National Audit Office

Department for Transport

The completion and sale of High Speed 1

Appendix Four

MARCH 2012

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Cost–benefit assessment

1 This appendix explains our assessment of the costs and journey time saving benefits from the project to build a high speed line between London and the Channel Tunnel, which we refer to in Part Three of the Comptroller and Auditor General's report *The Department for Transport: The completion and sale of High Speed 1*. It provides information on the method we used to estimate a value. It also sets out those costs and benefits that we have not included and our reason for their exclusion.

Purpose

2 We have previously reported on the Department's cost–benefit assessments of the project in 1998,[1] before it restructured the deal, and in 2001,[2] before proceeding with the construction of section two. We have reassessed the costs and journey time saving benefits for this report because the Department has not carried out its own analysis. As we state in paragraphs 3.11 and 3.12 of the report the Department and the National Audit Office do not agree on whether the Department could have conducted a partial evaluation of the project at this stage. A study published by LCR in 2009[3] did not include all the costs that are likely to be incurred by the taxpayer.

3 We have estimated the present value of costs and journey time saving benefits to 2070, a 60-year assessment period from the start of domestic services, which is standard for the Department's appraisals of assets it classes as having an 'infinite life'.

Costs

4 We have estimated the costs to the taxpayer of the project and presented them in 2010 prices. The key cost categories are given below:

- Grants paid by the Department to fund construction of the high speed line between 2001 and 2007.
- Grants paid by the Department to reserve capacity for domestic services between 2005 and 2009.

1 Comptroller and Auditor General, *The Channel Tunnel Rail Link*, Session 2000-01, HC 302, National Audit Office, March 2001.
2 Comptroller and Auditor General, *Progress on the Channel Tunnel Rail Link*, Session 2005-06, HC 77, National Audit Office, July 2005.
3 London & Continental Railways and Colin Buchanan in association with Volterra, *Economic Impact of High Speed 1*, January 2009.

- Costs the Department incurred in preparing for the sale of HS1 Limited, including financial support to stabilise and establish Eurostar as a standalone company.
- The cost of servicing and repaying the project debt raised by LCR, with government guarantees, to fund the project. The debt transferred to the Department in June 2009. Final repayment is due in 2052.
- The estimated present value of future subsidy payments for domestic high speed services.
- Proceeds from the sale of the 30-year concession to run the high speed line in 2010 and in 2040 which are treated as negative costs.

5 We have used GDP deflator data published by HM Treasury in October 2011,[4] to present costs in 2010 prices. 2010 was used as the reference year as it was the first full year in which domestic high speed services ran and also when HS1 Limited was sold. We applied HM Treasury's discount rates[5] to future cost streams to calculate present values.

Journey time saving benefits

6 We estimated the value of international and domestic passenger journey time saving benefits to 2070 and discounted them to a 2010 price base. We made the following assumptions in valuing journey time savings:

- International passengers benefitted from a 20 minute time saving between 2004, after section one opened, and November 2007, when services transferred to St Pancras. We have assumed a 33 minute time saving for international passengers from 2008 onwards.
- Journey time savings for domestic services depend on the station from which passengers travel. We have used 2010 passenger data to calculate the proportion of passengers travelling from each station. We have assumed growth in passenger numbers occurs evenly at the stations served by the domestic high speed service.
- Our assessment is based on the most up to date actual passenger journeys on the high speed line for both international (2011) and domestic services (2010).
- We drew on the passenger forecasts contained in HS1 Limited's strategic business plan dated September 2010. Following advice from the Department, we assumed no growth in passenger numbers beyond 2030 (20 years after the first full year in which domestic high speed services ran).

4 Forecast data are consistent with information used in HM Treasury's Autumn Statement on 29 November 2011 available on the HM Treasury website.

5 These are 3.5 per cent real for the first 30 years after a scheme opens and 3 per cent for years 31 to 75. (Source: HM Treasury, *The Green Book, Appraisal and Evaluation in Central Government*, 2003 edition updated in July 2011).

- We calculated a monetary value for journey time savings using the Department's methodology for valuing time, which is consistent with how these savings were calculated in earlier value-for-money assessments. This method gives different values of time for business, commuting and leisure passengers (**Figure 1**). The estimate for business passengers is based on a simplifying assumption that all time savings result in additional productive time or reduced costs to employers. In accordance with the Department's transport analysis guidance, we increased these values in line with GDP growth. We estimated the proportion of different passenger types according to 2008 survey data for international passengers and 2010 survey data for domestic users. Journey time saving benefits are expressed as a present value using HM Treasury discount rates (see paragraph 5 above).

- The analysis does not consider the benefits or disadvantages to passengers on the classic network who may have experienced less crowded services, slower journey times or the loss of rail services following timetable changes when domestic high speed rail services started. We have been unable to provide a value as data are not yet available.

Figure 1
Values of time per person per hour

Traveller	Value of time (2002 market prices) (£)	Value of time (2010 market prices) (£)
In work time	36.96	49.55
Commuting	5.04	6.69
Leisure	4.46	5.92

Source: National Audit Office analysis of the Department for Transport's Guidance WebTAG Unit 3.5.6

- The estimation of journey time saving benefits is not straightforward because those passengers who used Eurostar and domestic passenger rail services before the launch of the high speed link get the full value of the time saving benefits; and those who are new users of the new high speed services only get half of the value to recognise differences in passenger preferences. As we did not have access to detailed passenger forecasts that would allow us to model the behaviour of individual transport users, we calculated a range of journey time saving benefits to account for these differences in the benefits derived by existing passengers and those switching to the new service. Our range of estimated benefits is based on the two extremes that might occur.

- In the first case, we assume that there would be no growth in passenger journey numbers without the high speed line. In this scenario, any estimated journey time saving benefits for increases in passenger numbers after the launches of high speed international and domestic passenger services have been halved. This results in a present value for journey time saving benefits of £6,100 million.

- In the second scenario, we assume that none of the forecast passenger growth is attributable to the high speed line. In this case, all passengers receive the full journey time saving benefit. This results in journey time saving benefits of £7,700 million.

- Our mid-point estimate of the value of journey time saving benefits — £7,000 million — falls between these two extremes.

- We tested the sensitivity of our assumption that there would be no growth in passenger numbers beyond 2030 on our upper estimate of £7,700 million for journey time saving benefits. We tested two scenarios: in the first, passenger numbers did not grow beyond 2020; and in the second, passenger numbers continued growing until 2040. The results of the tests were that:

  - if passenger numbers grow for only ten years, the present value estimate of journey time saving benefits reduces from £7,700 million to £6,800 million; and

  - if numbers grow for thirty years, the present value estimate of journey time saving benefits increases to £8,400 million.

Exclusions from our assessment

7 We have not been able to value some benefits that were part of previous value-for-money assessments for the project that the Department carried out because data showing the extent to which they will be delivered by the project are not yet available (**Figure 2** overleaf). There is a particular absence of data on the additional wider economic impacts and regeneration benefits that the project will deliver compared with what would have occurred without the high speed link. The Department's latest transport analysis guidance assesses a wider range of impacts than considered in the Department's past cost benefit assessments of the project, such as improved rail reliability and wider economic impacts.

Figure 2
Project benefits we have been unable to value

Capacity and crowding

The Department's 1998 assessment included an estimate for capacity benefits. These benefits were not triggered until a certain level of passenger demand was exceeded, which was around 15 million journeys in the case of international services.

Current departmental guidance takes a different approach to valuing capacity improvements. In this approach, crowding penalties are attached to the busy conditions in which passengers must travel. Crowding has fallen by 0.3 per cent across all Southeastern services between 2009 and 2010, in contrast to the overall trend for rail which saw crowding increase between 2009 and 2010. This cannot be directly attributed to the start of domestic high speed services because it is the result of a number of factors. The train operator reports that some 30 per cent of passengers choose high speed services at stations also served by main line services. These data are insufficient to value the capacity benefit for domestic passengers.

Improved journey time reliability

The reliability of train services is important to passengers because delays can disrupt their schedules, and passengers tend to factor in additional travel time if they expect poor reliability. The value of improved journey time reliability was not quantified in the original business case for the high speed rail link. We did not have access to the detailed demand forecasting models or the data that would enable us to estimate these benefits. However, it is clear that passengers using the high speed rail link are benefiting from services that experience little delay (paragraph 1.6). For Southeastern railways overall, including high speed services, there has been only a very small improvement in existing levels of punctuality since these services started.

Other rail user impacts

Other rail user impacts include the benefits of increased service frequency and improved station access times. The value of other rail user impacts was not quantified in the original business case and we did not have access to the data to estimate these benefits.

Other non-rail user impacts

Other non-rail user impacts arise from travellers switching from cars to the high speed rail service, bringing time savings to remaining road users through reduced congestion; reductions in accidents and noise; and improvements to air quality. In its 1998 appraisal, the Department estimated that road decongestion benefits contributed less than 1 per cent to the total estimated value of project benefits. There was no separate estimate of safety benefits. A survey of early users of the domestic service showed that 8 per cent would have travelled by car or coach if the high speed service was not available.

Environmental benefits

A weekly international high speed freight service between Warsaw and Barking started in November 2011. In its 1998 appraisal, the Department estimated that environmental benefits from freight travelling by rail rather than road amounted to 3 per cent of the total benefits from the project. The Department no longer estimates freight user benefits in its transport appraisals and we have therefore excluded these benefits from our assessment.

Under its current guidance, the Department would include a value for changes in greenhouse gas emissions attributable to running passenger services on the line. The Department has not assessed the environmental benefits of the project but would expect a small positive impact.

Loss to HM Government of indirect taxes

Government loses taxes if passengers switch from road to rail because this reduces road fuel duty and VAT revenues and increases spending on rail fares, which are zero rated for VAT. This item was not assessed in the 1998 business case. As stated under other non-rail user impacts above, data on the number of passengers who have switched from road to rail is limited.

Wider economic impacts and regeneration benefits

Transport users directly experience most of the benefits of a transport improvement. However, under certain conditions there may be additional wider economic impacts resulting from a transport scheme such as the positive long-term effects of better transport links between firms in the same sector. The value of these impacts was not quantified in the original business case and we did not have access to the data that would allow us to estimate these benefits.

In its 1998 economic appraisal, the Department estimated that the high speed link would deliver regeneration benefits amounting to £1,000 million over 60 years, discounted to a 1997 price base. It halved this figure to take account of any double counting of benefits already reflected in estimated transport benefits for UK residents, which resulted in estimated regeneration benefits of about £500 million.

The Department's current transport appraisal guidance recommends that wider economic impacts and regeneration benefits are included in an adjusted benefit-cost ratio.

Source: National Audit Office analysis

8 The Department has a number of assets from the project which it can reuse or sell. We have excluded these assets from our assessment because they transferred to LCR as part of the original deal to build the line in 1996. We have not included these assets in our assessment because we cannot separate out how their value has changed since 1996 as a direct result of the project and what is due to external factors. LCR, which is now a wholly-owned subsidiary of the Department, holds a 40 per cent stake in Eurostar International Limited and shares in property development partnerships at King's Cross and Stratford.

9 When it agreed to fund the new Temple Mills maintenance depot in east London, the Department negotiated the return of Waterloo International rail terminal and the existing maintenance depot outside London Paddington station. We have not included the cost of building the new maintenance depot or the upgrade costs Network Rail avoided because Eurostar trains do not have to travel on the North London Line for maintenance. These costs are approximately equal so we have judged that including them would have a negligible effect on our calculations.

10 We have excluded some costs and benefits where the high speed line has been one of several contributing factors as we cannot reliably apportion impact. These projects are:

- the redevelopment of King's Cross St Pancras Underground station by Transport for London, which was partly undertaken to provide capacity for the additional passengers travelling to St Pancras on the high speed line;
- the relocation of the King's Cross Thameslink station to St Pancras as part of the Thameslink programme. The fit-out of the station was delivered by LCR under a separate contract; and
- the 2012 Olympic Games; the high speed line contributed to London winning the right to host the Games.

11 We have not included the costs that the Department incurred on the project before 1996 or the costs of departmental oversight of the project as these cannot be estimated with any accuracy.

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