeys to a new high speed rail will release train paths for freight service provision.

<sup>39</sup> A Route Utilisation Strategy (RUS) takes a strategic look at the rail network and its usage and capability in relation to current and future demand. Where shortfalls in capacity are determined, the RUS will identify options for addressing them. These options may involve timetable changes or investment.

"The high speed rail proposals to link London and major cities to Manchester and Leeds is essential to provide additional capacity on these congested corridors and allow for the growth of rail freight, estimated to more than double by 2030.

Whereas these first phases of a high speed network are welcome, the congestion on routes between England and Scotland is already serious. Failure to deal with this will constrain growth in the future. A continuation of the high speed lines to Edinburgh and Glasgow would free up capacity, particularly on the West Coast Main Line corridor, to meet the fast growing demand for rail freight on this corridor."

Lord Berkeley  
Chairman, Rail Freight Group

"Demand for services on the West Coast Main Line is predicted to grow strongly, with the line reaching full capacity within 12 years. Already the busiest the rail freight line in Europe, carrying 43% of all UK rail freight, we can ill afford to ignore the need for significant investment in the line. High speed rail will not only deliver the necessary long term capacity enhancements but allow greater opportunities for freight services between the North West and Scotland."

Greater Manchester Chamber of Commerce

- *Irregular services or no direct services between the North West (Manchester and Liverpool respectively) and Scotland*

High speed rail will deliver new journey opportunities between key cities; it will also free capacity on existing lines for new inter-regional journey opportunities.

- *Poor frequency of direct services between Lockerbie and Glasgow/Edinburgh*

A new high speed rail line will release train paths for additional regional passenger services.

Previous route strategy documents have identified similar gaps across the network. The East Coast Route Utilisation Strategy<sup>40</sup> considered the aspiration for improved connectivity at Dunbar and North Berwick, and improvements to timetable speed in northern sections of the route. These may be achieved as additional capacity is released by the development of high speed lines.

<sup>40</sup> Network Rail (2008)



#### 4.2.4 Punctuality and reliability

As well as benefiting from additional capacity, users of the high speed rail network should expect high levels of punctuality, beating delays on the road network, in the air and on the existing conventional rail network.

Evidence from Spain supports the argument that high speed rail can deliver these characteristics, with passengers on Madrid to Seville services offered full refunds if their train does not arrive within five minutes of the advertised time. Records to date show that only 0.16% of trains have been delayed by more than five minutes. These features all contribute to the higher quality journeys enjoyed on high speed rail compared to air travel, with other advantages including significantly less disruptions associated with security check as well as greater potential for wireless communications and use of IT equipment. The ability of the high speed rail network to provide these benefits is significant as it is these that may help drive modal shift more from air to high speed rail rather than simply reflecting differences in journey time.

### 4.3 Environment

The assessment of a project's environmental impact is a key part of appraisal, particularly as high speed rail is frequently presented as a low-carbon technology. A key determinant of this is the ability of high speed rail to achieve modal shift from air to rail.

#### Key Message

High speed rail offers environmental benefits to the UK. These are maximised when longer journeys such as London - Scotland are included. High speed rail reduces our reliance on carbon fuels.

DfT (2007) argued that the embodied carbon element of a new high speed rail line was expected to be substantial, and only where significant modal shift from air to rail was possible, was a net reduction (embodied carbon less operational carbon) achieved. This led the study to conclude that proposed routes from London to Birmingham and London to Manchester would make a potential increased contribution to carbon emissions and that an extension to Scotland was essential in providing significant reductions in UK carbon emissions.

"Shepherd and Wedderburn is a UK law firm with offices in Edinburgh, Glasgow, Aberdeen and London. With a client base throughout the UK and beyond, it is critical that our lawyers are able to be where their clients need them.

Our business is built on personal relationships which rely on meeting our clients to get to know them and to understand their business.

A high speed link between Edinburgh and Glasgow and connecting Scotland and London would significantly reduce our carbon footprint as well as increasing our reach and responsiveness to clients."

Shepherd and Wedderburn

### 4.3.1 Overall emissions associated with cross-border travel

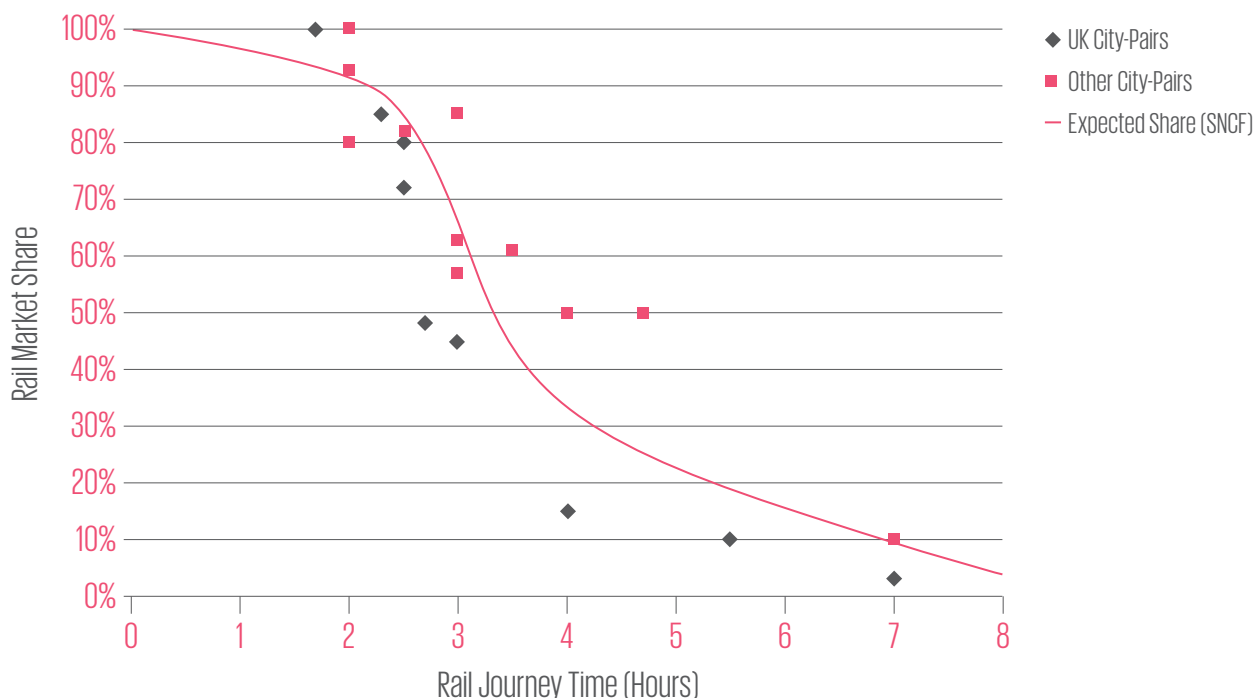
There is widespread agreement that the net contribution of high speed rail to carbon emissions is dependent on the degree of modal shift from air to rail, and on the change in the number of flights. This view is held by the Committee on Climate Change (CCC) as calculations for the Fourth Carbon Budget show “a maximum potential emissions reduction of 2 MtCO<sub>2</sub> annually through switching from aviation to high speed rail”. They also estimate that “the effects of high speed rail proposals on surface transport emissions (i.e. the combined effect of the increase in emissions from electricity generation and any reduction in car emissions through modal shift) would be negligible”<sup>41</sup>.

Modal shift from air to rail is generally accepted as being largely determined by the journey time by rail, with the generally accepted relationship being an inverted ‘S’ shaped curve reflecting how increasing journey time reduces the rail share of a city to city market.

Figure 2 below shows point data for a range of European and UK city-pairs. A trend line shows this inverted ‘S’ shaped relationship.

Figure 2

Rail/air market share



Source: Greengauge 21 (2009c)

<sup>41</sup> Committee on Climate Change (2010)

Figure 2 shows that a step change in journey time to 3 hours is required to achieve a significant rail market share. Since the potential carbon benefit of a new high speed rail line is greatest where rail share is currently low, operating a new high speed rail line over longer distances, where strong air competition exists, offers a potential opportunity to reduce overall long-distance transport emissions. If a journey time is already around two and a half hours then the rail market share will already be high and therefore the potential for modal shift is limited. Consequently, only a high speed rail network which includes Scotland and therefore delivers journey times of under three hours can achieve significant modal shift from air to rail.

"We are aware of the ecological footprint of flying and would actively seek alternatives that can allow us to complete our business but reduce our ecological foot print. A high speed rail link would very much increase our options provided to all staff required to travel if the times quoted can be delivered."

Barclays Bank

Internationally, the introduction of high speed rail services on long-distance routes has been proven to encourage modal shift. In some cases commercial airlines have withdrawn routes served by new high speed rail services, including between Paris and Marseille and London to Paris. In Spain, the introduction of the Madrid to Barcelona high speed line has allowed rail to capture a market share marginally below 50%, and this is expected to increase significantly over the short to medium term<sup>42</sup>. The following table shows the significant modal shift from other transport modes and the growth in the rail market share across key European travel markets.

<sup>42</sup> Greengauge (2009a)



Table 5  
Change In Rail Market Share across key European Routes

Route	Distance	Before	After
Paris to Marseille (TGV, 1999-2005)	663 km/412 miles	22%	65%
Madrid to Seville (AVE, 1991-1997)	391 km/243 miles	19%	53%
Paris to Brussels (Thalys, 1994-2005)	262 km/163 miles	24%	52%

Source: Eurostar (2009)

HS2 Ltd (2011a) also identify international examples of significant mode shift after the introduction of high speed rail. The consultation paper highlights the route between Frankfurt and Cologne where flights have almost ceased since the opening of high speed rail connections.

A high speed rail network which includes Scotland will also have environmental benefits through increased provision for rail freight. As highlighted in section 4.2.3, a new high speed rail line will release train paths for freight service provision preventing freight from having to remain on the road due to the existing line reaching capacity.

Forecasts prepared for Greengauge 21 (2009a) suggest that a full high speed rail network would result in an annual reduction in CO<sub>2</sub> emissions by 2055 of 1 million tonnes, with the Manchester to Scotland section accounting for 54% of this reduction. This is based on the expected reductions in car and air travel, but also takes into account the forecast carbon emissions arising from passengers travelling on high speed rail services. By far the biggest benefit is secured from the forecast reduction in air travel. This assumes that electricity is increasingly generated by low-carbon sources, as indicated by government policy.

Assessments of future emissions are also complicated by the treatment of landing slots at constrained airports freed up in any shift from air to rail (the CCC estimate shown earlier requires these are withheld) and the impact of the EU Emissions Trading Scheme, which caps total emissions in certain sectors, including electricity generation. Changes to these assumptions would reduce the estimated carbon saving but would allow for increased economic impacts through, respectively, increased flight connections and other economic activity which would otherwise be subject to the cap.

### 4.3.2 Embodied carbon

Embodied carbon represents the carbon emissions associated with construction operations such as constructing the rail infrastructure and trains, as well as the embodied carbon within the bulk construction materials. HS2 Ltd (2011c) attempted to estimate the embodied carbon associated with building a new high speed rail line. The results are shown in the table below.

Table 6  
Embodied Carbon Emissions for Current Proposed Route and the Extension to Scotland

Route	Carbon Emissions MtCO <sub>2</sub> e
Current Proposed Route	+1.2 (+0.29 to +2.12)
Extension to Scotland <sup>1</sup>	+5.36 (+1.16 to +9.59)
The Reference Case	0 (0 – 0)

Source: HS2 Ltd (2011c)

Notes: <sup>1</sup>The extension to Scotland route refers to the route from the West Midlands to Scotland. Carbon emissions are expressed as a mean and range of uncertainty. No details are available at present for embodied carbon associated with the reference case.

Emissions from embodied carbon are largely due to the use of high energy bulk materials such as steel and concrete, and high energy intensive construction practices such as tunnel boring. It should be highlighted that the embodied carbon emissions figure presented in table 7 for the extension to Scotland is the total embodied carbon for the route from the West Midlands to Scotland and therefore is higher than the marginal impact of extending from the North of England to Scotland.

On balance, it can be seen that despite considerable levels of embodied carbon, the inclusion of Scotland in the UK’s high speed rail network is essential for realising significant reductions in UK carbon emissions as it vitally important in achieving major levels of modal shift from air to high speed rail.





In the previous section an assessment of the benefits arising from a high speed rail link to Scotland has been presented. The case for the Scottish link also depends on the additional costs of both the construction and operation of the link. The cost estimates provided below are based on analysis by HS2 Ltd and Greengauge 21. The components of the estimated cost of the high speed rail link to Scotland are:

- Capital costs – the cost of land purchases, design, materials, construction (including labour and power), allowance for risk and an allowance for optimism bias. Optimism bias reflects the likelihood of project planners estimating costs to be lower than they eventually prove to be.
- Operating costs – the operation and maintenance of the railway including train crew and station staff, the maintenance and lease of the rolling stock, again with optimism bias.

## 5.1 Capital costs

Greengauge 21 (2009e) estimate the infrastructure costs including depot costs and optimism bias associated with a high speed rail section from Manchester to Scotland at £16.9billion (2009 prices). This cost estimate is built up from a variety of unit costs which are derived from different sources. The primary source is the High Speed One line, between London and the Channel Tunnel, with this being the only high-speed line in the UK. Greengauge 21's consultants highlight that HS1 is, per kilometre, the most expensive high speed railway that has been constructed anywhere in the world (financing costs excluded) and therefore argue that these unit costs cannot simply be applied as they stand. They believe that costs for future high speed development could be less, particularly in the context of a large national high speed rail project that would have less overhead per km of line. Therefore, the analysis has adopted unit costs that have similar characteristics to the proposed line sections. For example, Contract 240, which is composed mostly of tunnels from Stratford to London West Portal, was used as a basis for urban tunnels. Data on the construction of high speed lines in France were then used to identify and adapt any costs that seemed over- or underestimated.

Caution should be taken with the Greengauge 21 capital cost estimates as when modelled sections are compared with similar HS2 Ltd<sup>43</sup> sections there are considerable differences in the values. Their analysis results in an estimate of £16.8 billion<sup>44</sup> (2009 prices) for HS2 (London – West Midlands). An estimate of £9.2 billion (2009 prices) for London to Birmingham Central & Birmingham International is provided by Greengauge 21 (2009e). This route is not an exact comparison as it does not include a spur to Heathrow but gives an indication of the differences in the cost estimates, with HS2 Ltd's costs being 81% higher.

<sup>43</sup> HS2 Ltd also used a bottom up process to derive the cost estimates using a variety of available data sources.

<sup>44</sup> HS2 Ltd (2009)

Given the significant difference between the Greengauge 21 and HS2 Ltd cost estimates, an uplift of 50% has been applied to the Greengauge 21 cost estimates for the Manchester to Scotland link, in the absence of any other evidence at this stage. This gives an estimated capital cost of £25.4 billion (2009 prices). However, it can be argued that in business case terms this is a cautious estimate as actual costs may be lower. In 2009 HS2 Ltd commissioned a 'benchmarking' study by independent consultants, BSL, which investigated civil engineering costs in other countries and compared them to costs in the UK. This study showed that civil engineering costs in the UK are up to twice what they are in other comparable European countries. Following this, the Infrastructure Cost Review, undertaken by Infrastructure UK (IUK), part of HM Treasury, investigated the findings further and identified the scale of issues and a range of possible actions that could be undertaken to reduce the cost of civil engineering construction in the UK. Therefore, if these actions are successful in reducing civil engineering costs in the UK, the cost of the high speed rail link to Scotland would fall.

## 5.2 Operating costs

Data for Greengauge 21's operating and maintenance cost model are mainly derived from UK inter-city train operating company operating costs and on the existing infrastructure management costs, and adapted to the high speed context according to practice on existing systems in other countries. These costs are then factored for which year they arise in as certain unit costs increase or decrease over time (inflation excluded) as they depend on: wear and tear of equipment, increase of energy costs, staff wages etc. The analysis assumes that maintenance costs of infrastructure globally increase by 2% p.a. between two renewals (track equipment must be replaced after 30 years). In addition, train operating companies' costs have been assumed to increase by 0.5% p.a., reflecting common practice in French preliminary high speed rail studies. Given these assumptions, Greengauge 21 estimate the annual operating cost in 2055 for the high speed link from Manchester to Scotland would be £396 million (2008 prices). However, there is also a reduction in the operating cost of the existing line in 2055, due to released capacity, of £73 million resulting in the total annual change in 2055 operating costs arising from the high speed rail link to Scotland of £323 million (2008 prices)<sup>45</sup>.

It is not possible to verify these figures with any estimates provided by HS2 Ltd as the two analyses do not provide operating cost figures for equivalent routes.

<sup>45</sup> Greengauge (2009b)

## 5.3 Challenges to analysis

Much of the quantitative benefits for the high speed rail link to Scotland has been provided by analysis undertaken by Systra and MVA for Greengauge 21. The analysis involved high level modelling and was aimed at making the case for a high speed rail network, rather than detailed analysis of a specific route. The model results provide a key source of evidence to support the argument that a high speed rail link is essential in achieving the greatest economic and environmental benefits for Scotland. However, the modelled results used by Greengauge 21 may be considered to be based on optimistic assumptions.

A key assumption in Greengauge 21's demand forecasting is that demand is capped in 2055. This is in contrast to HS2 Ltd who cap demand in 2043. Greengauge 21 argue that it would have been inappropriate to use any other demand cap than 2055 as the high speed rail network was still being built up to 2055 in the model. Capping the growth in passenger demand in a specific year has been a topic of debate throughout the appraisal of HS2, with HS2 Ltd delaying the demand cap in their model by 10 years in their most recent analysis. The later the demand cap is applied the higher the level of passenger demand and therefore the more people affected by the high speed rail link. Consequently, the later demand cap will result in a higher level of benefits compared to the equivalent analysis with an earlier cap.

It should also be noted that due to different timings with the Greengauge 21 and HS2 Ltd analysis there are significant differences in the economic growth forecasts used in the modelling. If the Greengauge 21 analysis was to reflect the latest economic forecasts it is likely that the level of benefits would fall.

Section 5.1 identifies an additional assumption in the Greengauge 21 analysis which may seem to be optimistic, with capital costs significantly lower than that of HS2 Ltd. However, as detailed that section it would be hoped that through actions of Infrastructure UK the cost of civil engineering projects in the UK would fall and therefore the final construction costs would be less than the HS2 Ltd estimates.

## 5.4 Risks

Greengauge 21 (2010) identify several key risks which are inevitably associated with a technically, environmentally, financially and politically complex project such as high speed rail. However, given appropriate risk management and mitigation these risks should not impact the decision to include Scotland in the UK's high speed rail network.

# 6. Value for Money

Section 4 clearly shows that there are significant economic and environmental benefits provided by a high speed rail link to Scotland. DfT (2007) acknowledges this, arguing that the inclusion of Scotland in the UK high speed rail network is essential for the project to achieve significant reductions in UK carbon emissions. The significance and importance of including a high speed rail link to Scotland is also highlighted by Greengauge 21 (2009a), with their analysis showing that the section between Manchester and Scotland provides the highest Benefit to Cost ratio out of all of the sections modelled. A breakdown of these results for the Manchester to Scotland section are shown below in table 7. All results are calculated over a 60 year appraisal period.

**Table 7**  
Quantified Costs and Benefits (£ millions) of Manchester to Scotland (2002 PV/Prices) and resulting BCR Over 60 year appraisal period

(1)	Present Value of Benefits	£26,767m
(2)	Capital Costs	£10,184m
(3)	Operating Costs	£3,361m
(4)	Total Costs = (2) + (3)	£13,545m
(5)	Revenue	£10,007m
(6)	Present Value of Cost = (4) - (5)	£3,538m
(7)	Net Present Value = (1) - (6)	£23,229m
(8)	Benefit-Cost Ratio (excluding Wider Economic Benefits) = (1) / (6)	7.6

Source: Greengauge 21 (2009b)

The Greengauge 21 analysis provides a very strong positive case for a high speed rail link to Scotland. The Benefit to Cost ratio of 7.6 shows that for every £1 spent by Government, the scheme would deliver £7.60 in benefits. It is important to note that this calculation does not include the significant wider economic benefits which will arise from the introduction of a high speed rail link to Scotland.

Table 8 presents a sensitivity analysis of the Greengauge 21 results. Capital costs have been uplifted by 50% and the present value of benefits have been reduced by 10% to reflect the optimistic assumptions in the Greengauge 21 analysis. Despite these changes the high speed rail link to Scotland provides a strong economic case with a Benefit to Cost ratio of 2.8.

**Table 8**  
Sensitivity Analysis - Quantified Costs and Benefits (£ millions) of Manchester to Scotland (2002 PV/prices) and resulting BCR over 60 year appraisal period

(9)	Present Value of Benefits = (1) x 90%	£24,090m
(10)	Capital Costs = (2) x 150%	£15,276m
(11)	Operating Costs = (3)	£3,361m
(12)	Total Costs = (10) + (11)	£18,637m
(13)	Revenue = (5)	£10,007m
(14)	Present Value of Cost = (12) - (13)	£8,630m
(15)	Net Present Value = (9) - (14)	£15,460m
(16)	Benefit-Cost Ratio (excluding Wider Economic Benefits) = (9) / (14)	2.8

Source: Greengauge 21 (2009b)

Overall, it can be seen that the high speed rail link to Scotland provides significant economic and environmental benefits to Scotland and the rest of the UK. The new link will successfully meet all of its objectives; increasing capacity to comfortably accommodate future demand, significantly improving journey times between Scotland and some of the UK’s major cities, encourage modal shift from air to rail, supporting and benefitting businesses throughout Scotland and enabling Glasgow and Edinburgh to remain competitive in attracting inward investment.

Nonetheless, it is important to note that it is not just the scale of benefits but the timing of when they are delivered that is important, which is why it is essential that Scotland is included in the construction programme north of Birmingham.







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