



# High Speed Rail Strategic Business Case

## Transport Scotland

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# 1. Exec Summary

There is a growing body of evidence of the potential benefits that could arise from a high speed rail link from Scotland to the rest of the UK. This has come from a variety of sources, covering business groups, environmental groups, as well as Government bodies. In response to this, the Scottish Government has instructed Transport Scotland to develop this Strategic Business Case, which will feed into the detailed appraisal to be undertaken later in the year by High Speed Two on behalf of the UK Government.

The purpose of the Strategic Business Case is firstly to establish the case for change and the need for investment; and secondly to provide a suggested way forward for the scheme.

The Government Economic Strategy (2007) 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.*

Edinburgh and Glasgow are key to Scotland's economy, with their city centres alone contributing 30% of Scottish output; data from the Strategic Transport Projects Review suggests that the city regions could make up more than 70% of Scotland's economy. Supporting the development of these two cities is a key part of the Government Economic Strategy. Linkages to London and the south are important for these cities, as they facilitate commerce and industry, and in particular the export of financial and business services, which together make up more than 25% of Scotland's exports to the rest of the UK. Good rail links are twice as important to these industries as to other sectors in the Scottish economy.

The principle of high speed rail cross-border links, which is set out as an aspiration in the National Planning Framework for Scotland Two, is clearly compatible with the Scottish Government's strategic objectives, in particular the following objectives for transport:

- Making connections across and with Scotland better;
- Improving reliability and journey time; and
- Maximizing the opportunities for employment, business, leisure, and tourism.

Edinburgh and Glasgow are not only key contributors to the Scottish economy in their own right, but they are also catalysts of economic growth in the rest of Scotland.

This study has reviewed the potential benefits of a high speed link, and its results will feed into the business case being developed by High Speed Two, which will be presented to the UK Government in the beginning of 2010. The Scottish Government will work closely with High Speed Two over the coming months to ensure that the case for bringing high speed rail to Scotland is fairly represented.

From reviewing the available evidence, it is clear that extension of the high speed line all the way to Scotland represents the best option. Even under conservative assumptions, a high speed line will deliver the most significant economic welfare benefits to Scotland, and only a full line will deliver the step change in journey times which is required to achieve modal shift from air to rail, with the associated environmental benefits. Indeed, current evidence suggests that a high speed rail line will only be able to deliver reductions in UK carbon emissions if it is extended to Scotland.

Failure to bring the high speed line to Scotland will disadvantage the Scottish economy, particularly the tourist industry. A limited development of high speed lines in England will mean that cities in England unfairly benefit compared to those in Scotland, as they attract more visitors, and make Scotland appear the poor relation of the UK.

The high speed line will attract more development to Edinburgh and Glasgow, supporting the Scottish Government's aim to develop the cities into a single economic mass.

The merits of different alignments will be examined in more detail at the next stage of the business case development process. At this stage, the Scottish Government's preference is for a line which splits north of the border to provide direct access to both Glasgow and Edinburgh. This will provide the best opportunity for balanced development between the two cities, which, by maximizing the amount of room for development to occur in, will help ensure that the potential of high speed lines is fulfilled in Scotland.

The Strategic Business Case provides a rationale for intervention and enough evidence for a scheme or project to be allowed to proceed to development. At this stage of the project, detailed information on the commercial, financial, and management arrangements for the project has not been developed. These aspects will be advanced by High Speed Two, with involvement from the Scottish and UK Governments as required.

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## 2. Investment Case

### 2.1 Purpose

The purpose of this Investment Case is firstly to establish the case for change and the need for investment; and secondly to provide a suggested way forward for the scheme. It:

- Identifies the problems to be addressed and the potential opportunities that could be realized;
- Sets out the objectives of the investment, which will address these problems and opportunities; and
- Identifies the intervention which optimises value for money in delivering these objectives.

### 2.2 Strategic Vision

The Government Economic Strategy (2007) 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.*

Furthermore, it sets out five Strategic Priorities, which are internationally recognized as being critical to economic growth:

- Learning, Skills and Well-being;
- Supportive Business Environment;
- Infrastructure Development and Place;
- Effective Government; and
- Equity.

Two of these in particular are relevant to the case for improved links between Scotland and the rest of the UK. 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 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 of Scotland and the development of internationally competitive firms; and
- A particular policy focus on a number of key sectors with high growth potential and the capacity to boost productivity.

These key sectors are:

- Creative Industries;
- Energy;
- Financial and Business Services;
- Food and Drink;

- Life Sciences;
- Tourism; and
- Education

Improved links between Scotland and the rest of the UK will help improve regional equity both within Scotland and the UK as a whole, and strengthen Scottish businesses' competitiveness. An important influence of intra-Scotland equity will be the impact of new cross-border high speed services on existing routes, such as the direct London-Aberdeen services on the east coast main line.

Finally, the Government Economic Strategy also sets out the following objectives for transport:

- Making connections across and with Scotland better;
- Improving reliability and journey time; and
- Maximizing the opportunities for employment, business, leisure, and tourism.

## 2.3 Strategic Context

There is a growing body of evidence of the potential benefits that could arise from a high speed rail link from Scotland to the rest of the UK. This comes from a variety of sources:

- Business and tourism;
- Environmental; and
- Government.

A wide range of Scottish businesses associations, including the Scottish Chambers of Commerce, Scottish Financial Enterprise, and VisitScotland, as well as Scottish Local Authorities and Regional Transport Partnerships, have collaborated to produce the High Speed 2 Scotland report<sup>1</sup>, which sets out the belief in the business community that improved rail links to London can deliver significant economic and environmental benefits. These latter benefits have been emphasized by environmental bodies such as Transform Scotland<sup>2</sup>, Greenpeace<sup>3</sup>, and the World Wildlife Fund (WWF)<sup>4</sup>.

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 noted that Britain's railways are now carrying more people per year (1.3 billion) than at any time since 1946 when the network was almost twice the size<sup>6</sup>. This 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, with new high-speed lines delivering passengers to the centre of Birmingham, Manchester, Liverpool, Glasgow and Edinburgh with calling points at Warrington and Preston. This line was to be delivered by 2020.

Greengauge 21 recently published their ambition for a UK-wide high speed rail network<sup>7</sup>. This also examined various options and alignments and recommended a phased

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<sup>1</sup> Scottish Chambers of Commerce *et al.* (2009)

<sup>2</sup> Written submission from Transform Scotland to Scottish Parliament's Transport, Infrastructure, and Climate Change Committee, 20<sup>th</sup> October 2008

<sup>3</sup> Greenpeace (2009)

<sup>4</sup> WWF (2009)

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

<sup>6</sup> Network Rail (2009b)

<sup>7</sup> Greengauge 21 (2009c)

approach to the introduction of a full high speed rail network across the UK. This includes trains operating at speeds of 200mph (320kph), 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.

Both the Network Rail and Greengauge 21 reports make firm conclusions that high-speed rail must include Scotland in order to maximise economic and environmental benefits.

The benefits of improved rail links are also being recognised by the UK and Scottish Governments. In January 2009 the UK Government established High Speed Two, a new company that would consider the case for investing in new high speed lines; and in February 2009 the Scottish Parliament's Transport Infrastructure and Climate Change Committee published a report into the potential benefits of high speed rail, which stated that there was no doubt that such links would provide significant economic benefits to Scotland, enhance Scotland's attractiveness as a place to do business, and provide clear environmental benefits.

As well as investment in potential cross-border high speed lines, the Scottish Government has committed itself to a range of improvements to existing Scottish rail services as set out in the Strategic Transport Projects Review. These will include enhancements to the Highland Main Line and services between Aberdeen and the central belt. These improvements need to be borne in mind when considering the final form of cross-border lines to ensure that links between the north of Scotland and the rest of the UK are optimized.

It is due to the strong evidence of the potential economic and environmental benefits of improved rail links that the Scottish Government set out its intention to work with the UK Government to deliver journey times of less than three hours between London and central Scotland in its second National Planning Framework.

## 2.4 Economic Context

Scotland has a population of just over 5 million, equivalent in size to other small European countries such as Denmark and Finland, and output with a value in excess of £93 billion in 2006. This is equivalent to around 8% of the UK economy. The service sector is the largest sector in the Scottish economy, accounting for 82% of all employees, followed by the production (9%) and construction sectors (6%)<sup>8</sup>. The largest sub-sector within services is public sector, education and health while Scotland also has strong business and financial services sectors, together accounting for 23% of the economy's employment; tourism accounts for a further 8%. The largest sub-sector within manufacturing is electronics and electrical engineering, followed by food & drink.

Table 1, below, provides an overview of key economic indicators for the Scottish economy overall, and its two main economic centres Edinburgh and Glasgow. UK values are also provided for comparison.

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<sup>8</sup> Scottish Economic Statistics 2008

**Table 1 - Overview of the Edinburgh, Glasgow, Scottish, and UK economies**

	Aberdeen city & shire	Dundee	City of Edinburgh	Glasgow City	Scotland	UK
Population (000s 2008)	448	142	472	584	5,169	64,431
GVA £m (2006)	10,879	4,132*	14,192	14,867	93,361	1,177,232
GVA per head £ (2006)	24,550	16,431*	30,620	25,602	18,246	19,430
Employment 000s (2008)	241	64	251	264	2,521	29,454
Employment % 2008	81.0%	69.1	76.1%	66.4%	76.0%	74.6%
Employment growth 1999-2005 (000s)	11.0	14.1	46.5	57.6	210	1,881
Employment growth 1999-2005 (%)	4.2%	22.5%	17.2%	16.3%	9.7%	6.9%
Unemployment 000s 2009 (claimant count)	5.0	4.7	10	24	133	1,580
Unemployment % 2009 (claimant count)	1.9%	6.3%	3.8%	8.5%	4.7%	4.9%
No. of businesses (workplaces)	20,535	3,455	15,975	16,265	154,635	4,766,295
No. of businesses employing over 250 people	685	420	980	1,115	2,285	8,140
No. of businesses employing 50-249 people	440	185	660	810	3,575	30,210
No. of businesses employing under 50 people	7,030	2,855	14,335	14,340	148,770	1,259,845
Business per 1000 population 2007	45.8	24.3	30.4	24.6	28.8	74.0
Business birth rate (new businesses per 1000 population in 2007)**	3.1	1.6	5.0	4.2	3.7	4.7
Business Churn (ratio of business births to deaths 2007)**	1.39	1.2	1.50	1.45	1.56	1.32
3 year business start-up survival rate (%)**	69.0%	63.9%	63.1%	58.4%	63.8%	63.9%
Business Expenditure on Research and Development (BERD) £m (2007)	58.1	42.8	147	22.5	513	16,111

\* Figures for Angus and Dundee City

\*\* Refers to VAT registered businesses only

Source: Scottish Government, ONS, GROS, BERR

### *Edinburgh economy*

The Edinburgh city region economy is at the heart of the Scottish economy, with the city itself accounting for 15% of output and 9% of the population of Scotland.

Edinburgh, like other capital cities, 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 Edinburgh and the surrounding areas. Over a third of workers in Edinburgh are graduates compared to a fifth for Scotland. The higher skills mix leads to higher earnings and productivity within the city, GVA per head being 68% above the national average.

Edinburgh is home to a large number of highly innovative companies, investing in research and cutting edge technologies such as biotechnology and life sciences. Business expenditure on research and development (BERD) stood at £147 million in Edinburgh during 2007, the latest year available, 29% of the Scottish total. New business starts in Edinburgh are above the Scottish average and Edinburgh also has a dynamic corporate sector with more businesses per thousand residents than the Scottish average.

The key sectors in Edinburgh include financial services, tourism, life sciences (including biotechnology and translational medicine) and creative industries.

The City of Edinburgh is acknowledged as the UK's second most competitive financial centre following London, and is ranked seventh in Europe. Around 38,780 people work in the financial services sector in Edinburgh representing an increase of 27% since 2000. Edinburgh accounts for around 40% of all financial services employment in Scotland.

With a critical mass in banking, fund management, life insurance, securities, corporate finance, broking, asset servicing and support services, financial companies are opting to move their businesses to the Edinburgh city region. Financial services companies headquartered in Edinburgh include one of the world's largest banking corporations, the Royal Bank of Scotland Group; the UK's largest supermarket bank, Tesco Personal Finance; and leading Life & Pensions providers including Standard Life, Scottish Widows and AEGON UK. Following its acquisition of HBOS, the Lloyds Banking Group has a major presence within Edinburgh. The city also attracts international players including HSBC, Citigroup and a growing asset administration sector populated by top international firms including State Street, UBS AG and Bank of New York Mellon.

Despite fears that the current recession would significantly downgrade the city's economy (particularly because of the scale of financial industries), the evidence to date is that it is coping relatively well in the circumstances, with the unemployment rate remaining substantially below the UK and Scottish averages.

### *Glasgow economy*

Glasgow is Scotland's largest city and urban economy with GVA of nearly £15 billion and supporting around 400,000 jobs. Financial and business services and real estate was the major growth sector in employment between 2000 and 2008, employment increasing by 46% with the creation of 24,685 jobs.<sup>9</sup> 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).

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<sup>9</sup> Business Services and Real Estate includes several sub-sectors as defined according to UK Standard Industrial Classification (SIC) codes 2003. Information on such classifications is available at [http://www.statistics.gov.uk/methods\\_quality/sic/downloads/UK\\_SIC\\_Vol1\(2003\).pdf](http://www.statistics.gov.uk/methods_quality/sic/downloads/UK_SIC_Vol1(2003).pdf)

The economy is now dominated by the service industry which accounts for 89% of city employment, having seen significant recent growth in financial and business services, public administration, communications, biosciences, health and retail. The city's specialisms sectors include life sciences, tourism, creative industries (digital media, TV & film production, music and design) and energy. It 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.

The city has a successful business tourism sector which is a significant contributor to growth and development. Around 2,500 new hotel rooms are currently in planning, and with the Commonwealth Games in 2014, there is a development momentum which is enabling Glasgow to weather the impacts of recession better than many other UK cities.

Glasgow has now reversed a long term downwards trend in population due to in-migration, improved labour market conditions and broader social and cultural infrastructure to attract and retain residents.

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 such as Dell to set up in the city. A number of the key general insurance companies in the UK have a base or head office in Glasgow – including Direct Line and Esure. 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 Caledonian Universities, Glasgow School of Art and the Royal Scottish Academy of Music and Drama), investors have access to a highly talented labour force. The city's efficient public transport network also delivers a labour pool of around 1.5 million people from the travel to work area.

#### *Aberdeen and Dundee economies*

The Aberdeen and Dundee city regions have a key role as drivers of sustainable economic growth in Scotland, representing strategic concentrations of business activity<sup>10</sup>. Any extension of a high speed line to Dundee or Aberdeen will be assessed on the basis of an investment case and affordability. Both cities and surrounding regions, would however, be significantly affected by the initial creation of a link to the central belt. Currently, these two cities account for slightly less than 3% of cross-border rail trips but almost 15% of cross-border air trips, indicating that there is scope for modal shift from air to rail if reductions in cross-border journey times can be achieved.

The population of Aberdeen City was around 210,000 in 2008, accounting for 4% of Scotland's people. Although its population has decreased overall by 1% since 2001 it has been growing steadily since 2004. The city and surrounding shire produces approximately 12% of Scotland's total output. 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.

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<sup>10</sup> Scottish Government (2008b)

Aberdeen City has become increasingly dominated by the service sector. In 1999, the service sector accounted for 73% of jobs in the city whilst the production and construction sector accounted for 27%. By 2007, the service sector accounted for 78% of jobs in the city whilst the production and construction sector accounted for 22%. The energy and water sector accounted for 11% of jobs in the city. The tourist industry is also becoming increasingly important in Aberdeen.

Traditional industries such as fishing and farming still flourish in and around the city but Aberdeen's buoyant modern economy – reflected in claimant count unemployment rates consistently under 2% – is fuelled by the oil industry, earning the city a new epithet as 'Oil Capital of Europe'. The city has recently re-branded 'Aberdeen City and Shire' to reflect its strong regional offering which also includes distilling.

Dundee is the fourth-largest city in Scotland, with a population of around 142,000. It currently contributes approximately 4% of Scotland's GVA, although the Dundee Waterfront has been identified as offering substantial strategic growth potential due to the opportunity to exploit knowledge economy linkages<sup>11</sup>. Dundee's economy is also dominated by the service sector, which accounted for over 80% of jobs in 2007. 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.

### *Inward Investment*

Edinburgh and Glasgow have performed strongly both in terms of attracting foreign direct investment (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>12</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>13</sup>

Inward investment data is not published at the Scotland level. Some data is available from Scottish Development International, which is involved in a range of investment projects. This data largely relates to investment in the Edinburgh and Glasgow city regions, and therefore does not provide a good indication of the regional distribution of inward investment in Scotland. Table 2 demonstrates the pattern of inward investment activity over the last four years:

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<sup>11</sup> Scottish Government (2008b)

<sup>12</sup> FDI Magazine, European Cities & Regions of the Future 2008/09.

<sup>13</sup> Ernst & Young (2008)

**Table 2 - Sectoral breakdown of SDI-assisted inward investment in Scotland**

	2004/05	2005/06	2006/07	2007/08
Life Sciences	18%	8%	0%	53%
Energy & Engineering	1%	3%	34%	16%
Ship & Marine	0%	30%	0%	10%
Business and Financial Services	47%	33%	57%	18%
Electronic Markets	0%	8%	0%	3%
Other	34%	17%	9%	0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: Scottish Development International (SDI)

It is clearly very difficult to identify trends in the data; however, business and financial services is a consistently large attractor of investment, and is the largest sector in all but one year. Investment in other sectors appears to fluctuate more markedly. It is also noticeable that there has recently been a sudden marked increase in investment in life sciences, highlighting its potential as a future growth sector.

The SDI data suggests that the USA is the main source of inward investment to Scotland contributing 53% of total inward investment in 2007/08. A further 27% came from England. This is perhaps a surprising result, and likely reflects the fact that SDI is focussed around attracting foreign investment; however, these countries are the top two destinations for Scottish exports, indicating a correlation between levels of FDI attracted and the export profile of an economy. The level of openness within an economy will impact on its ability to attract FDI, with export orientated economies more likely to attract the knowledge transfer and networking benefits associated with FDI. Attracting investment and an increasing export profile are mutually beneficial features of the economy, aiding future growth potential.

### *Exports*

As a small open economy with a limited domestic population to increase demand for Scottish goods and services, export markets are important in ensuring Scottish economic growth. Manufactured goods accounted for nearly three quarters of all Scottish exports to the rest of the world in 2007 with £2.8 billion or 13% of the total going to USA, Scotland's largest external export market.

Scotland's main export market is the rest of UK (RUK) which in 2007 accounted for nearly £37 billion or 63.5% of total Scottish exports. The importance of the RUK as an export destination for Scottish goods and services can be attributed to the shared geographic, language, regulation and currency characteristics which minimise barriers to trade. Services are the most important source of exports to RUK: nearly 65% of total exports to RUK in 2007 were in service industries.

RUK has been an important growth market for the Scottish economy, with exports rising by 35% since 2002 alone. Table 3 shows the growth in Scottish exports over the same period has largely been determined by this growth in exports to the rest of the UK.

**Table 3 - Scottish exports by destination**

	2002 £m	2003 £m	2004 £m	2005 £m	2006 £m	2007 £m
Estimated Total RUK Exports	27,240	30,955	33,445	33,590	34,800	36,065
Estimated Total Rest of World Exports	19,870	19,010	18,125	18,025	19,310	20,665
Estimated Total Exports (RUK + ROW)	47,110	49,965	51,570	51,620	54,110	56,725

Source: Global Connections Survey, 2007

Table 4 identifies the six most important sectors of the Scottish economy in terms of exports to RUK over recent years. Financial intermediation was the most important Scottish export sector, accounting for nearly a fifth of total exports in 2007. The dominance of financial intermediation as a Scottish export sector reinforces the robust reputations of Edinburgh and Glasgow as financial centres while also demonstrating strong linkages with London, a global financial capital. Improved transport links are likely to further strengthen these business links and sector growth potential. Other key sectors like business services, or energy are also major sources of Scottish exports to RUK.

**Table 4 - Sectoral analysis of Scottish exports to the rest of the UK**

Sector	2002 £m	2003 £m	2004 £m	2005 £m	2006 £m	2007 £m
Financial Intermediation	3,495	6,575	5,145	6,010	6,485	6,370
Wholesale, Retail & Repairs, Hotels & Restaurants	4,180	4,255	6,025	6,040	5,210	5,200
Electricity, Gas & Water Supply, Construction	2,845	3,190	4,350	3,205	3,670	3,825
Business Services	2,900	2,735	3,445	3,160	3,545	3,780
Manufacture of Food Products and Beverages	2,325	2,310	2,535	2,780	2,910	2,965
Land, Water & Air Transport & Auxiliary Transport Activities	1,670	1,950	2,025	2,420	2,385	2,415

Source: Global Connections Survey 2007

### *Tourism*

Tourism has been identified as one of Scotland's key sectors in the Government Economic Strategy. It is one of Scotland's largest business sectors, providing direct employment for over 200,000 people and generating GVA of more than £4 billion a year. Approximately half of this is generated in Scotland's four strategic cities. In terms of domestic visitors, the United Kingdom Tourism Survey (UKTS)<sup>14</sup> measures the volume and value of tourism trips taken by residents in the UK. In 2008, over 12 million domestic tourists took overnight trips to Scotland with annual expenditure estimated at £2.8 billion.

The tourism industry is also a key sector of both the Edinburgh and Glasgow economies, currently worth £1.4 billion per year and attracting around six million visitors a year<sup>15</sup>. It is also increasingly important in Aberdeen, which now accounts for more than 10% of Scotland's tourism-related GVA<sup>16</sup>.

<sup>14</sup> United Kingdom Tourism Survey (2009)

<sup>15</sup> VisitScotland (2008)

<sup>16</sup> Scottish Government (2008a)

Edinburgh is the most visited UK city after London<sup>17</sup>. Tourism related employment accounts for 12.5% of the workforce and attractions include the Edinburgh Summer Festivals, of which Edinburgh Festival Fringe is the largest arts festival in the world, and the Hogmanay celebrations.<sup>18</sup>

In Glasgow and the Clyde Valley tourism provides employment for 8.3% 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. Glasgow was named as the UK's international conference capital for 2008<sup>19</sup>.

Between them, Edinburgh and Glasgow also have eight of the top ten free visitor attractions and seven of the top ten paid attractions in Scotland. This is in addition to the number of sports tourists attracted by international and European events in both cities throughout each year.

In Aberdeen City and Shire 7.5% of employment is tourism related. Not only does the city acts as Scotland's northern gateway, being the principle port to the Shetlands and Orkney, it also provides a wide range of tourist attractions, such as the Malt Whisky Trail and the Castle Trail. During the winter it also provides opportunities for skiing and other winter sports.

Dundee City also has 7.5% of its employment in the tourism industry. The top tourist attractions in the city are the Dundee Science Centre and the University of Dundee Botanic Garden. The city also provides access to many tourist attractions in Angus, including the Forfar Loch Country Park, Crombie Country Park, and Glamis Castle.

Outside of the four strategic cities, tourism plays an important role in much of the rest of Scotland, particularly in more rural areas. Tourism related employment, for example accounts for approximately 13% of employment in Argyll and Bute and the Highlands and Islands, where key visitor attractions include the Isle of Bute Discovery Centre and Urquhart Castle. In Dumfries and Galloway, tourism accounts for approximately 9% of employment, and attractions include the World Famous Old Blacksmith's Shop Centre, the fourth most popular attraction in Scotland.

#### *City links to the Government Economic Strategy*

The Scottish Government's Economic Strategy sets out the Government's ambitions for the Scottish economy and how it will meet its objective of raising Scotland's sustainable economic growth rate. The Strategy emphasises the importance of Edinburgh and Glasgow to the Scottish economy and highlights the benefits that greater links between the two cities and beyond would bring to businesses and the wider economy.

The strategy also focuses on a number of key sectors in Scotland with high growth potential and the capacity to boost productivity, which are set out in Section 2.2 above. The Scottish Government intends to create the right environment for delivering competitiveness and growth in these sectors through investment in physical infrastructure, research and development, education and skills and business support.

Ring-fencing of local government funding for specific projects has been replaced by the introduction of Single Outcome Agreements. Each Community Planning Partnership agrees a Single Outcome Agreement with the Scottish Government based on the 15

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<sup>17</sup> Office of National Statistics (2009)

<sup>18</sup> *ibid*

<sup>19</sup> ICCA (2008)

National Outcomes, therefore ensuring consistency between local and national government development plans.

The main National Outcome which has an impact on transport development is the commitment to ensure “we all live in well-designed, sustainable places where we are able to access the amenities and services we need.”<sup>20</sup> Strong transport and telecommunication links will enhance the attractiveness of Scotland as a place in which to do business, while the promotion of sustainable modes of transport will help improve health through improved air quality and other factors. In order to achieve this Outcome there is a commitment for the Scottish Government to work along with local authorities to raise the quality, accessibility and affordability of public transport.

Single Outcome Agreements provide local authorities with the flexibility to address issues which are more pressing in their area while ensuring no conflict with national objectives. They therefore concentrate on removing any potential local barriers to growth while helping meet Scottish Government objectives.

In Edinburgh, the growth of the economy has been identified as being dependent on sustainable transport infrastructure. Outcomes identified by the Edinburgh Partnership include ensuring that it continues to attract the skilled workforce and investment required to maintain itself as an internationally competitive business location, and that it continues to build on its strength as the most popular UK tourist destination after London<sup>21</sup>.

In Glasgow, the local outcomes targeted by Glasgow Community Planning Partnership include increasing the number of jobs in the city, increasing the proportion of more productive jobs, and increasing the performance and volume of business carried out in the city; these are complemented by an outcome to improve Glasgow's physical environment and infrastructure, which is identified as a vital component of a successful economy<sup>22</sup>.

In Aberdeen, a key focus of the Single Outcome Agreement is to provide a supportive business environment and to promote tourism. These will help drive wealth creation and help reduce the level of deprivation in the city. Delivering a fully integrated transport network is also one of the seven priorities for the area, alongside the attracting and developing of a skilled workforce.

In Dundee, a key focus of the Single Outcome Agreement is to develop Dundee as a regional centre, attracting a highly skilled workforce to the city, as well as developing the city's strengths in the knowledge economy. This could be assisted through improved transport links to other strategic economic centres.

## 2.5 Objectives

In this context, the aim of investment in high speed rail links is to support the Government's Purpose by helping to achieve the following National Outcomes:

- We live in a Scotland that is the most attractive place for doing business in Europe;
- We realise our full economic potential with more and better employment opportunities for our people;
- We reduce the local and global environmental impact of our consumption and production; and

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<sup>20</sup> [Scottish Government \(2007\)](#)

<sup>21</sup> Edinburgh Partnership (2009)

<sup>22</sup> Glasgow Community Planning Partnership (2008)

- Our public services are high quality, continually improving, efficient and responsive to local people's needs.

In order to achieve these outcomes, the following objectives have been set for the investment in high speed rail services:

#### **Investment Objective 1**

Improving journey times and connections between Scotland and London, other UK cities, and continental Europe

#### **Investment Objective 2**

Reduce the overall ecological footprint associated with cross-border travel

In order to ensure transparency, accountability, and consistency through the business case process, it is important that SMART targets are set to accompany these objectives. A SMART target is one which is:

**S**pecific  
**M**easurable  
**A**ttainable  
**R**ealistic  
**T**imed

The development of these targets has been informed by the initial assessment of the potential impacts of improved cross-border links. This ensures that they are Attainable, Realistic, and also outcome focussed.

## **2.6 Potential options**

The set of options which have been considered to meet the objectives are:

- Improvements to existing rail services (no new infrastructure);
- Limited development of high speed lines in England, with associated journey time improvements for long-distance services to Scotland; and
- Dedicated high speed lines between London and Scotland.

The potential journey times and market shares of these different options is shown below in Table 5.

**Table 5 - Journey times from the central belt to London of different options**

Option	Fastest journey time
Current	4 hrs 45 minutes <sup>23</sup>
Improvements to existing services	4 hrs 10 minutes <sup>24</sup>
High speed lines in England only	3 hours 40 minutes <sup>25</sup>
Full high speed line	Less than 3 hours

## 2.7 Assessment of benefits

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:

- International comparison of HSR in other countries
- Potential impacts on inward investment
- Potential impacts on businesses and development
- Potential economic welfare benefits
- Wider economic benefits/E&G collaboration benefits (dependant on alignment)
- Environmental impact

### 2.7.1 *International comparison of HSR in other countries*

High speed rail has positively impacted on the economies and provided environmental benefits to countries such as France, Germany and Italy, as evidenced by trends in rail market share and observed modal shift<sup>26</sup>. However, differing geographical constraints, economic appraisals and planning laws in each of these countries make it difficult to make direct comparisons; there are however, many lessons to be learned.

In order to make the case for high speed rail, it is important to recognise the key drivers that justify its implementation. In the context of international markets, there are some comparisons which can be related directly to the UK and some which may require further consideration. Internationally, the key drivers for implementing a high speed system were: capacity issues; reduced journey times; modal shift; economic and environmental considerations.

#### *Capacity*

One of the key drivers for high speed rail across the world has been the need to increase capacity. It was the predicted shortage of capacity that first motivated countries such as Japan, France and Germany to consider high speed rail as an option for releasing

<sup>23</sup> Average of current journey times, significant variability exists.

<sup>24</sup> Assumes deliver of the Intercity Express Project (IEP), with 4h 10m becoming the regular and fastest journey time.

<sup>25</sup> Based on Department for Transport (2007b), which suggested a new high speed line constructed only in England would allow a 3 hr 25 minute journey from Scotland to London non-stop, with an additional 15 minutes added to the journey time to allow for stops at intermediary stations.

<sup>26</sup> Eurostar (2009)

capacity. Where new lines have been constructed to create additional capacity, they have often been used to provide high speed rail journeys that offer a significantly faster journey time than is possible on conventional railway lines. Additionally, the capacity freed up on the traditional line has been used to improve freight and other passenger services.

In the 1980's and 1990's, when most other European countries were constructing or considering high speed rail lines for capacity reasons, the rail network in the UK did not require such an intervention. However, this is no longer the case as predicted figures show an increase in passenger demand in the next 20 years on all conventional routes.

**Table 6 - Forecast Rail Passenger Demand Increases on UK Network**

Route	Growth, 2006 - 2026
East Coast Main Line (ECML)	69%
Midland Main Line (MML)	84%
West Coast (WCML)	104%
Great Western Main Line (GWML)	80%

Source: Atkins (2008)

#### *Modal shift*

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.

Across Europe, the pattern of modal shift is repeated. In Spain, the introduction of the Madrid to Barcelona high speed line has allowed rail to capture a market share marginally above 50%, and this is expected to increase significantly over the short to medium term. 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.

**Table 7 - 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)

#### *Reliability*

The reliability of high speed rail is positive compared to air, road and the existing conventional rail network. In Spain, passengers on Madrid to Seville services are 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. Punctuality on the new high speed link to the Channel Tunnel has also reached 92%<sup>27</sup>.

### 2.7.2 *Potential economic welfare benefits*

Within transport, the economic welfare benefits of projects are typically valued in terms of reduction in travel time. Some of these benefits are used to measure the final impact on the 'real' economy, but they also include other benefits which accrue to leisure travellers which may not impact on traditional measures such as GDP.<sup>28</sup>

This approach is well established in transport appraisal, and the methodology applied is standard not only in the UK but internationally; however, there are inevitably weaknesses to the approach, two of which are particularly relevant for this study.

#### *Valuation of business time savings*

The valuation of business time savings is currently an area of debate within transport appraisal, and this is an area which is being researched by the Department for Transport. The debate relates to assumptions regarding the amount of work that can be undertaken by business travellers whilst travelling, and the current value of time is criticised as being too high. Whilst no change is expected in the short term, the most recent research paper undertaken for the Department for Transport<sup>29</sup> indicated that a reduction in the value of time savings may be appropriate.

#### *Treatment of large cost changes*

The appraisal of transport schemes has been developed to deal with schemes that make relatively small improvements to the transport network. Where schemes introduce large improvements, standard techniques will tend to overestimate the value of these improvements. This is a particular weakness where the relationship between demand and journey time is assumed to be non-linear, as is the case with high speed rail.

The combination of these two impacts would suggest that it would be preferable to select interventions that deliver significant net economic welfare benefits on a large scale. This would ensure that, should future changes to appraisal practice show that the initial benefits were overestimated, the intervention would still be capable of delivering significant benefits.

Although the above limitations need to be borne in mind, it is only possible to undertake appraisals today using existing best practice. Table 8 below shows the potential economic welfare benefits of reducing journey times between Edinburgh and Glasgow, and London. These have been calculated by applying standard values of time to the resulting time savings to existing travellers, over a standard appraisal period.

**Table 8 – Potential welfare benefits to Scotland of reduced journey times between the Central Belt and London (£m, 2002 prices)**

Journey time saving	0.5 hrs	1 hr	1.5 hrs	2 hrs
Benefit	£270m	£540m	£815m	£1,085m

<sup>27</sup> Greengauge21, (2009)

<sup>28</sup> GDP, or Gross Domestic Product, is a measure of the total output of a country's goods and services.

<sup>29</sup> Department for Transport, (2008)

Table 8 shows that, as would be expected, the greatest benefits are associated with the largest time savings, with a two hour reduction in journey time delivering benefits in excess of £1bn. Despite the potential for a standard approach to overestimate benefits, as discussed above, these benefits are considered to be conservative, for the following reasons:

- They are based on existing rail journeys only, and do not allow for benefits associated with new trips, either from demand growth over time or from people switching mode;
- They represent only trips between Edinburgh or Glasgow and London, and so exclude benefits for trips from other parts of Scotland or to other parts of the UK.

The potential benefits, which are clearly significant, will be investigated in more detail through the analysis that is being undertaken by the UK group High Speed Two. The Scottish Government is working in partnership with this group to ensure that benefits to the Scottish people of high speed rail are fairly represented in the overall business case.

### 2.7.3 *Potential 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 reductions in journey times. These can arise from the following:

- Reduced business costs;
- Densification of business activity; and
- Improved labour supply.

#### *Reduced business costs*

Reducing the cost of travel for businesses not only provides them a direct benefit by reducing their costs, but it also means they are able to increase production. The benefits associated with this are shown below in Table 9, for the journey time savings identified above.

**Table 9 - Wider business benefits**

Journey time saving	0.5 hrs	1 hr	1.5 hrs	2 hrs
Benefit	£20m	£35m	£55m	£75m

As Table 9 demonstrates, these benefits are significant, but also far smaller than the standard benefits shown previously in Table 8. This is a standard result.

#### *Densification of business activity*

The densification of business activity allows firms to take advantage of spillovers and synergies. This effect is generally considered to occur only over relatively short distances. As a result, it is unlikely that even the fastest high speed links would result in any significant densification of cross-border business activity. This effect is therefore not particularly relevant for this study. There is the potential, however, for a high speed link between Edinburgh and Glasgow, depending on the final alignment of a new line, which may allow significant opportunities for collaborative working practices and help allow the two cities to become a single economic entity. A study of the potential for these benefits to arise between Edinburgh and Glasgow identified benefits of £150m if a twice hourly service with a 35 minute journey time were introduced in addition to existing services; however, this study considered improvements between Edinburgh and Glasgow in isolation from cross-border improvements, and if the latter were to benefit one city more

than the other (see Section 2.10), this would potentially skew the densification of business activity toward this city, which might affect these results.

#### *Improved labour supply*

Benefits relating to improved labour supply are unlikely to be relevant to this study. The main mechanism for the delivery of these benefits is through improvements to commuting opportunities. Existing levels of commuting on current cross-border services are extremely low, and although there may be an increase in long distance commuting with the introduction of high speed rail services, this is expected to be small in relation to overall levels of patronage, and the impact is considered to be insignificant in relation to the overall benefits of high speed rail services.

### *2.7.4 Potential impacts on business and development*

The economic welfare benefits discussed above are abstract in nature. It will also be important to consider how these benefits manifest themselves in the real economy, through impacts on business and development.

#### *Potential impact of HSR*

Historically, it has been difficult to establish the impact of major transport interventions on economic indicators such as employment, and therefore at this stage it is assumed that there will be no significant increase in Scottish employment as a result of a high speed line. This seems an especially reasonable assumption for a high speed rail line, as one of the key mechanisms through which transport interventions may increase employment is by reducing the costs of commuting. It is likely that a high speed line between Scotland and London would have little impact on commuters, and therefore may be expected to have few benefits in the labour market.

An area where a high speed line would be expected to have an effect is the location and growth of existing businesses. The impact on attracting new business is discussed in Section 2.7.5 below.

The business response to the opening of a high speed line between Scotland and London will almost certainly be to increase investment in the Glasgow and Edinburgh city areas. What is uncertain is the scale and timing of this impact.

Establishing the timing of the business response is difficult. With such a long term project, there is the possibility that business will begin relocating in advance of its opening, in anticipation of the potential benefits. As a cautious approach, however, it is assumed that the majority of development will take place after the opening of the rail line, as has been found to be the case with the Docklands Light Railway<sup>30</sup>.

The scale of the response will be determined by the importance of the change to businesses, and their ability to capitalize on the business opportunity. The evidence on the importance of transport links is mixed. In a recent Scottish business survey<sup>31</sup>, only 4% of businesses identified the current quality of transport infrastructure and services as a major concern; the primary transport related concern was the cost of fuel, and 65% of businesses identify investment in improving road networks as a top priority, compared to 15% identifying investment in rail. Businesses also reported that reliable and relatively

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<sup>30</sup> Smith, Howard (2002)

<sup>31</sup> Scottish Enterprise *et al.* (2008)

low cost travel was twice as important as journey time. This suggests that the business response to high speed rail lines may be relatively small; however, this lack of concern with transport infrastructure may in part be due to the difficult economic climate at the time the study was undertaken, or to the fact that their views on the rail network related more to local rail services than the possibility of significant step-changes in cross-border services. A UK survey<sup>32</sup>, in comparison, identified transport links to other cities as the fifth most important factor in determining business location, although the relative importance of rail links compared to road was not clear.

Although rail networks were generally not viewed as being of high importance, with only up to 11% of respondents rating them as important, they were approximately twice as important to businesses in the financial services, life sciences, and creative industries sectors of the economy, with more than 25% of businesses in these sectors indicating that they would like to make more use of rail services than they are currently able to. These are sectors which are important in Glasgow and Edinburgh, with financial and business services alone contributing almost 30% of employment in the two cities.<sup>33</sup> The issue of high speed links to London was also raised by some businesses in the survey. Therefore, it is reasonable to conclude that there is the potential for high speed links to significantly affect business decisions in the central belt.

Development which occurs in Glasgow and Edinburgh following the opening of any high speed link will likely be redistributed from elsewhere rather than new development. This is the conclusion of previous studies<sup>34</sup>, which suggest that up to 95% of development following investment in transport links is redistributed from other areas. Given that other major cities in the UK will also be benefiting from high speed links, it is likely that development in Edinburgh and Glasgow will be abstracted from other regions of Scotland, most likely other areas in the central belt which most compete with these cities.

Despite this, it is also the case that the strong links between Edinburgh and Glasgow city regions and the rest of the Scottish economy mean that much of this wealth will be recycled back to these areas from which development is initially abstracted, albeit in a different form from which it may have occurred without the introduction of a high speed line. This will particularly be the case for regions which have strong commuter links to the cities.

It is logical to assume that most development will be related to the financial services, life sciences, and creative industries, as these are the sectors to which rail is most important. The potential for these industries to develop will be determined by the policy support they are given. It is generally accepted that providing new infrastructure alone will not stimulate development, but that it needs to be supported by a business friendly environment. Edinburgh city centre in particular, where the existing rail terminus is based, is already highly developed, with planning restrictions hampering new development as there is a desire to maintain the city's heritage. As a result, development in the city has moved away from the city centre to the West Edinburgh area. This is less the case in Glasgow, where there continues to be land available for developments such as the International Financial Services District. There is, however, a risk that, if the high speed line terminates at Glasgow and Edinburgh city centres there is the potential for development to be constrained and absorbed through higher property rents in city centres, particularly if the high speed line connects Glasgow to the rest of the UK via Edinburgh, and therefore primarily improves cross-border connections to the capital rather than Glasgow.

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<sup>32</sup> Cushman and Wakefield (2007)

<sup>33</sup> ONS (2008)

<sup>34</sup> See Llewelyn-Davies et al., (2004) for a review; see also, Debrezion, G., *et al.*, (2004); Dabinett (1998); and Network Rail (2009c)

The development response will also in part be determined by the policy support provided by government. There is the potential for the Scottish Government to ensure greater regional distribution of benefits by providing improved regional transport links. The enhancements provided by the Strategic Transport Projects Review will help promote links between the central belt and the rest of Scotland, and therefore assist in ensure that the benefits of high speed rail links are fairly distributed throughout Scotland.

Overall, high speed links between Scotland and London are expected to bring most benefit to Glasgow and Edinburgh. It is expected that this will largely take the form of the increased development in the financial services, life sciences, and creative industries. This may come at the expense of other areas of Scotland, most likely that of Edinburgh and Glasgow's competitors in the central belt, although it is possible that there could be a general shift of development away from the peripheries of Scotland toward the central belt. This negative impact will likely be partly or possibly wholly offset by recycling of wealth back to the cities economic hinterland, with this effect strongest for the communities with strong commuter links to the cities. The final scale of these impacts will depend on the support provided by government and planning authorities, as well as the size of improvement that the final line delivers to Scottish businesses. The latter will be investigated in more detail by High Speed Two in the next stages of the business case process.

### 2.7.5 *Potential impacts on 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 FDI;
- Retaining existing investment; and
- Expanding existing investment in face of competition from other areas.

As a single factor, transport is unlikely to be crucial in determining levels of investment. This is perhaps unsurprising, as transport costs in general form less than 5% firm costs<sup>35</sup>. More important are factors such as access to skilled labour and the presence of clusters of similar firms. A recent Department for Transport study concludes:

"the majority of inward investment decisions are triggered by factors other than the desire to physically relocate operations; therefore the potential of transport to attract FDI is limited. This does not mean that transport has no role in attracting FDI, just that the impact of transport investments is likely to be small when measured as a percentage of total FDI into a country."<sup>36</sup>

In an economy where different regions compete for investment, however, it is possible that improvements in transport infrastructure in one region could lead to a shift in investment toward that region. This has led to concerns that Scotland could become a less attractive place for business should investment in high speed rail occur only in England. The counter to this argument is that constructing a full high speed link to Scotland would allow English firms to access Scottish markets without the need to maintain a physical presence, and so would therefore be harmful to Scotland; this is

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<sup>35</sup> McQuaid *et al.* (2004)

<sup>36</sup> Department for Transport (2004)

similar to the experience in the United States of building highways to the Appalachian region. There is little evidence to inform this argument either way.<sup>37</sup>

Some regional modelling has been undertaken by Greengauge 21, as part of a study into the benefits of high speed rail. This concluded that, although the introduction of a limited high speed network may cause disbenefit to a limited number of regions in England and Wales, Scotland was expected to benefit in all scenarios. This is in line with expectations, as the distance between Scotland and the major urban areas in the rest of the UK is such that Scotland can be viewed as a distinct regional market. Therefore, investment in high speed links in England is likely to harm the peripheral English or Welsh regions not included in the network, rather than Scotland.

In conclusion, improvements in cross-border rail links are unlikely to affect the level of inward investment in Scotland. Domestic business in Scotland, however, is expected to benefit regardless of the size of the network, although the benefits are expected to be significantly greater if Scotland is directly linked to London by a high speed link.

### 2.7.6 *Potential impact on tourism*

It is difficult to forecast the impact of improved rail links on tourism. Historically, transport appraisal has been concerned with understanding the impact on commuter travel, and to a lesser extent business decisions.

It is unlikely that improved rail services would lead to an overall increase in the amount of tourism within the UK. The choice of destination for tourist trips is likely to be determined primarily by the facilities and attractions available at the destination, although the cost of travel is naturally a consideration. Tourist travellers are often more concerned with the monetary cost of their journey than the amount of time it takes; therefore, the final fare that is charged on any high speed service will likely be key in determining the final impact on tourism.

The primary role of improved rail services is expected to be redistributive; that is, there will be a shift toward rail as a mode of travel for existing tourists. Currently, 11% of tourists from the UK arrive by plane, and 11% by rail.

It is likely that the tourist sector in Scotland could suffer if high speed links were only to be built in England. This is because, for the north and midlands of England, London and the south would become a relatively more attractive tourist destination; for London, although Scotland would become a more attractive tourist destination, it would lose in relative terms to the areas which had benefitted from the high speed link.

In comparison, such an outcome would be avoided by the extension of a high speed line to Scotland. This would also provide the potential to increase the amount of domestic tourism, as Scottish tourist destinations would become as accessible by rail from London as those in the near continent. This impact is expected to be small, however. As discussed above, the main impact of high speed rail is expected to be redistributive, either existing tourists switching to rail travel, or by tourists travelling to areas which benefit from high speed links.

Redistribution of destinations in Scotland is expected to be low. This is because Glasgow and Edinburgh act as gateways to many destinations in or north of the central belt for journeys from the rest of the UK. As such, it is expected that tourists currently travelling

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<sup>37</sup> *ibid*

beyond these cities to access the northern parts of Scotland would continue to do so after any high speed line were introduced.

An increase in tourism to Glasgow and Edinburgh would, however, likely benefit much of the rest of Scotland, as tourists would venture away from the cities to see other attractions in Scotland, even if only on day trips. The main risk to Scottish tourism is expected to be that Scots currently holidaying domestically may choose to travel to other parts of the UK. The primary impact of any high speed line would be to open Glasgow and Edinburgh to similar competition in the form of markets for short city-breaks. As such, destinations north of Glasgow and Edinburgh, which would not benefit from improved rail services, such as Stirling, Aberdeen, or Perth, would be most at risk at losing tourism, although this effect is expected to be small as these destinations offer a unique combination of the urban and rural experience that is not available in most easily accessible English tourist destinations. The delivery of enhancements to regional services, making them more accessible from the central belt, as set out in the Strategic Transport Review, will also be the opportunity for these areas to increase their share of tourism from England, should tourism in Edinburgh and Glasgow increase. The final regional impact is therefore uncertain.

The overall impact of a high speed link on tourism in Scotland is therefore expected to be positive. This is because Scotland is viewed as being well placed to maintain its domestic tourist markets whilst also competing with other UK tourist destinations for UK tourists. Therefore, the tourist industry in Scotland would be expected to benefit at the expense of other parts of the UK. Glasgow and Edinburgh are expected to receive the majority of the benefit, at the expense of destinations in the north and midlands of England where they will be most competitive, but there would likely be some benefit to the wider Scottish economy, if only from tourists primarily visiting Glasgow and Edinburgh making trips to other parts of Scotland.

### 2.7.7 *Environmental impact*

The assessment of projects' environmental impact is a key part of appraisal, particularly with regards to understanding the carbon impact. This is an area where best practice is regularly being updated, and the Department for Energy and Climate Change is due to issue new guidance later this year.

The assessment of improved rail links is complicated by the fact that emissions from both domestic aviation and electric rail are covered by the European Union's Emissions Trading Scheme. This scheme controls the total emissions of CO<sub>2</sub> from various sectors of the economy at the EU level, in order to meet the EU's carbon reduction targets. As such, individual projects within the scheme do not affect overall scheme emissions. This means that, regardless of the degree of modal shift from air to rail, improved rail links will not contribute directly to mitigating climate change, although they will contribute to delivering government targets to reduce domestic emissions.<sup>38</sup>

This is not to say that there are no climate change related benefits from such links. Several types of benefits could potentially exist:

- A global reduction in greenhouse gases would be achieved if there were modal shift from road to rail;
- Making travel less carbon intensive, allowing us to make better use of scarce resources within existing carbon budgets; and

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<sup>38</sup> More information on the EU Emissions Trading Scheme and its treatment in appraisals is available from the Department for Energy and Climate Change at [www.decc.gov.uk](http://www.decc.gov.uk)

- A reduction in Scottish (but not global) emissions of CO<sub>2</sub>, contributing toward the Scottish Government’s climate change target.

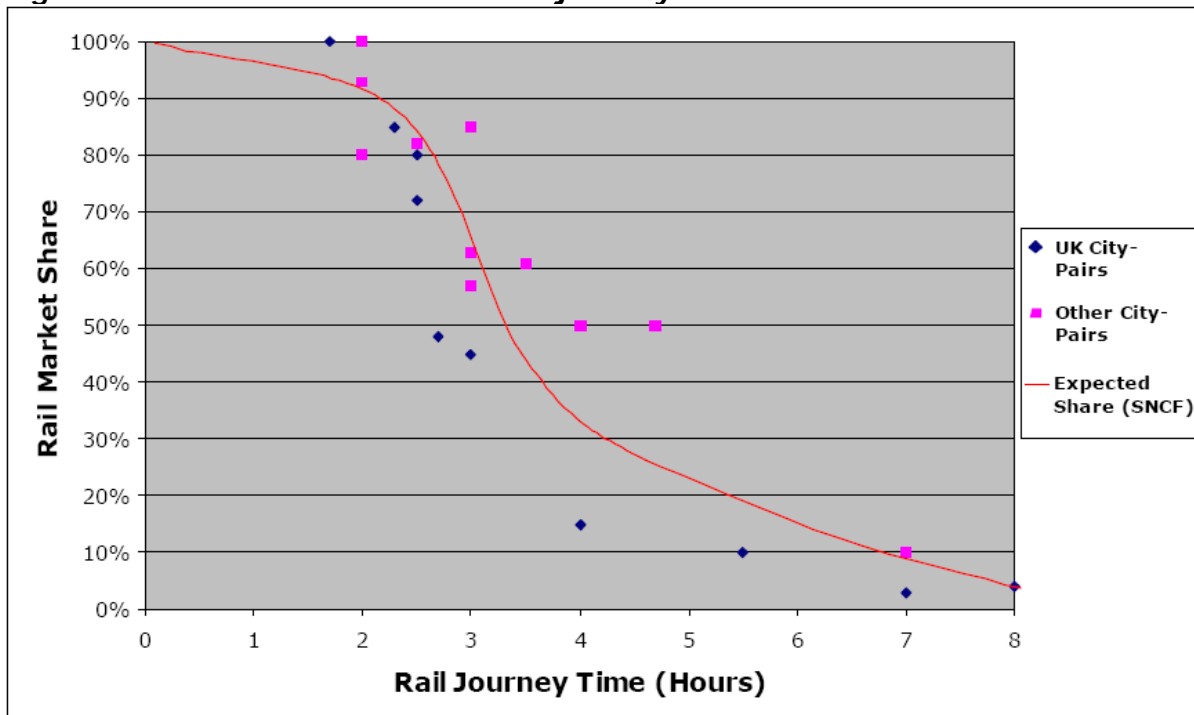
These last two effects are not necessarily mutually exclusive.

*Overall emissions associated with cross-border travel*

Overall cross-border travel emissions will depend on the degree of modal shift from air to rail, and on the change in the number of flights. At this stage, it is expected that the modal shift from road to rail would be relatively small, although this will be investigated further as more detailed modelling is undertaken. Should modal shift from road to rail prove significant, this would provide additional benefits.

Modal shift from air to rail is generally accepted as being largely determined by the journey time by rail. Figure 1 below shows point data for a range of European and UK city-pairs. A trend line has shows the standard relationship.

**Figure 1 - Rail market share and rail journey time**



Source: Greengauge 21 (2009a)

As might be expected, rail market share increases as journey times decrease, with a journey time of three hours or below required to achieve a significant rail market share.

An attempt has been made to quantify the carbon savings of achieving a given level of rail market share for journeys between the Scottish central belt and London. The results are shown below.

**Table 10 - Potential annual reduction in cross-border travel emissions**

Journey time (hours)	4	3.5	3	2.5	2
Rail market share	29%	48%	67%	82%	91%
CO <sub>2</sub> savings (Mt CO <sub>2</sub> )	0.042	0.097	0.153	0.197	0.224

This is a relatively simplistic assessment based solely on the change in passenger kilometres. This approach may therefore overstate the potential benefits, as in reality emissions from aviation will only decline if there is a reduction in the number of flights rather than the number of passengers. The numbers above also do not take into account the carbon impact associated with the construction of any new high speed lines.

A recent Department for Transport study<sup>39</sup> has investigated the degree of modal shift from air to rail required to achieve a reduction in carbon emissions for travel between Scotland and London. This suggested that a rail market share of at least 62% would be required to achieve lower overall emissions. This is believed to be a cautious estimate, as there was little allowance for the decarbonisation of grid electricity, but indicates that a significant degree of modal shift will likely be required to reduce emissions from cross-border travel; however, the study also identified that high speed lines within England would have little or no impact on reducing emissions, as the use of rail relative to air is already high; rather, in order to achieve significant reductions in UK carbon emissions, the study concluded that extending the high speed line to Scotland appeared essential.

#### *Reduction in Scottish emissions*

Any reduction in overall emissions associated with cross-border travel will ideally result in lower carbon emissions from Scotland as a whole, and therefore contribute toward the Scottish Government's climate change targets. However, evidence suggests that reductions in carbon emissions from one sector can often be offset by increases elsewhere in the economy. In simple terms, a reduction in energy associated with cross-border travel will reduce the price of energy, which will lead to an increase in consumption in other sectors of the economy, reducing some of the initial benefits. This is known as the 'rebound effect'. Scottish specific evidence<sup>40</sup> suggests that a third of carbon savings in the transport sector could be offset elsewhere in the economy. In some cases, the long term impact can mean the final saving is even smaller.

#### **The impact of this effect on the potential savings shown in**

Table 10 above is shown below.

**Table 11 - Final potential annual reduction in emissions of Scottish CO<sub>2</sub>**

Journey time (hours)	4	3.5	3	2.5	2
Rail market share	29%	48%	67%	82%	91%
Transport CO <sub>2</sub> savings (Mt CO <sub>2</sub> )	0.042	0.097	0.153	0.197	0.224
Rebound effect (Mt CO <sub>2</sub> )	0.013	0.029	0.046	0.059	0.067
<b>Final savings (Mt CO<sub>2</sub>)</b>	<b>0.030</b>	<b>0.068</b>	<b>0.107</b>	<b>0.138</b>	<b>0.156</b>

<sup>39</sup> Department for Transport (2007a)

<sup>40</sup> Turner, K. and Anson, S. (2009)

In addition to the above benefits upon opening, it is likely that there will be long term benefits as the electricity generation becomes decarbonised. This is shown in Table 12 below. As would be expected, this is significantly smaller than the initial reduction in emissions caused by the opening of the rail service.

**Table 12 - Additional annual savings in CO<sub>2</sub>**

Journey time (hours)	4	3.5	3	2.5	2
Additional annual savings (Mt CO <sub>2</sub> )	0.0003	0.0007	0.0012	0.0015	0.0017

Note that at the analysis presented here has not yet considered any emissions associated with the construction of the rail line. These are likely to be significant, given the scale of the infrastructure required. It is therefore sensible to pursue options which deliver greater modal shift to ensure that the project continues to deliver significant benefits when these are calculated in the later stages of the business case process.

#### *Contribution to Scottish Government climate change targets*

The Scottish Government, under the Climate Change (Scotland) Act 2009, has set itself the target of reducing emissions of greenhouse gases by 80% by 2050, relative to 1990 levels. This is broadly equivalent to achieving a reduction in Scottish emissions of 1 Mt of CO<sub>2</sub> each and every year. The contribution of the carbon savings discussed above to this target is shown below. Naturally, the greater the journey time saving and modal shift from rail, the more significant the contribution to the Scottish Government targets.

**Table 13 - Contribution to Scottish Government climate change targets**

Journey time (hours)	4	3.5	3	2.5	2
Contribution to annual reduction (opening year)	3%	7%	11%	14%	16%
Contribution to annual reduction (long term impact)	0.03%	0.07%	0.12%	0.15%	0.17%

In general, therefore, improved rail links have the potential to significantly contribute to Scottish Government targets on a one-off basis; however, their long term contribution is smaller. The ability for cross-border rail enhancements to reduce global emissions of greenhouse gases is dependent on the degree of modal shift from road to rail. This will be investigated in more detail as the business case process progresses.

## **2.8 Development of SMART Transport Planning Objectives**

At this stage, it is considered that the Transport Planning Objectives are specific, measurable, attainable, and realistic. They are not yet timed, however; this will be an issue addressed as the Business Case for high speed rail progresses.

Given the analysis above, it seems clear that, in order to meet the Investment Objectives for the project, and to ensure that the benefits relating to journey times and carbon are realized, ambitious targets should be set for the project.

**Target 1:** To achieve a journey time between Edinburgh/Glasgow and London of 3 hours or less

**Target 2:** To achieve a rail market share of travel between Edinburgh/Glasgow and London of 66% or better.

## 2.9 Performance of potential options against objectives

The performance of these objectives against the Investment Objectives is shown below.

**Table 14 - Journey times and rail market share for the different options**

Option	Fastest journey time	Likely rail market share	Meets target 1?	Meets target 2?
Current	4 hrs 45 minutes	20%	✗	✗
Improvements to existing services	4 hrs 10 minutes	35%	✗	✗
High speed lines in England	3 hours 40 minutes	50%	✗	✗
Full high speed line	Less than 3 hours	70%	✓	✓

It is apparent from Table 14 that only the full high speed line option is capable of robustly delivering the project Investment Objectives.

## 2.10 Potential alignments for the high speed line

Having established the rationale for a high speed rail link between Scotland and London, a set of more detailed options has been developed. The different potential alignments have been separated into three different categories, which are discussed below. Note that these alignments are illustrative, and will not represent the precise alignments and stopping patterns tested in the later stages of the business case, which will be determined through detailed timetabling and engineering analysis.

### 2.10.1 Alignment 1 – Glasgow-London via Edinburgh

#### *Description and benefits of the alignment*

Under this alignment, the high speed line will enter Scotland at the east coast and reach Glasgow via Edinburgh. Different options are shown in Figure 2. The reverse E provides the shortest route to London, and therefore has the shortest journey time, but with limited access to cities in the midlands, whilst the reverse S provides direct access to Leeds, Manchester, and Birmingham, but with a slightly longer journey time. The benefit of this alignment is that it reduces the required construction of new cross-border infrastructure, reducing capital costs, compared to replacing the existing west and east coast main lines. It also strengthens connections to northern England and the midlands as well as London.

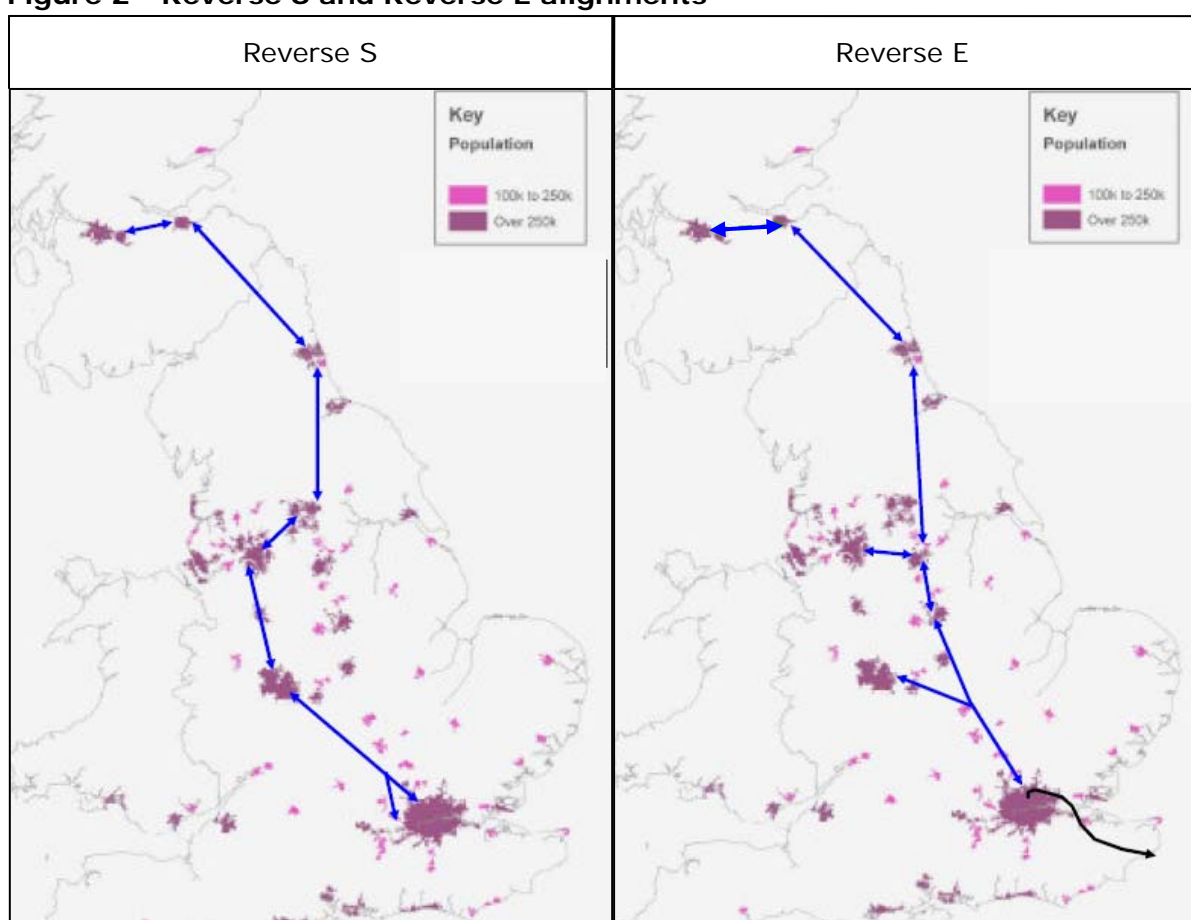
#### *Potential disadvantages of this alignment*

The primary disadvantage of these alignments is that, as mentioned above, access to England from Glasgow on the high speed line is via Edinburgh. This means that there is little improvement in connections between Glasgow and the midlands, and relatively less improvement in connections between Glasgow and London. The circuitous nature of the

route also introduces a requirement for costly trans-Pennine infrastructure. By providing only a single high speed line between Scotland and the rest of the UK, it would also result in the patronage currently travelling on the east and west coast main lines being carried on a single line, thereby increasing the risk of future capacity constraints in the long term.

The alignment would create the risk that there would be a further shift of development away from Glasgow to Edinburgh. Due to constraints of development in Edinburgh, this would mean that the potential for development in Scotland as a whole would not be maximized. The poorer journey times from Glasgow would also limit the potential for modal shift from air to rail and therefore limit the environmental benefits. Furthermore, this alignment does not fit well with current Scottish Government investment in upgrading the existing services between Edinburgh and Glasgow, as it may result in inefficient overinvestment in rail services between the two cities.

**Figure 2 - Reverse S and Reverse E alignments**



Source: Adapted from Greengauge 21 (2009b)

### 2.10.2 Alignment 2 – Dual line network

#### *Description and benefits of the alignment*

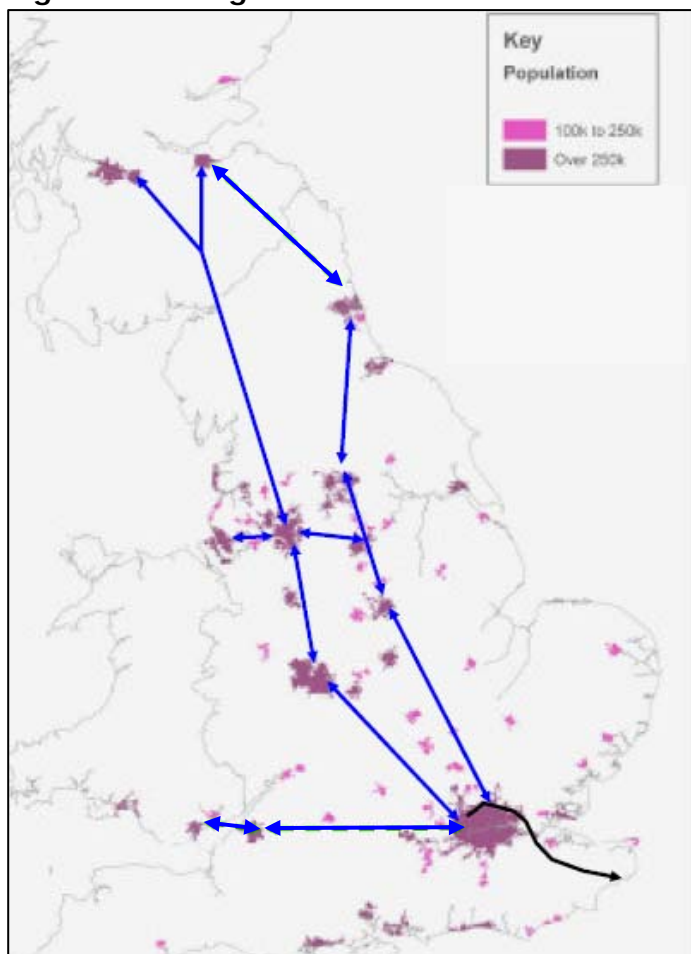
Under this alignment, there would be two north-south dedicated high speed lines, which would essentially parallel the current east and west coast main lines. An illustrative alignment is shown in Figure 3 below. Such a network provides both Edinburgh and Glasgow with fast journey times to London, whilst at the same time continuing to provide good connections from both east and west Scotland to cities in the north and midlands of England. It therefore maximizes both the potential for economic welfare and

environmental benefits. This option also ensures that, were there to be disruptions to services on either of the lines, a high speed service between London and Scotland would still operate.

#### *Disadvantages*

The primary disadvantage of this alignment is cost, as it would require the construction of a significant amount of new infrastructure. If it entailed upgrading any sections of the existing east and west coast main lines, there would be an increased risk of disruption to passengers on existing services during construction.

**Figure 3 - H alignment**



Source: Adapted from Greengauge 21 (2009b)

### 2.10.3 Alignment 3 – Central spine network

#### *Description and benefits of the alignment*

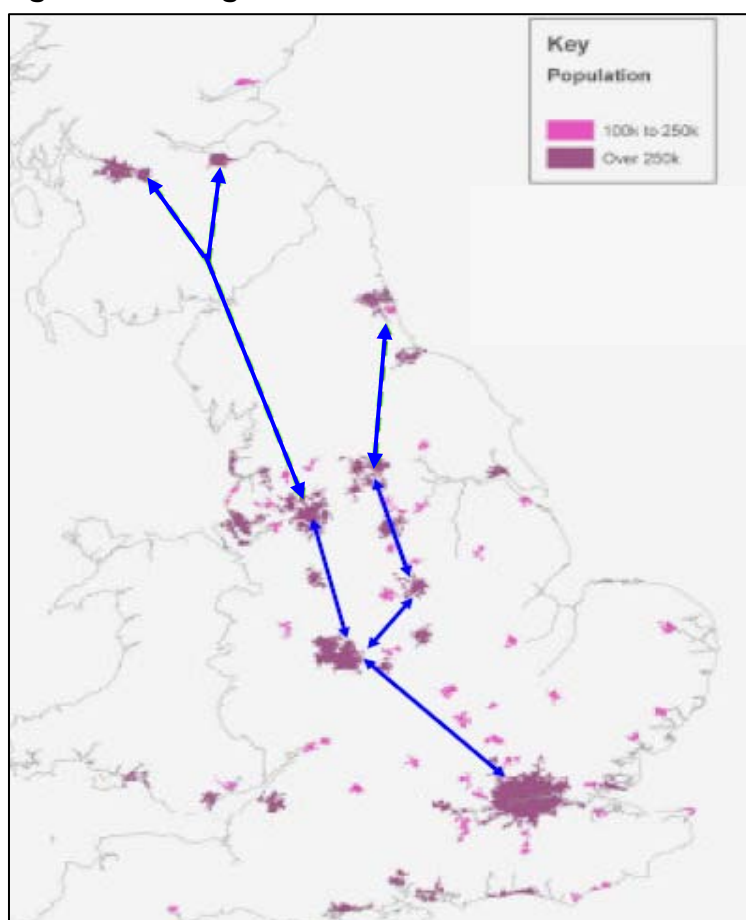
Under this alignment, Edinburgh and Glasgow would be served by two separate high speed lines, but these would join north of the Scottish border to form a single line which would then continue on to England. A potential alignment is shown in Figure 4 below. This option delivers similar journey times to the dual network alignment, and therefore similar economic welfare and environmental benefits, but does so at a lower cost.

#### *Potential disadvantages of this alignment*

The primary disadvantage of this network is that it limits the connections between Glasgow and Edinburgh and cities in the north and midlands of England, depending on the route chosen. In particular it is likely that there would be little improvement for services to Newcastle. Although the final connections to these cities will depend on the alignment and timetable chosen, it is likely that access to cities in the east of England in particular would require longer journey times and possible interchanges.

As with alignment 1 above, replacing the current east and west coast main lines with a single high speed line would increase the risk of capacity constraints in the long term. This risk is increased under this alignment as it concentrates demand on the west coast, which is currently more heavily utilized than for travel between the English regions and London.

**Figure 4 - Y alignment**



Source: Adapted from Greengauge 21 (2009b)

#### 2.10.4 Preferred alignment

The final preferred alignment will not be determined until a detailed economic, environmental, and operational analysis has been undertaken. This will occur in the later stages of the business case development, which will be advanced by High Speed Two, with support of Transport Scotland as required. At this stage, however, Transport Scotland's preferred alignment is the central spine network, which provides the best opportunity to realize economic welfare and environmental benefits whilst limiting cost. The dual line network would connect both Edinburgh and Glasgow a greater range of destinations, with potential to realise substantial economic welfare and environmental benefits, but at a significantly higher cost.

The potential to develop a dual line network should still be seriously considered, however. Although the most expensive alignment, it also has the potential to provide the greatest benefits. It is also the option which is best able to cope with future increases in demand into London and provides the best options for onward travel. A more detailed analysis of costs and benefits, which will be undertaken by High Speed Two as the business case is developed, will identify whether it is sensible to pursue this alignment at the current time, or whether it should be maintained as a long term aspiration. In the case of the latter, it will be important to ensure that any new network is future-proofed, with the potential for later expansion incorporated into the design.

### *2.10.5 Heathrow airport*

The Scottish Government recognises the opposing cases for inclusion of high speed links to a 'Heathrow Hub' in any development of high speed lines between London and the West Midlands. Better connections to Heathrow is likely to be a key objective of the Department for Transport. The Scottish Government does not currently take a strong view on its inclusion although the key focus must remain on investment to attract a core inter-city travel in the first instance, and to deliver the best possible timetables between the major cities across the country. The evidence base for its inclusion will be developed through the High Speed Two appraisal process.

### *2.10.6 Integration with the Scottish rail network*

It is important that the development of a new high speed rail network does not result in poorer quality journeys for travellers from outside of Glasgow and Edinburgh by introducing a need to interchange. Currently direct services from Scotland to the rest of the UK are available not only from Glasgow and Edinburgh, but also from Carlisle, Lockerbie, and Motherwell on the west coast, and Aberdeen, Dundee, and many local stations on the east coast. These areas should not be disadvantaged from the introduction of high speed rail. The case for extending the high speed network to Aberdeen and potentially Inverness should be considered. Should it be felt that this is not economically or technically feasible, the Scottish Government will work hard either to ensure that direct services are maintained, or where this is not possible that adequate mitigation measures are put in place.

### *2.10.7 Channel tunnel rail link*

The National Planning Framework for Scotland Two 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 rail link. The Scottish Government's preference is therefore 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. Commercial, Financial and Management Case

The purpose of the Strategic Business Case is to provide a Rationale for Intervention and provide enough evidence for a scheme or project to be allowed to proceed to development. At this stage of the project, it would be inappropriate to develop detailed information on the commercial, financial, and management arrangements for particular interventions. The section below does, however, set out expectations for the criteria of each and how these will develop over time.

#### 3.1 Commercial Case

Once a clear Investment Case is established there will be a requirement to develop a robust Commercial Case. This will outline the proposed deal in relation to the preferred option or options identified by the Investment Case.

##### *Procurement strategy*

This strategy summarises the best way of achieving the objectives of the project and value for money, taking account of the risks and constraints, leading to decisions on the most appropriate funding mechanism and asset ownership of the High Speed cross-border railway. The aim of the procurement strategy is to achieve the optimum balance of risk, control and funding.

Through the development of the project to the Outline Business Case stage a number of procurement routes will be identified as having the potential to achieve the objectives of the project and value for money in accordance with the relevant guidance. The cost, risk and benefits associated with these routes will be analysed and presented to investment decision makers. The project could be financed in several ways, including capital grant financing, private financing, Network Rail Regulatory Asset Base (RAB) financing, or a combination of the three. In their recent report into high speed rail options Network Rail rule out the option of RAB financing based on the experiences of High Speed 1 (the Eurostar link) and similar international projects.

#### 3.2 Financial Case

This financial case sets out the forecast cost and revenue implications of the preferred option (as set out in the investment case section), the proposed options for financing the costs as described in the commercial case, and the affordability impact. It will confirm whether the project is affordable to Transport Scotland and the Department for Transport. At this stage the cost to Government and the apportionment of the cost is unknown. This will be identified through the work-stream lead by High Speed 2 and subsequent negotiations between the UK and Scottish Governments. Evidence from Network Rail and Greengauge suggest the cost of constructing a dedicated high speed rail network, including cross-border line, will vary between £30 billion to over £100 billion, depending on alignments.

The impact on Transport Scotland's income will be calculated by preparing an outline cost plan (OCP) which estimates all required capital and operational expenditure.

### 3.3 Management Case

At this stage management arrangements are also unknown. As the scheme proceeds to development of an Outline Business Case the management case will be developed to set out the actions required to ensure the successful delivery of the scheme in accordance with best practice, and in a manner consistent with the procurement strategy established.

#### *Project management arrangements*

The nature of the project will require clear management arrangements, including roles and responsibilities, to be agreed with the Department for Transport. The project will, however, be managed in accordance with project management principles and practices as set out in the Association for Project Management Body of Knowledge (PMBOK).

A Project Execution Plan (PEP) will be developed to ensure that planning, cost control, change control progress measurement and status reporting is managed with agreed processes and procedures.

As likely principle funders and authorised undertakers of the project, the Department for Transport and Transport Scotland will oversee the development of the programme and business case, and ensure these are maintained and developed throughout the life of the project.

#### *Benefits realisation*

Benefits realisation is central to the production of a business case. Achieving real benefits is the sovereign objective of any intervention, and that the pursuit of benefits should be the starting and end point of every stage of project development. At the Outline Business Case stage a benefits realisation plan will be developed to:

- Establish exactly what is to be evaluated and how it is to be measured; this should stem directly from the project objectives;
- Establish when benefits are to be evaluated. For long-term projects this should be an ongoing process, beginning six to twelve months after the scheme becomes operational, and continuing every four to five years until scheme closure;
- Define what resources are to be spent on the evaluation, whether there are any constraints on their availability, how long the evaluation process will take, and who will bear the cost; and
- Establish who will be responsible for carrying out the evaluation.

#### *Outline arrangements for risk management*

A risk management strategy will be developed which seeks to ensure the efficient use of resources and to minimise waste by ensuring that risk is allocated to the party best placed to manage it.

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