



Department  
for Transport

House of Lords Economic  
Affairs Committee:  
The Economics of HS2  
Government Response

Moving Britain Ahead

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July 2015



# House of Lords Economic Affairs Committee: The Economics of HS2

## Government Response

Presented to Parliament  
by the Secretary of State for Transport  
by Command of Her Majesty

July 2015



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# 1. Introduction

- 1.1** The Government welcomes this opportunity to respond to the House of Lords Economic Affairs Committee's report into the Economics of High Speed 2.
- 1.2** The Government is confident that the case for HS2 is clear and robust. HS2 will have a transformational effect, supporting growth and increased productivity across the country, particularly in the North. It will improve connectivity, free up space on our crowded rail network, promote regeneration, boost local skills, generate tens of thousands of jobs and help secure the UK's future prosperity.
- 1.3** It is a vital part of the Government's long-term economic plan, strongly supported by the Northern and Midlands cities. Alongside our plans for better east-west rail links set out in the Northern Transport Strategy<sup>1</sup>, HS2 is an important part of the Government's plan to develop a Northern Powerhouse to help rebalance the economy.
- 1.4** The full Y HS2 network represents high value for money and will deliver over £2 of benefits for every £1 invested. People across the country will benefit, but we expect the Midlands and North to do particularly well.
- 1.5** Britain's record on infrastructure is mixed. Too often investment has failed to keep up with the country's needs and lagged behind our international competitors.
- 1.6** It is clear that we need to invest in our railways. In particular, we need to address a significant capacity challenge on the West Coast Mainline. It is a key north-south rail artery that links four of our five largest conurbations, carrying intercity, commuter and freight services into London, Birmingham, Liverpool, Manchester, Edinburgh and Glasgow.
- 1.7** Demand for long distance rail travel has more than doubled in the past 20 years<sup>2</sup>. Over that time, the intercity west coast franchise has seen 50% higher passenger growth than the wider network and city-centre to city-centre journeys between London, Birmingham and Manchester have trebled<sup>3</sup>. Services between London to Manchester have increased from 17 trains per day in 1994 to 47 in 2013; services from London to Birmingham increased from 31 trains per day to 49.
- 1.8** Demand for commuter services has also increased. Passenger numbers on what is now the London Midland franchise have increased by 4.5%

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<sup>1</sup> <https://www.gov.uk/government/publications/northern-transport-strategy>

<sup>2</sup> Office of Rail Regulation, Passenger Rail Usage, <http://dataportal.orr.gov.uk>

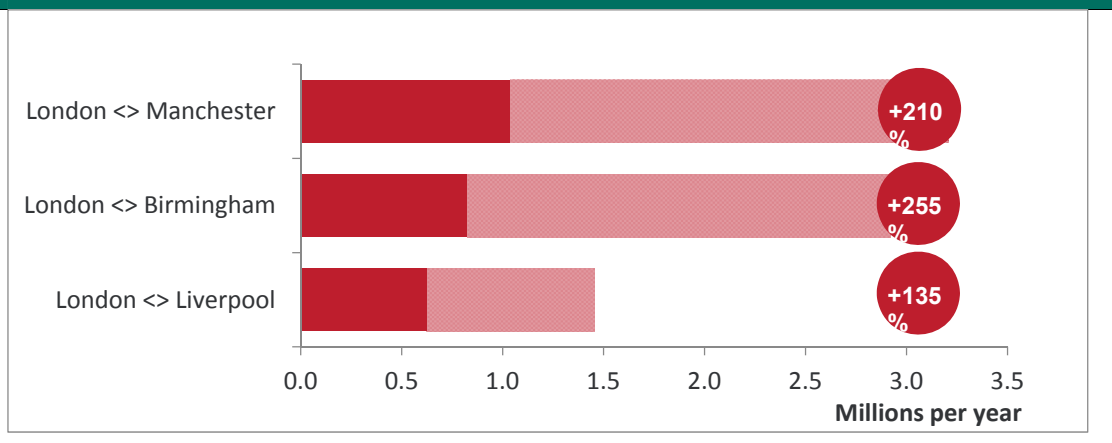
<sup>3</sup> Rail Usage Drivers Dataset (RUDD)

per annum since 1996/97<sup>4</sup>. London Midland services regularly feature in the top 10 most crowded in the country.

**1.9** The West Coast Main line is now the busiest mixed use rail line in Europe<sup>5</sup>. Despite a £9bn renewal and upgrade completed in 2008, the line is effectively full in terms of train paths, which restricts what services we can run and is impacting performance on both commuter and intercity services. Long distance services achieve around 85% punctuality, around four percentage points worse than the average for other long-distance services<sup>6</sup>.

**1.10** HS2 will deliver the step change in capacity we need to keep this vital artery flowing. The new high speed infrastructure will also improve reliability, giving passengers greater confidence when planning their trips. The HS2 sponsor's requirements are that, as an annual average, trains on the high speed network arrive within 30 seconds of their scheduled arrival time<sup>7</sup>. By releasing pressure on the existing network, HS2 could improve reliability there too.

**Figure 1.1 Passenger trip growth on key WCML flows (1994/95 to 2013/14)<sup>8</sup>**



<sup>4</sup> Average growth of Silverlink and London Midland (TOCs who have operated the current London Midland services) since privatisation 1996/97-2013/14 - Silverlink growth 4.6% p.a. from 96/97 to 2007/08. LM growth 4.4% p.a. since 2008/09. Source: Rail Industry Monitor.

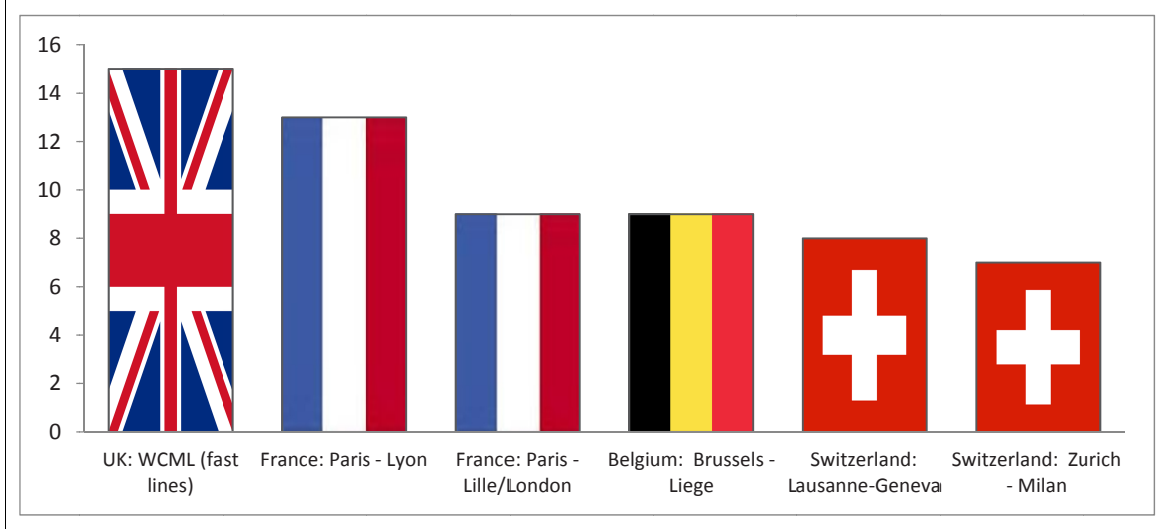
<sup>5</sup> Network Rail (2013), A better railway for a better Britain, <http://www.networkrail.co.uk/publications/strategic-business-plan-for-cp5/>, p.14

<sup>6</sup> ORR Data Portal: 2014-15 Q3 PPM (moving annual average)

<sup>7</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/389368/HS2\\_development\\_agreement\\_December\\_2014\\_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389368/HS2_development_agreement_December_2014_.pdf) p104

<sup>8</sup> Source: Rail Usage Drivers Dataset (RUDD)

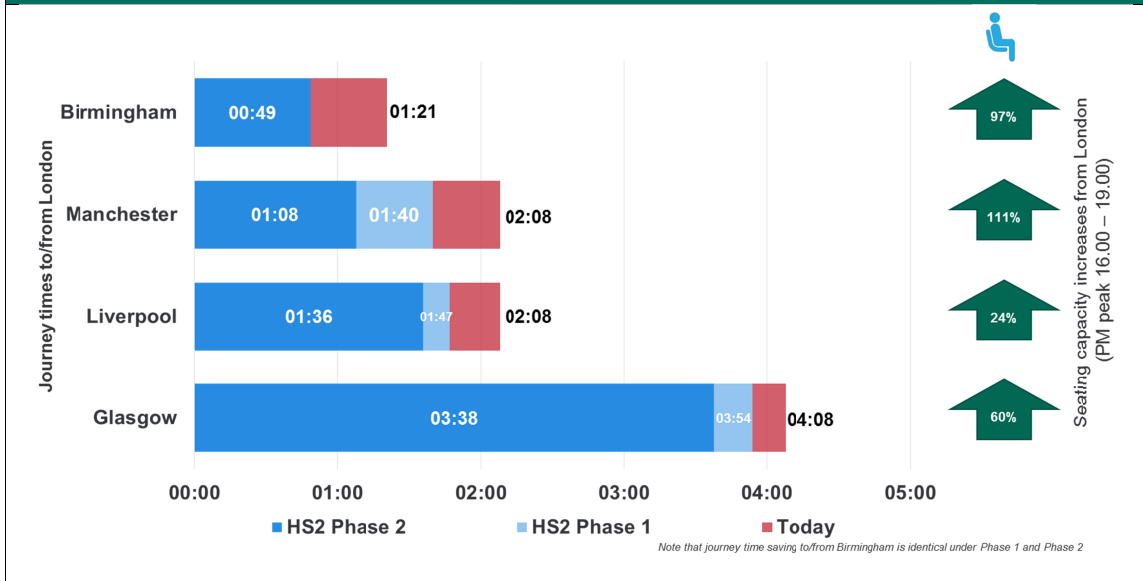
**Figure 1.2 Passenger trains per hour on leading fast European railways<sup>9</sup>**



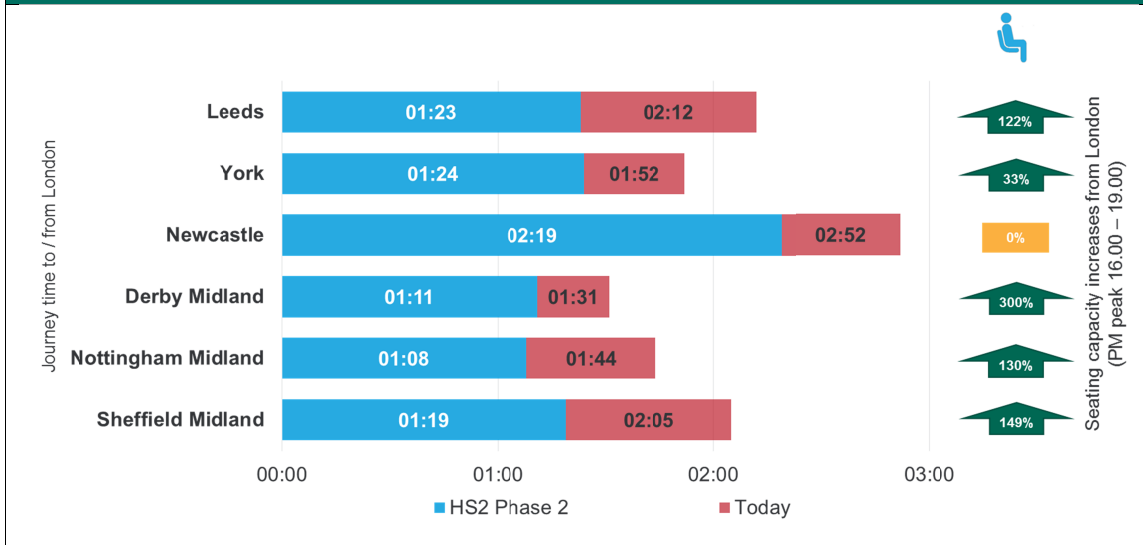
- 1.11** Although the extra capacity is badly needed, it is only part of the reason why we have to press on with HS2. Improving connectivity is also vitally important to support growth and productivity.
- 1.12** HS2 will slash journey times between our largest cities, which are the engines of economic growth (Figures 1.3, 1.4 and 1.5). It will not only improve times to and from London - the journey from Leeds to Birmingham will be cut from nearly two hours to under one. Manchester to Birmingham will be cut from an hour and a half to forty minutes.
- 1.13** Together with the Government's Northern Transport Strategy, HS2 will bring the Northern cities closer together, allowing them to operate more efficiently together and helping rebalance the economy.
- 1.14** The Government's position is clear - as a country we simply cannot afford not to invest in HS2. It is crucial that we press ahead with delivering HS2 on time and budget and we remain on track to start construction in 2017.

<sup>9</sup> GB working timetable, [www.bahn.de](http://www.bahn.de) and the Thomas Cook European timetable, summer 2014. Does not include freight traffic.

**Figure 1.3 Journey time improvements and evening peak seat capacity increases with HS2 (Western Leg) <sup>10</sup>**



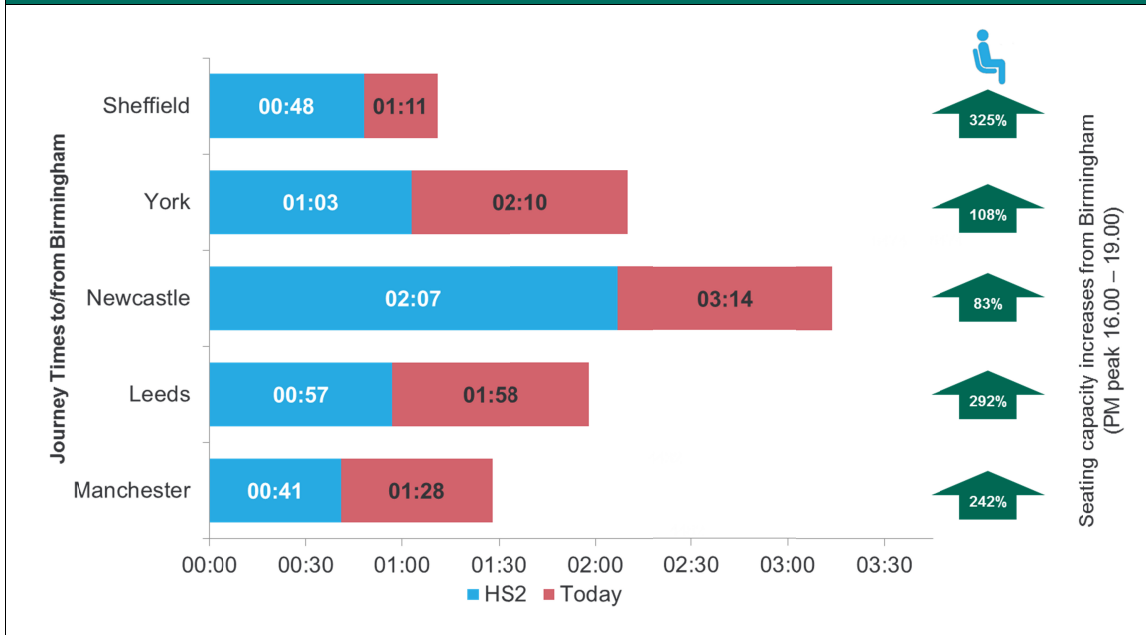
**Figure 1.4 Journey time improvements and evening peak seat capacity increases with HS2 (Eastern leg) <sup>11</sup>**



<sup>10</sup> Source: HS2 Ltd. Journey times represent the fastest current journeys against those provided by HS2. Capacity increases are from current services to the indicative service pattern in the 2013 Economic Case for HS2.

<sup>11</sup> Source: HS2 Ltd. Journey times represent the fastest current journeys against those provided by HS2. Capacity increases are from current services to the indicative service pattern in the 2013 Economic Case for HS2.

**Figure 1.5 Journey time improvements and evening peak seat capacity increases with HS2 (Midlands and North)<sup>12</sup>**



<sup>12</sup> Source: HS2 Ltd. Journey times represent the fastest current journeys against those provided by HS2. Capacity increases are from current services to the indicative service pattern in the 2013 Economic Case for HS2.

## 2. Government Response

### National Transport Plan

*The Committee states that: "An investment decision on the scale of HS2 should have been made with reference to a co-ordinated transport plan for passenger and freight traffic across all modes of transport. Such a plan could have given full consideration to how all areas of Great Britain and all transport users would be affected by the project".*

- 2.1** The Government has set out how HS2 fits within wider transport policy. The Strategic Case for HS2<sup>13</sup>, published in 2013, set out in detail how HS2 fits with investment in the existing rail network and the wider Government strategic aims of supporting growth and addressing the productivity gap between the north and south of the country.
- 2.2** The Northern Transport Strategy<sup>14</sup>, published earlier this year sets out transport's role in creating a Northern Powerhouse, of which HS2 is key.

### The cost of HS2

*The Committee states that: "HS2 is an expensive project. The construction of the railway and purchase of rolling stock is estimated to cost up to £50 billion at 2011 prices, including contingency. The net cost to the taxpayer is expected to be £31.5 billion at 2011 prices over 60 years. If complementary projects to connect HS2 to existing transport networks are taken into account, the final cost would be even higher.*

*If a new railway is required, the costs could be reduced, for example by constructing it to run at a slower speed—say at the same speed as the French TGV—and by reducing the cost of construction closer to French levels."*

- 2.3** Spending Round 2013 established a clear funding envelope of £50.1 billion at 2011 prices, including contingency. There are strong controls in place to ensure we remain within our budgets, and we aim to deliver HS2 below this figure.
- 2.4** We are committed to driving down costs and increasing efficiency. Sir David Higgins has a remit to look across the project to ensure that HS2 delivers value for money for the taxpayer. However, we are committed to building a world class railway that stands the test of time. Consequently it

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<sup>13</sup> DfT (2013), *The Strategic Case for HS2*, <https://www.gov.uk/government/publications/hs2-strategic-case>

<sup>14</sup> DfT (2015), *The Northern Powerhouse: One Agenda, One Economy, One North*  
<https://www.gov.uk/government/publications/northern-transport-strategy>

is important to evaluate opportunities to optimise the benefits of the new railway as well as opportunities to reduce costs.

- 2.5** We have engaged early with industry so that we harness their expertise in designing and building the railway in a cost effective way, and we will structure contracts to incentivise efficiency.
- 2.6** We are undertaking a comprehensive international benchmarking exercise to help us learn from best practice, but it is important that we compare like for like. We have made the decision to include considerable amounts of environmental mitigation in the design such as additional tunnels (Figure 2.1) and noise protection. These add cost, but we have done it because it is the right thing to do.

**Figure 2.1 HS2 Route Characteristics<sup>15</sup>**

Route Characteristics (km)	Phase One	Phase Two (Western Leg)	Phase Two (Eastern Leg)	Full Y Network
Total route	225.5	150.4	184.8	560.7
Tunnel	53.4	17.6	9.7	80.7
Cutting	73.8	55.8	75.1	204.7
Percentage of route in tunnel or cutting (%)	56	49	46	51

- 2.7** It is important to clarify what the £31.5bn quoted by the Committee represents and to put it in context. It is the net (discounted) cost to Government of building and operating HS2 over a 60 year appraisal period, including the cost of replacing rolling stock and infrastructure renewals, offset by the revenues that HS2 will generate for Government. It assumes that demand does not grow beyond 2036, just three years after Phase 2 opens, in line with the Demand Cap - a conservative assumption used in the economic appraisal.
- 2.8** The net cost is calculated on a present value basis. This is to reflect that in general people prefer to receive goods and services now rather than later. This means that as well as demand being capped at 2036 levels, the revenues received during the latter part of the HS2 appraisal period are significantly discounted compared to the construction costs incurred earlier in the appraisal period.
- 2.9** If the analysis allowed demand to continue to grow to 2049, the net cost to Government would fall by around a third<sup>16</sup>. Furthermore, the net present value of costs may overstate the full cost to Government as it does not account for tax benefits to the Exchequer arising from improvements in productivity.

<sup>15</sup> Source: HS2 Environmental Statement Volume 3, page 169  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/259488/Volume\\_3\\_Route-wide\\_effects.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/259488/Volume_3_Route-wide_effects.pdf)

<sup>16</sup> Information provided by HS2 Ltd

- 2.10** The analysis carried out by DfT as part of the Financial Case for HS2<sup>17</sup> provides an understanding of the affordability of HS2 in the context of wider GB rail. On a standalone basis, HS2 is forecast to generate an operating surplus of £2.8bn a year. Overall, once HS2 is fully operational, the analysis (again with demand capped in 2036) suggests the premium/subsidy balance across GB rail would improve by around £300m a year on average in the medium term (2010/11 prices)<sup>18</sup>.
- 2.11** The Demand Cap is important. For every year the demand cap is extended the surplus to GB rail is expected to increase by £50m-£100m a year.

## Who will pay for HS2?

*The Committee states that: "Business travellers are forecast to derive the most benefit from the project (70 per cent of the net transport benefits). Passengers could be charged higher fares for travelling on HS2 to recoup more of the costs and reduce the burden on the taxpayer, especially since many taxpayers would derive no benefit from the project."*

- 2.12** The business case assumes HS2 will not charge premium fares, and shows that HS2 is economically viable without them. The decision on fare structures will be taken by future Governments, but our underlying assumption is that it is more important to maximise usage for the wider benefit of citizens than to charge premium fares.
- 2.13** The up-front capital costs to the taxpayer represent an investment in infrastructure that will benefit the country for decades to come. As noted above, our analysis shows that once complete, HS2 itself will generate a significant return and improve the net position for GB rail by around £300m per year in the medium term (in 2011 prices, with a demand cap in 2036).
- 2.14** Over 90 million passengers are expected to use HS2 each year once the full Y network is complete - not just a few business people. Phase One is expected to carry 138,000 passengers a day, rising to over 300,000 passengers a day in 2036 after Phase Two opens and the full Y network is complete.<sup>19</sup>
- 2.15** Many more people across the country will benefit from HS2, even if they are not regular users of HS2 services or do not live in directly connected cities. Network Rail estimate that up to 100 cities and towns could benefit from improved rail services on the existing rail network which make use of capacity released by HS2<sup>20</sup>; and there will also be more space for rail freight.

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<sup>17</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/286797/financial-case-hs2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/286797/financial-case-hs2.pdf)

<sup>18</sup> This assumes that up front capital costs associated with construction of the network and delivery of rolling stock are met by government.

<sup>19</sup> HS2 Ltd (2013), *The Economic Case for HS2*, p.69

<sup>20</sup> Network Rail 2013, HS2 benefits to extend across rail network – Network Rail study, <http://www.networkrailmediacentre.co.uk/news/hs2-benefits-to-extend-across-rail-network-network-rail-study>



## Demand and capacity

*The Committee states that: "The government has not provided sufficient information to determine whether there is a capacity problem. Overcrowding appears to be caused by commuter, not long distance traffic, and is exacerbated by inflexible pricing."*

- 2.16** Demand for rail travel has grown consistently over the last two decades. Last year alone, passenger numbers using London Euston and Birmingham New Street grew by 9.4% and 8.3% respectively<sup>21</sup>. Freight demand is also rising.
- 2.17** The capacity problem stems from the combination of markets that the existing railways are serving - intercity, commuting and freight. In the short to medium term, making maximum use of the track capacity available by extending all trains to maximum length can help meet the challenge and the investment needed is already happening. But this approach can only provide a temporary solution. To support long term economic prosperity we need more track capacity for additional trains.

### Performance

- 2.18** The West Coast Main Line is the busiest mixed use rail line in Europe and, despite a £9bn upgrade, it is now effectively full in terms of peak time train paths. This is adversely affecting performance as shown in Figure 2.2 below.
- 2.19** Since 2011, the ORR<sup>22</sup> has rejected several intercity access applications, with concerns around the impact on performance being at the heart of these decisions. For example, in July 2013 the ORR turned down an application by Virgin Trains to run two additional services a day from London to Blackpool and Shrewsbury. Their assessment found that the additional services would cause further deterioration in punctuality and have a detrimental impact on the journeys of millions of passengers travelling on the route<sup>23</sup>.

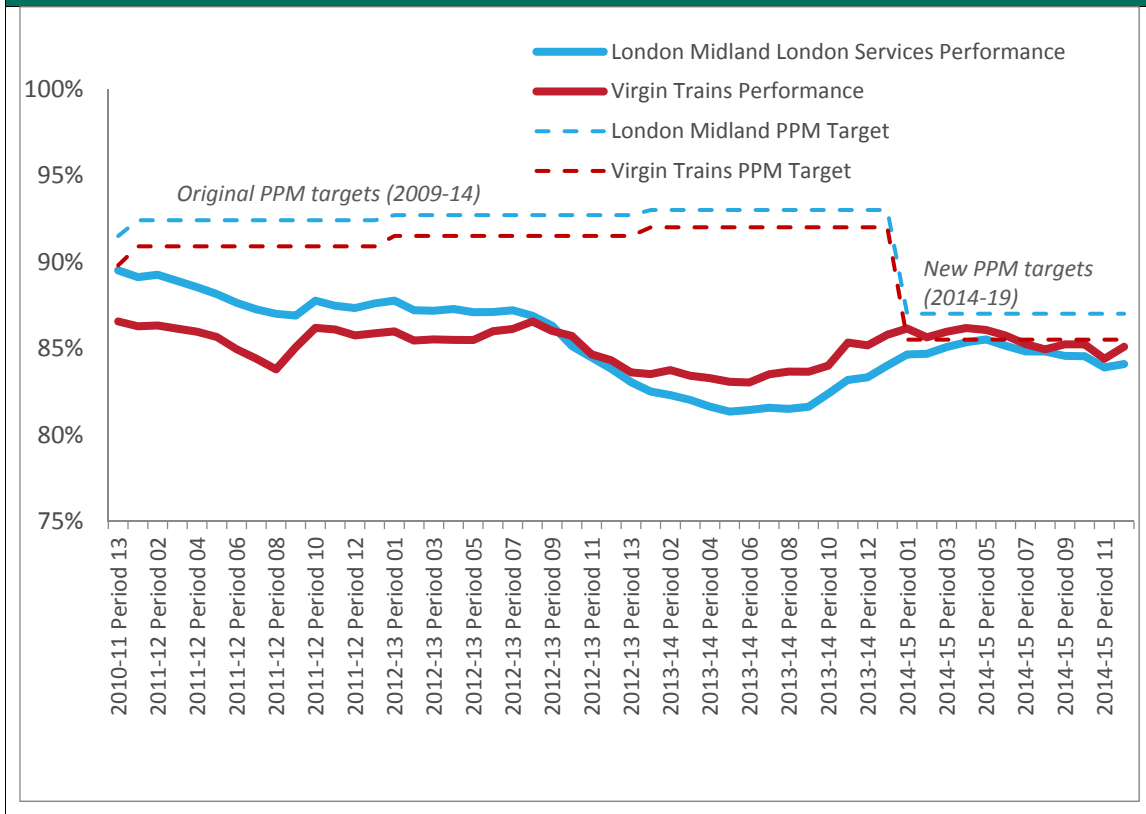
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<sup>21</sup> ORR Station Usage: [http://orr.gov.uk/\\_data/assets/pdf\\_file/0003/15366/station-usage-infographic.pdf](http://orr.gov.uk/_data/assets/pdf_file/0003/15366/station-usage-infographic.pdf)

<sup>22</sup> Formerly the Office of Rail Regulation, now the Office of Road and Rail

<sup>23</sup> Office of Rail Regulation, 2013, ORR decision on West Coast track access application, <http://www.rail-reg.gov.uk/server/show/ConWebDoc.11219>

**Figure 2.2 Public Performance Measure (PPM) Moving Annual Average of Virgin and London Midland<sup>24</sup>**



## Commuter Services

**2.20** The committee has not questioned that there is a commuter capacity issue. London Midland, which provides commuting services into Euston, regularly features in the top 10 most crowded services in the country. There are capacity constraints for commuters along the West Coast corridor - not just in London, but also in the West Midlands and the North West, where services have had to be cut back to accommodate additional intercity trains.

**2.21** In Autumn 2013 (the last published statistics) London Midland had the second highest level of overcrowding for London and South East operators<sup>25</sup>. On commuter services leaving Euston during the final hour of the evening peak, on average there were 120 passengers for every 100 seats. This means that one in six passengers was standing - and the situation on certain trains was worse.<sup>26</sup>

<sup>24</sup> Source: ORR Data Portal: 2014-15 Q3 PPM (moving annual average)

<sup>25</sup> DfT statistics, measured in terms of Passengers in Excess of Capacity (PiXC)

<sup>26</sup> DfT (2013), *The Strategic Case for HS2*, <https://www.gov.uk/government/publications/hs2-strategic-case>

- 2.22** Since 1996/97, the London Midland franchise has seen annual passenger growth in excess of the London and South East average (4.5%<sup>27</sup> vs 4.3%<sup>28</sup> per annum).
- 2.23** We have recently undertaken further analysis to illustrate what could happen to these services in 2033/34. This analysis has used a 1.8% growth rate (the reference case growth rate for commuter services in the 2013 Economic Case<sup>29</sup>) and a higher 2.9% sensitivity growth rate derived from DfT's Network Model Framework (NMF).
- 2.24** Figure 2.3 shows projected passenger loadings in 2033/34 on trains arriving at Euston during the morning peak, and Figure 2.4 shows trains departing Euston during the evening peak. The chart uses today's capacity, which includes extra peak time services that began in late 2014. Importantly the capacity levels shown in the chart include an allowance of around 25% for standing on these services.
- 2.25** The charts clearly show that in both scenarios demand would substantially exceed capacity across the peaks. Without action these services would be overwhelmed with relatively modest passenger growth rates.
- 2.26** In reality, demand growth is uncertain and difficult to predict. Recent demand growth has been higher than our forecasts. Part of this may be because our models forecast the impact of "background" or "exogenous" factors on rail growth - such as GDP growth, population growth and fuel prices - but do not model all potential "endogenous" growth factors - such as operators' own initiatives to improve their services and fares structures.
- 2.27** The lack of track capacity for commuter services is highly relevant to the case for HS2 as the West Coast Main Line is a mixed use railway. Commuter, freight and intercity services all use the same congested tracks. We could not increase the number of commuter services without significant trade-offs and negatively impacting intercity and freight services.

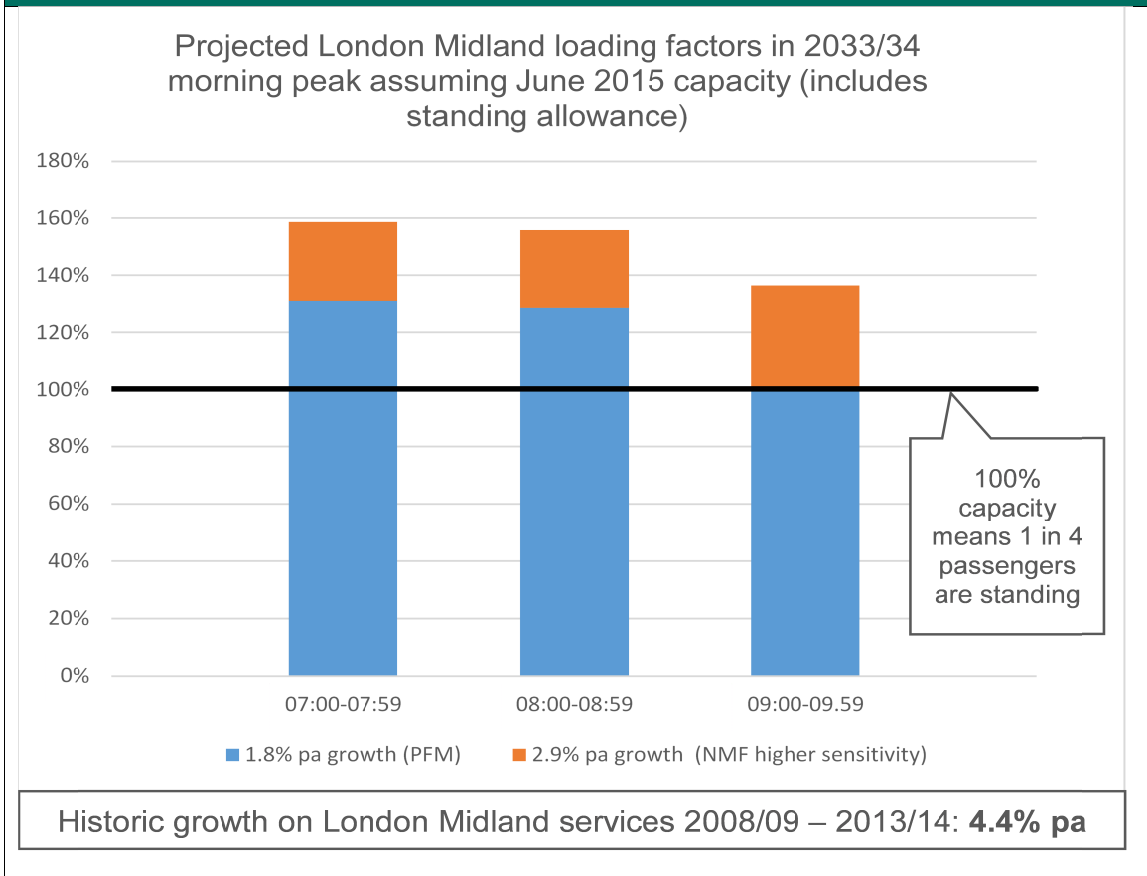
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<sup>27</sup> Average growth of Silverlink and London Midland (TOCs who have operated the current London Midland services) since privatisation 1996/97-2013/14 - Silverlink growth 4.6% p.a. from 96/97 to 2007/08. LM growth 4.4% p.a. since 2008/09. Source: Rail Industry Monitor.

<sup>28</sup> London and SE growth 1996/97-2013/14. Source: National Rail Trends

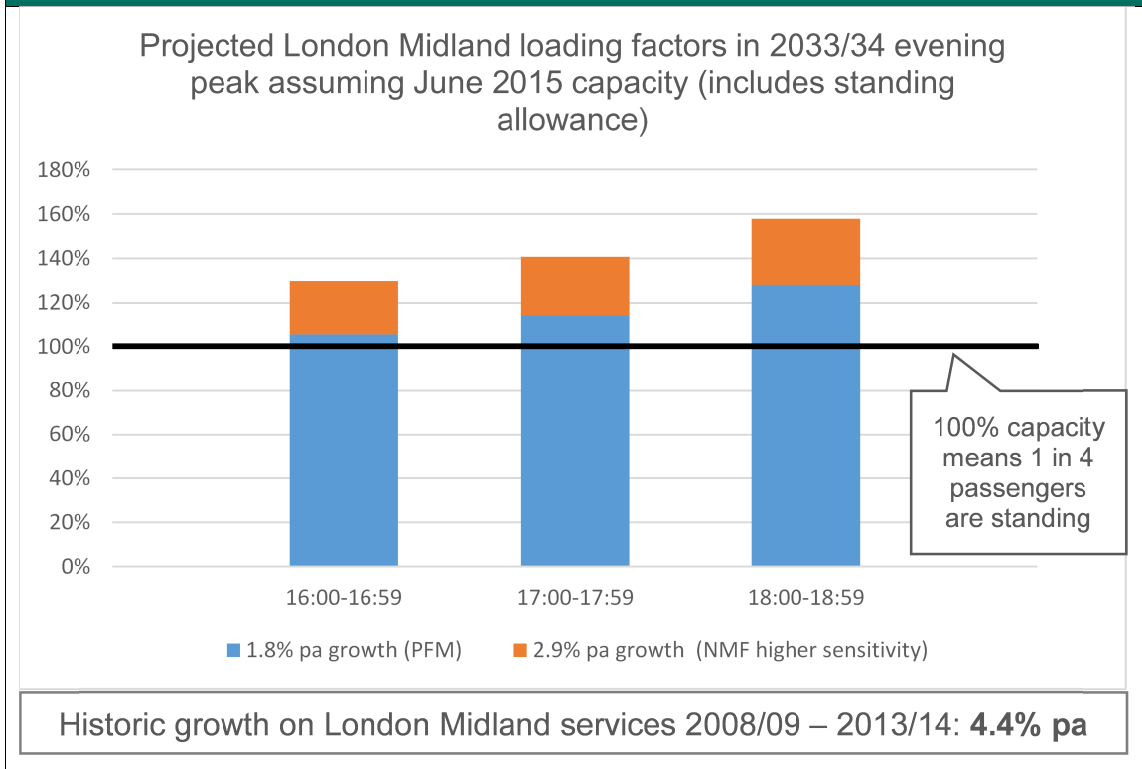
<sup>29</sup> The economic case uses Planet Framework Model (PFM) to model growth rates

**Figure 2.3 Indicative loadings on midweek morning peak commuter services arriving at London Euston in 2033/34<sup>30</sup>**



<sup>30</sup> Source: Source: DfT passenger loading data, PFM and NMF. The historic growth rates quoted include some endogenous growth factors that are not modelled in the growth forecasts presented in the charts (such as such as operators' own initiatives to improve services or fares structures).

**Figure 2.4 Indicative loadings on midweek evening commuter services departing at London Euston in 2033/34<sup>31</sup>**



## Intercity Services

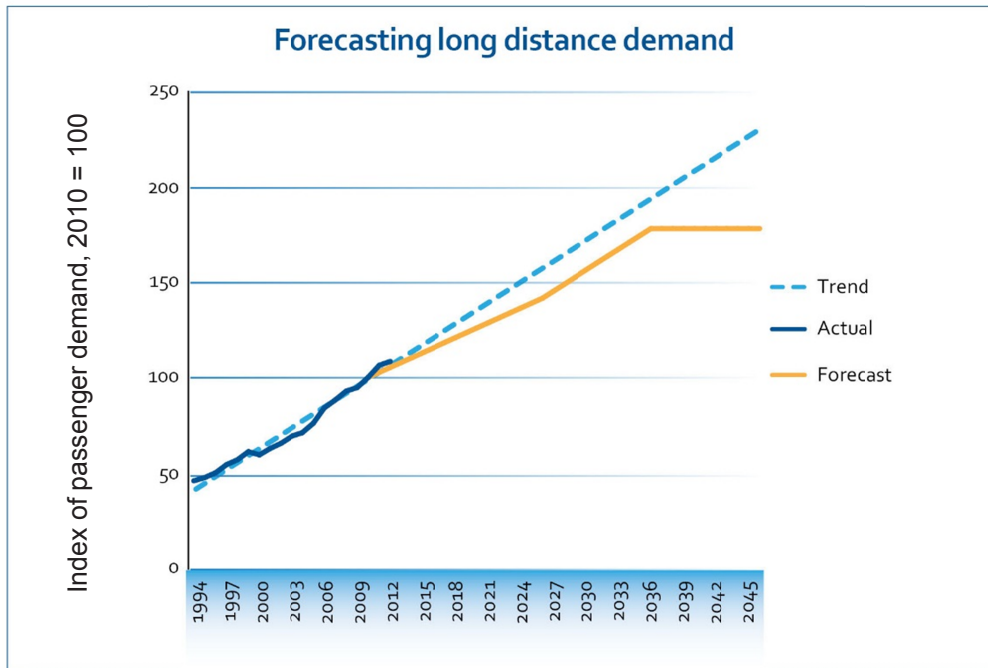
**2.28** For intercity services, even more so than commuter services, the issue is about both the number of train paths and the number of seats on trains. With the line full in terms of train paths, operators cannot run all the services they would like, which restricts the markets they can serve. Some sizeable towns in the North and Scotland such as Bolton, Blackburn and Dumfries do not have direct services to London, while other towns such as Telford and Blackpool have infrequent services. Considering its size, Liverpool is not as well connected as other cities and has only one (off peak) or two (peak) direct trains to London per hour. Focusing only on seating capacity does not tell the whole story.

**2.29** Yet we also face a seating capacity challenge. On the West Coast Main Line intercity passenger numbers have grown by an average of 5.3% per annum since 1996/97<sup>32</sup>. City-centre to city-centre journeys between London, Birmingham and Manchester have more than trebled over the past 20 years. By contrast, our business case assumes a more conservative growth rate of 2.2% per year on intercity west coast services. Figure 2.5 below shows that this is below recent trends.

<sup>31</sup> DfT passenger loading data, PFM and NMF. The historic growth rates quoted include some endogenous growth factors that are not modelled in the growth forecasts presented in the charts (such as operators' own initiatives to improve services or fares structures).

<sup>32</sup> National Rail Trends

**Figure 2.5 Forecast growth in long distance demand in HS2 Economic Case against recent trends<sup>33</sup>**



- 2.30** We have provided significant capacity increases to meet this demand. London to Manchester trains have increased from 17 in 1994 to 47 in 2013; London to Birmingham trains from 31 to 49.
- 2.31** Since completion of the £9bn West Coast Main Line upgrade in 2008 we have increased peak time intercity seats by nearly 50%, but nearly half of this extra capacity has already been used up<sup>34</sup>. Monday to Friday, services are already very busy between 7pm and 8pm with three quarters of trains leaving London over 80% full in standard class. Monday to Thursday, between 7am and 9am, about 25% of trains are over 80% full in standard class<sup>35</sup>.
- 2.32** Given factors such as passengers with luggage and unequal distribution of passengers along a train, intercity services loaded at 80% and above will feel overcrowded. Behavioural research shows that on long distance services passengers begin to feel negative effects from crowding at between 60% and 70% loading<sup>36</sup>, and in practice people will be standing before there is a passenger for every seat on board the train.
- 2.33** Without action, seating capacity will be a real issue - even if passenger growth rates turn out to be lower than we have seen over the last 20 years. We have recently undertaken further analysis beyond that

<sup>33</sup> Source: HS2 Ltd

<sup>34</sup> DfT Autumn 2008 and 2013 count data

<sup>35</sup> Information from Virgin Trains

<sup>36</sup> Passenger Demand Forecasting Handbook

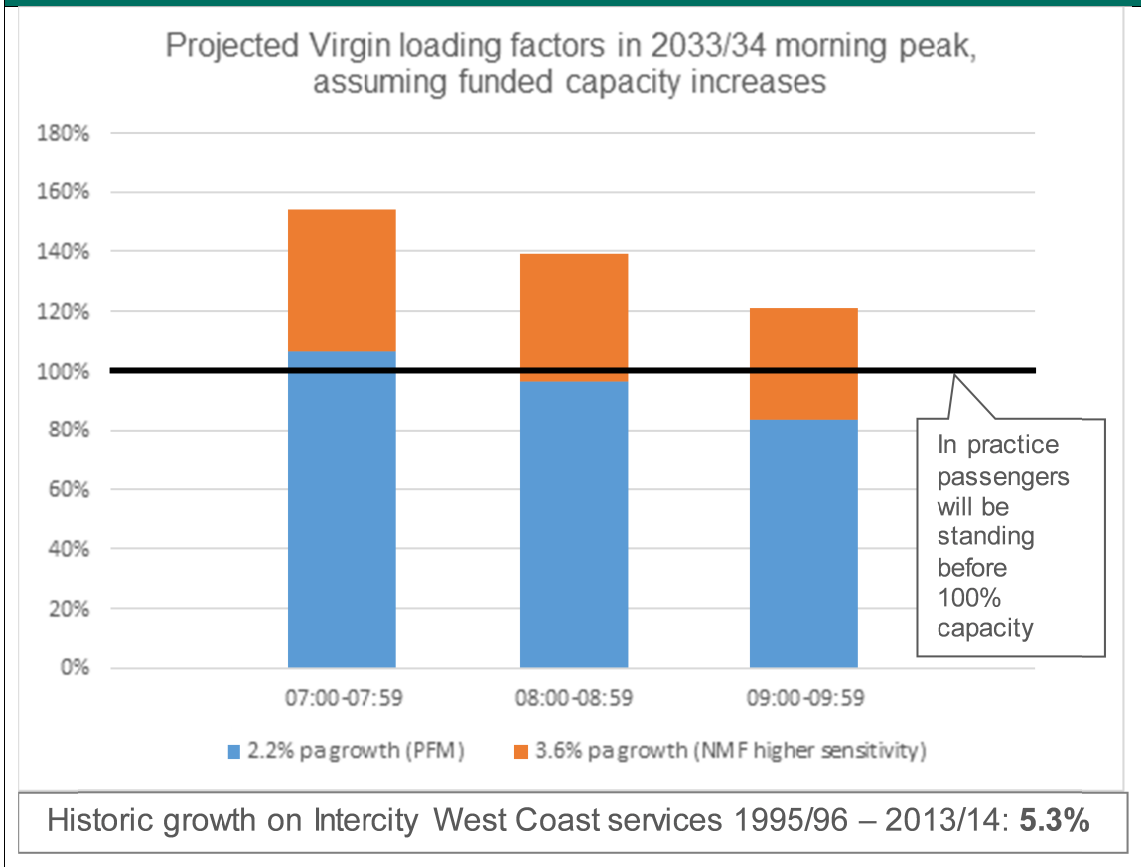
published in the Strategic Case to illustrate potential train crowding in 2033/34.

- 2.34** Figures 2.6 and 2.7 show projected standard class crowding levels in 2033/34 once committed capacity improvements<sup>37</sup> are complete. The charts show a 2.2% yearly growth rate, which is the growth assumed for long distance services in the economic case, and a higher growth rate of 3.6%, again derived from sensitivity tests using the Network Model Framework (NMF). Again demand growth is uncertain and difficult to predict; recent demand growth has been higher than our projections.
- 2.35** These charts show that at the lower growth rate, trains would be over 80% full across the peaks and well above 100% in the busiest hours. With a growth rate of 3.6%, which is closer to but still below recent growth rates, demand would exceed capacity across the peak, and during the busiest hours demand would be over one and a half times the available capacity.
- 2.36** We have also analysed potential crowding levels if all intercity services are extended to the maximum 11 cars together with a first class coach converted to standard. This would provide 33% more seats across the evening peak, yet with growth of 3.6% per year, by 2033/34 one in ten passengers on those services would be standing. Nearly half of those would be standing for over an hour before the first station stop out of London - in some cases as far as Crewe or Warrington.
- 2.37** Crowding would be worse on Friday afternoons, when nearly one in five peak time passengers would have to stand, even with the additional capacity. During the busiest hour, demand would see three passengers wanting to travel for every two seats.
- 2.38** Flexible pricing would not be able to address the problem as trains would be full across a sustained period of time - unless people were priced off the railway completely, which the Government does not consider to be an acceptable solution.

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<sup>37</sup> Converting one first class carriage to standard on all nine-car pendolino services

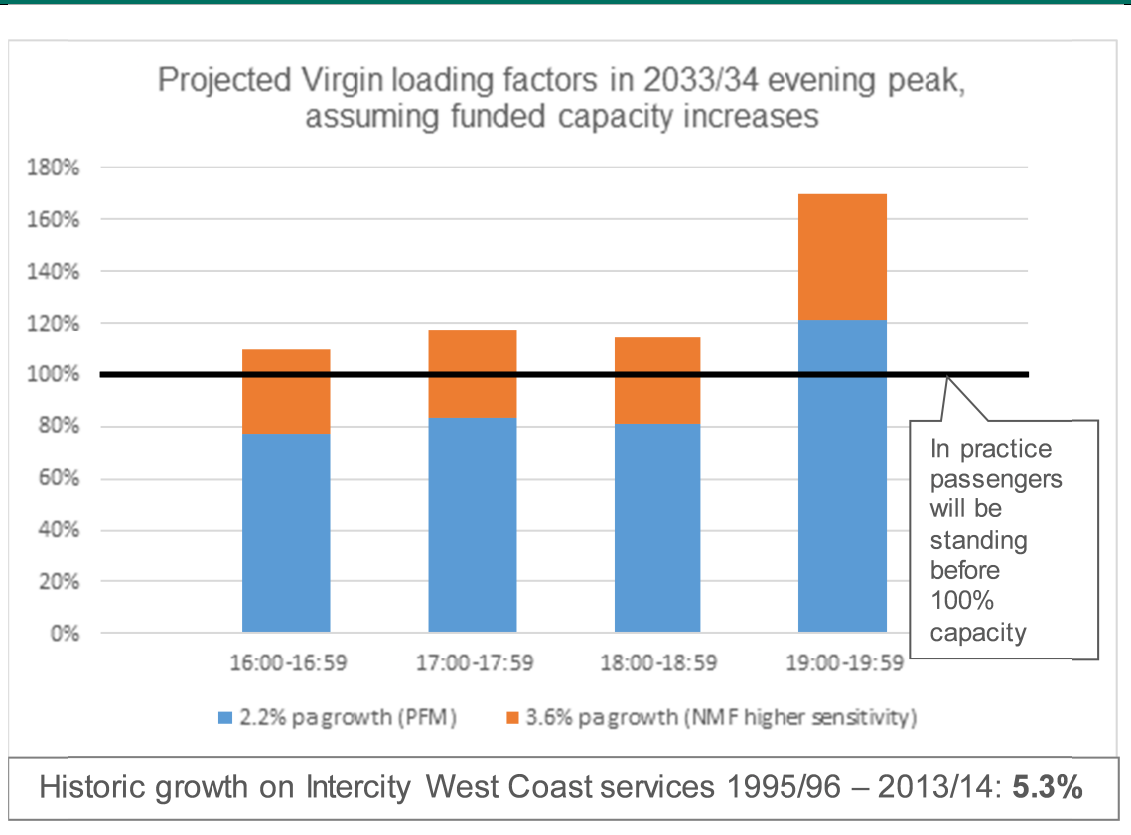
**Figure 2.6 Indicative loadings on midweek morning peak intercity services arriving at London Euston in 2033/34<sup>38</sup>**



<sup>38</sup> Source: Source: DfT passenger loading data, PFM and NMF. The historic growth rates quoted include some endogenous growth factors that are not modelled in the growth forecasts presented in the charts (such as operators' own initiatives to improve services or fares structures).



**Figure 2.7 Indicative loadings on midweek evening intercity services departing London Euston in 2033/34<sup>39</sup>**



## Freight

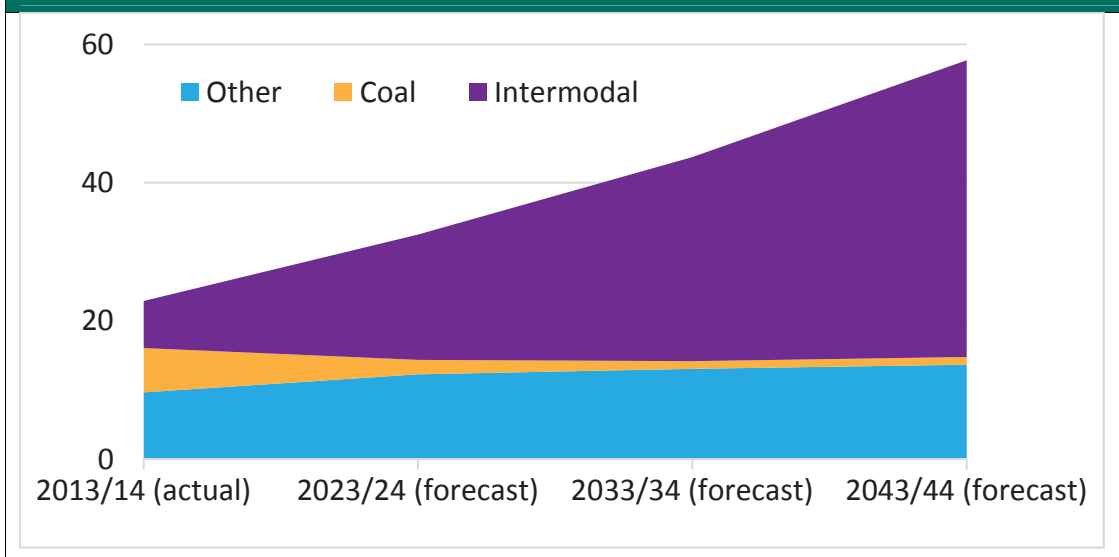
- 2.39** Demand for freight is also predicted to rise. The West Coast Main Line is a key spine for rail freight, with an estimated 43% of all freight journeys using it at some point<sup>40</sup>.
- 2.40** In 2011 around 42 freight trains per day used the West Coast Main Line. Utilisation of intermodal freight paths is around 85%<sup>41</sup>. Given the daily, weekly and even seasonal variations in freight demand, in practice this represents a line running near capacity in terms of freight path utilisation.
- 2.41** Network Rail’s forecasts suggest that demand could nearly double by 2033 from 42 to 80 freight trains per day, with the majority of the growth being in intermodal freight, as set out in Figure 2.8 below. This demand simply could not be supported with the current infrastructure.

<sup>39</sup> Source: Source: DfT passenger loading data, PFM and NMF. The historic growth rates quoted include some endogenous growth factors that are not modelled in the growth forecasts presented in the charts (such as operators’ own initiatives to improve services or fares structures).

<sup>40</sup> West Coast Project Briefing Note – Network Rail Media Centre, 2008

<sup>41</sup> Typical numbers operated in 2011 (Network Rail LTPP)

**Figure 2.8 Freight growth projections (billion tonne kilometres)<sup>42</sup>**



## Consideration of alternative rail investment

*The Committee states that: "It is impossible to agree with the Government that HS2 is the only solution to increase capacity on the rail network. Additional capacity could be provided by incremental improvements to the existing network, a new conventional railway line, or a new high-speed line (of which HS2 is only one option). These options have not been assessed equally, with only HS2 receiving serious consideration by the Government."*

**2.42** The Government has published four substantial reports from external consultants that have looked at potential rail alternatives to HS2 in detail:

- (i) "High Speed 2 Strategic Alternatives Study, Strategic Outline Case" March 2010 (Atkins)<sup>43</sup>
- (ii) "High Speed Rail Strategic Alternatives Study, Strategic Alternatives to the Proposed 'Y' Network" February 2011 (Atkins)<sup>44</sup>
- (iii) "High Speed Rail Strategic Alternatives Study Update Following Consultation" January 2012 (Atkins)<sup>45</sup>
- (iv) "HS2 Strategic Alternatives Final Report" October 2013 (Atkins)<sup>46</sup>

**2.43** In the section above we have set out how, even with moderate demand growth compared to recent trends, the West Coast Main Line will be overwhelmed. Make do and mend upgrades simply will not provide the

<sup>42</sup> Freight Market Study, Network Rail, 2013

<sup>43</sup> [http://www.speenbucks.to.uk/wp-content/uploads/2010/06/atkins\\_02\\_strategic\\_outline.pdf](http://www.speenbucks.to.uk/wp-content/uploads/2010/06/atkins_02_strategic_outline.pdf)

<sup>44</sup> <http://webarchive.nationalarchives.gov.uk/201111005090740/http://highspeedrail.dft.gov.uk/sites/highspeedrail.dft.gov.uk/files/hsr-strategic-alternative.pdf>

<sup>45</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/3664/hs2-strategic-alternatives-study-update.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3664/hs2-strategic-alternatives-study-update.pdf)

<sup>46</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/253456/hs2-strategic-alternatives.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253456/hs2-strategic-alternatives.pdf)

step change in capacity we need to provide a long term solution to the capacity challenge and support long term economic growth.

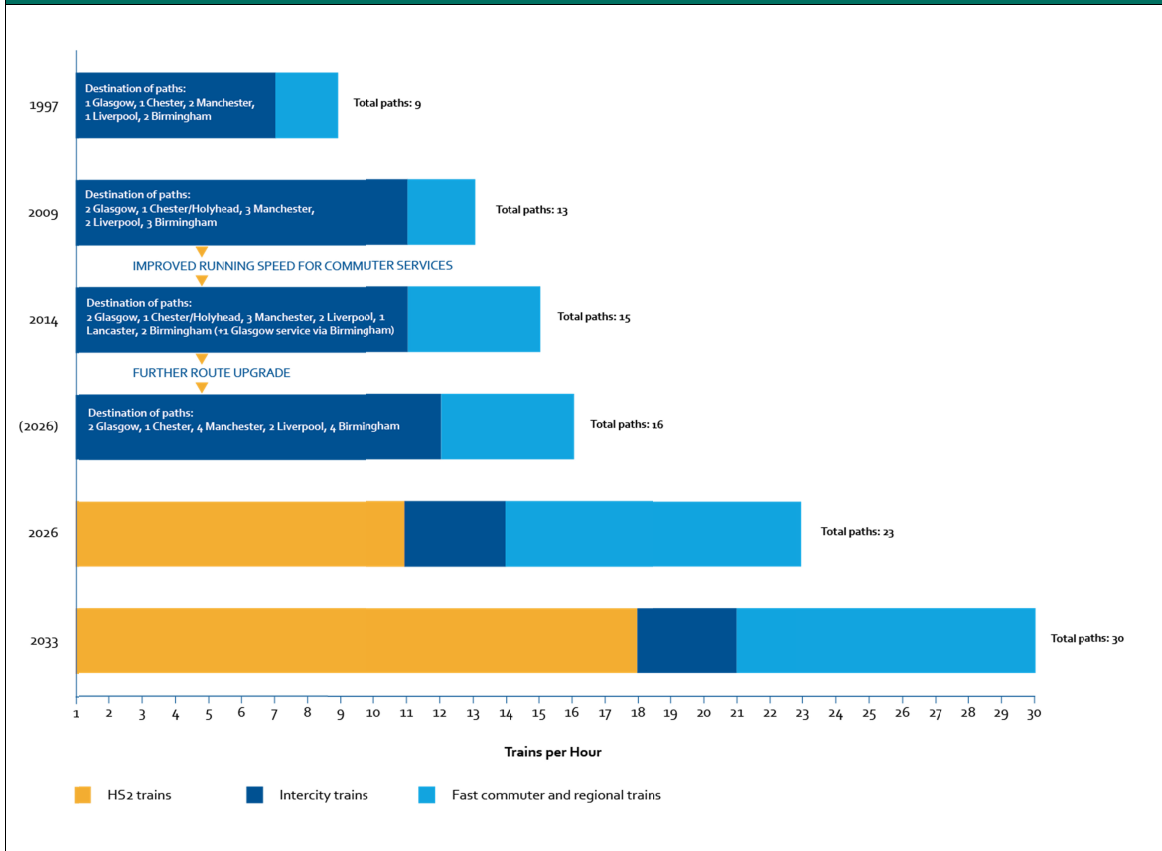
- 2.44** Since the 2013 Strategic Case, London Midland has already increased the number of commuter trains that run on the fast lines. This leaves even less potential for improving capacity through upgrades, which are increasingly challenging and provide diminishing capacity returns. The best upgrade alternative to HS2 would only provide one more peak hour train path compared to the current timetable.
- 2.45** HS2 not only slashes journey times, it provides a very significant increase in intercity and commuting capacity on the rail network. On completion of the full Y network the new infrastructure will provide capacity for up to 18 High Speed services per hour connecting London and major cities in the Midlands, Northern England and Scotland.
- 2.46** HS2 will also free up space on the existing rail network for more commuter and inter-regional services and long distance services for key towns and cities not served by HS2. Currently, capacity constraints limit what services can be provided along the length of the line as trade-offs are made between intercity and regional or commuter trains<sup>47</sup>. The benefits from capacity released by HS2 will not be restricted to London commuter services, but will be felt by passengers across the country.
- 2.47** HS2 could also free up 20 freight paths per day on the West Coast Main Line, potentially more with detailed planning. Each freight train typically takes 40 lorries off the road<sup>48</sup>, easing congestion, reducing carbon emissions and improving safety.
- 2.48** Figure 2.9 below shows clearly the limited returns from further upgrade works. Only HS2 will provide the step change in capacity we need to address the capacity challenges facing commuter, intercity and freight services as well as major improvements in connectivity between major city regions.

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<sup>47</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/286617/capacity-on-north-south-main-lines.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/286617/capacity-on-north-south-main-lines.pdf) page 13.

<sup>48</sup> 134 WSP, 2013, HS2 Could Save Carbon and Money in Increased Freight Capacity (news release), <http://www.wspgroup.com/en/WSP-UK/Who-we-are/Newsroom/News-releases/1/2013/hs2-could-save-carbon-and-money-in-increased-freight-capacity>

**Figure 2.9 Long distance train paths from London on the West Coast Main Line and HS2<sup>49</sup>.**



**2.49** Upgrading the existing railway is extremely disruptive to existing rail services compared with building a new line. Lord Adonis described the £9bn West Coast Main Line upgrade completed in 2008 as "performing open heart surgery on a moving patient"<sup>50</sup>.

**2.50** The Strategic Case set out the indicative number of weekend closures on the existing network during construction of the strategic alternatives to HS2. For the alternative to the full Y network, this would be the equivalent of 14 years of weekend closures, as shown in Figure 2.10.

<sup>49</sup> Note: destinations may not number the same as the total train paths because some services split during the journey. Source: Steer Davies Gleave, Atkins and HS2 Ltd Source: SDG & KPMG

<sup>50</sup> <http://andrewadonis.com/2013/11/20/why-britain-needs-hs2-lords-paving-bill-debate/>

**Figure 2.10 Deliverability of alternatives<sup>51</sup>**

Deliverability				
	HS2 Phase One	Phase One Alternative	HS2 Both Phases	Phase One and Two Alternative
Disruption (indicative number of weekend closures)	223	410	386	2790
Local Impacts: additional mileage of double-track railway (route length rather than track length)	136	~20	350	~155
RAG rating	Amber	Amber	Amber	Red

## Effect on the UK economy

*The Committee states that: "We do not believe that the Government has shown that HS2 is the best way of stimulating growth in the country. While investment outside London is long overdue, evidence and experience from other countries has suggested that London would be the biggest beneficiary of a project such as HS2. Nor has the Government considered the opportunity cost of spending £50 billion at 2011 prices on this single railway. How much could be achieved if that money were invested differently?"*

- 2.51** HS2 is a vital part of the Government's strategy to create a Northern Powerhouse which aims to increase growth, improve productivity and rebalance the economy.
- 2.52** Leaders in the North and Midlands are strongly supportive of HS2. Over 70% of the estimated 100,000 jobs supported by HS2 are expected to be outside London<sup>52</sup>. Research by KPMG suggests that the regions served by HS2 will benefit proportionately more than (although not at the expense of) London<sup>53</sup>.
- 2.53** HS2 will deliver significant cuts to journey times between city regions in the North and Midlands. HS2, together with the TransPennine Express and proposals under The Northern Transport Strategy, will provide an even greater step change in connectivity. This will bring cities closer together, which can in turn support growth and boost productivity by improving access to markets, jobs and suppliers.

<sup>51</sup> Source: Network Rail and HS2 Ltd

<sup>52</sup> HS2 Ltd (2013), HS2 Environmental Statement volume 3: Route-wide effects, page 170 <https://www.gov.uk/government/publications/hs2-phase-one-environmental-statement-volume-3-route-wide-effects>; Temple ERM, (2013), Sustainability Statement, page 121

[http://assets.hs2.org.uk/sites/default/files/consultation\\_library/pdf/PC205%20Vol%201%20Sustainability%20Statement%20180713.pdf](http://assets.hs2.org.uk/sites/default/files/consultation_library/pdf/PC205%20Vol%201%20Sustainability%20Statement%20180713.pdf)

<sup>53</sup> <http://www.kpmg.com/uk/en/issuesandinsights/articlespublications/pages/hs2-regional-economic-impact.aspx>

- 2.54** Local authorities are getting ready to maximise the benefits of HS2. Birmingham and Solihull have already created extensive plans to maximise jobs and growth in the 140 hectares around both Curzon Street and Interchange stations. The Curzon Street Draft Masterplan<sup>54</sup> projects 14,000 net jobs can be provided as a result of regeneration and development of the station area. This is projected to deliver over £1bn per year into the local economy. Solihull's prospectus for a Garden City<sup>55</sup> sets out that on top of the existing jobs, the new zone to the east of the M42 will provide the capacity for up to 9,300 jobs and at least 2,000 homes. Local areas are also committed to producing growth strategies, setting out in more detail how the planned growth will be realised.
- 2.55** Cities are key engines of growth with a powerful relationship between cities and productivity. The top 600 cities in the world contain just over 20% of the global population, but contribute 60% of global GDP<sup>56</sup>. Cities are a vital part of the UK economy. Just 10 city regions account for 35% of the UK's employment<sup>57</sup> and are important drivers of economic growth.
- 2.56** HS2 will connect our major cities, bringing them closer together and supporting growth. The busiest long distance routes for business travel on the railway (greater than 50 miles) are between cities that will be served by HS2. The new railway will make these journeys quicker, more reliable and better for business.
- 2.57** A large proportion of jobs in knowledge-based sectors are located within City Regions, particularly in city centres. Forty-five per cent of jobs in knowledge-based sectors are located in the City Regions compared with 35% of the population and over 40% of jobs growth is expected to occur within these sectors<sup>58</sup>. These sectors also contain a high proportion of employees in the professional, managerial and technical occupational groups, who account for over 70% of total rail passenger miles<sup>59</sup>
- 2.58** HS2 will create nearly 25,000 construction jobs<sup>60</sup> and support up to 100,000 jobs around the stations<sup>61</sup>. The Core Cities group suggest this figure could be as much as 400,000 jobs. HS2 Ltd has announced its ambition to create over 2,000 apprenticeship opportunities - more than the Olympics and Crossrail combined<sup>62</sup>. We expect that the HS2 Skills College will train around 900 people each year in high-level construction skills.

<sup>54</sup> Birmingham City Council (2014), Birmingham Curzon HS2 Draft Masterplan, <http://www.birmingham.gov.uk/birminghamcurzonhs2>

<sup>55</sup> Solihull MBC (2014), The Interchange: Prospectus for a 'Garden City' approach, [http://www.solihull.gov.uk/Portals/0/Planning/LAP/UKC\\_Garden\\_City\\_Prospectus\\_2014.pdf](http://www.solihull.gov.uk/Portals/0/Planning/LAP/UKC_Garden_City_Prospectus_2014.pdf)

<sup>56</sup> [http://www.mckinsey.com/insights/urbanization/urban\\_world](http://www.mckinsey.com/insights/urbanization/urban_world)

<sup>57</sup> Business Register and Employment Survey (BRES)

<sup>58</sup> Data source: BRES (Business Register and Employment Survey)

<sup>59</sup> Data source: National Travel Survey

<sup>60</sup> HS2 Ltd (2013), HS2 Environmental Statement volume 3: Route-wide effects, page 170

<https://www.gov.uk/government/publications/hs2-phase-one-environmental-statement-volume-3-route-wide-effects>

<sup>61</sup> Temple ERM, (2013), Sustainability Statement,

[http://assets.hs2.org.uk/sites/default/files/consultation\\_library/pdf/PC205%20Vol%201%20Sustainability%20Statement%20180713.pdf](http://assets.hs2.org.uk/sites/default/files/consultation_library/pdf/PC205%20Vol%201%20Sustainability%20Statement%20180713.pdf), p.121

<sup>62</sup> <https://www.gov.uk/government/news/first-new-college-in-20-years-to-support-development-of-high-speed-2-hs2>.

**Figure 2.11 Selected UK rail business flows 2013/14<sup>63</sup>**

**(Red flows served by Phase One, Blue flows by Phase Two)**

Flow (both directions)	Business trips by rail in 2013/14
London <> Manchester	1,843,000
London <> Birmingham	1,528,000
London <> Leeds	853,000
London <> York	577,000
London <> Liverpool	491,000

## Prioritisation

*The Committee states that: "The evidence we have heard suggests that investment in regional transport links between cities outside London could be more likely to generate significant growth in the north than HS2. The Government should consider whether improving trans-Pennine links, or building the northern legs of HS2 first, are higher priorities than the southern leg of HS2."*

**2.59** It is simply not a case of having to choose between HS2 and investment in trans-Pennine links. The Northern Transport Strategy, developed in partnership with Transport for the North and published earlier this year, explains how both HS2 and improved regional transport are key to developing a Northern Powerhouse.

**2.60** In the last five years we have invested substantially in the northern rail network. We have committed to the Northern Hub and electrification projects, commissioned modern trains for TransPennine routes and committed to commuter capacity increases<sup>64</sup>. The Government has committed £13 billion in this Parliament to improve regional connections so that northern towns and cities can pool their strengths and create a single economy.

**2.61** In the Northern Transport Strategy we committed to developing options ahead of the rail Control Period 6 (2019-24) to improve rail services further right across the North, and set out our plans to improve road connections. We are doing this now, not waiting until after HS2 is complete.

**2.62** An important point is that HS2 is not taking money away from the existing rail network or other modes of transport. In 2013 the Government committed to provide £73bn of funding for transport over this Parliament, with £22bn for national rail and £14bn for local authority transport (Figure 2.12).

<sup>63</sup> Source: Rail Usage Drivers Dataset (RUDD)

<sup>64</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/427339/the-northern-powerhouse-tagged.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427339/the-northern-powerhouse-tagged.pdf) page 17



**2.63** HS2 is integral to the Government's plans for a Northern Powerhouse. It will transform connectivity on our most important intercity business travel routes on the railways, which are between our largest cities and London. To do this effectively we need to start with Phase One, which relieves the most pressing capacity constraints we face on the West Coast Main Line, which are between London and Birmingham.

**2.64** If we built the northern legs of HS2 first, we would funnel more passengers onto a network that we have shown will not be able to cope with existing demand. However, we are looking closely at how we can bring benefits to the North sooner, such as Sir David Higgins' suggestion that we accelerate delivery of HS2 to Crewe.

**Figure 2.12 Investing in Britain's future<sup>65</sup>**

Investing in Britain's future							
£m	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Total
Highways Agency	1497	1907	2316	2614	3047	3764	15145
National Rail	3548	3681	3770	3789	3824	3859	22471
High Speed Two	832	1729	1693	3300	4000	4498	16052
London Transport Investment	925	941	957	973	990	1007	5793
Local Authority Transport	2253	2253	2253	2253	2253	2253	13518
<b>Total</b>	<b>9055</b>	<b>10511</b>	<b>10989</b>	<b>12929</b>	<b>14114</b>	<b>15381</b>	<b>72979</b>

## Evidence

*The Committee states that: "The cost-benefit analysis for HS2 relies on evidence that is out-of-date and unconvincing. The Government needs to provide fresh, compelling evidence that HS2 will deliver the benefits it claims."*

**2.65** Our appraisal techniques are world class. A number of experts provided evidence to the Lords Committee which showed that the economic case was robust. For example, Professor Venables noted that our quantification of user benefits and wider economic impacts was "done very well and very professionally" Professor Glaister called our cost benefit analysis "even handed and well done" while Professor Graham commended our use of sensitivity testing<sup>66</sup>.

<sup>65</sup> HM Treasury, *Investing in Britain's Future 2013*

<sup>66</sup> HoL Economic Affairs Committee (2014), *The Economic Case for HS2 Oral and Written Evidence*, <http://www.parliament.uk/documents/lords-committees/economic-affairs/Economic-case-for-HS2/hs2-final-ev-vol.pdf>



- 2.66** While we are confident in our existing techniques, which have been built up over many years to be a world class basis for informing decisions, the Department also continues to develop its appraisal methods.
- 2.67** In October 2013, we published 'Understanding and Valuing the Impacts of Transport Investment'<sup>67</sup>, which reviewed how we appraise transport investment options. It confirmed our commitment to keeping our approach world class by maintaining and developing our methods to keep pace with an ever-changing world.
- 2.68** In December 2014 we published a progress report<sup>68</sup> on this work, which also responded to the 'Transport Investment and Economic Report'<sup>69</sup> commissioned by the Department from Professor Tony Venables, Professor Henry Overman and Dr James Laird. This set out the progress we have made to date and our plans for further development.
- 2.69** We recognise that the values of time used in the economic case have a significant bearing on the benefits. We revised the values we used for the 2013 business case in line with the latest data. We reviewed our values against the available evidence on people's willingness to pay for travel time savings, concluding that our values are towards the centre of these estimates<sup>70</sup>.
- 2.70** The values we used are consistent with people working on trains. However, we note that if the potential levels of crowding illustrated earlier in this document were realised it would be unlikely that the people standing on crowded trains would be able to work productively. We do take into account the reduction in journey quality from crowded services in our analysis.
- 2.71** To ensure that the values we use continue to reflect people's behaviours, we are also near completion of a major research project into how people value a range of journey improvements such as quicker journey times, improved reliability and reduced crowding. This will be the largest study of its kind ever conducted in the UK and we expect to publish the outcomes later in the year.
- 2.72** We also recognise the importance of business travellers to the HS2 business case. We have used the most appropriate methodology to estimate the number of business travellers that will use HS2 and our assumptions are consistent with the available data sources.
- 2.73** In 2014 business travel accounts for nearly half (45%) of all intercity rail journeys on the corridors served by HS2<sup>71</sup>. Business trips between the HS2 city regions have increased by 170% in the last 20 years. Our

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<sup>67</sup> <https://www.gov.uk/government/publications/transport-appraisal-in-investment-decisions-understanding-and-valuing-the-impacts-of-transport-investment>

<sup>68</sup> <https://www.gov.uk/government/publications/transport-appraisal-in-investment-decisions-understanding-and-valuing-the-impacts-of-transport-investment>

<sup>69</sup> <https://www.gov.uk/government/publications/transport-investment-and-economic-performance-tiep-report>

<sup>70</sup> Department for Transport (2014), 'TAG Unit A1.3, p. 4-5  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/427089/TAG\\_Unit\\_A1.3\\_-\\_User\\_and\\_provider\\_impacts\\_November2014.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427089/TAG_Unit_A1.3_-_User_and_provider_impacts_November2014.pdf)

<sup>71</sup> Rail Usage Drivers Dataset (RUDD)

assessment of the benefits to businesses from the full Y-network is £53.3 billion over a 60-year period<sup>72</sup>.

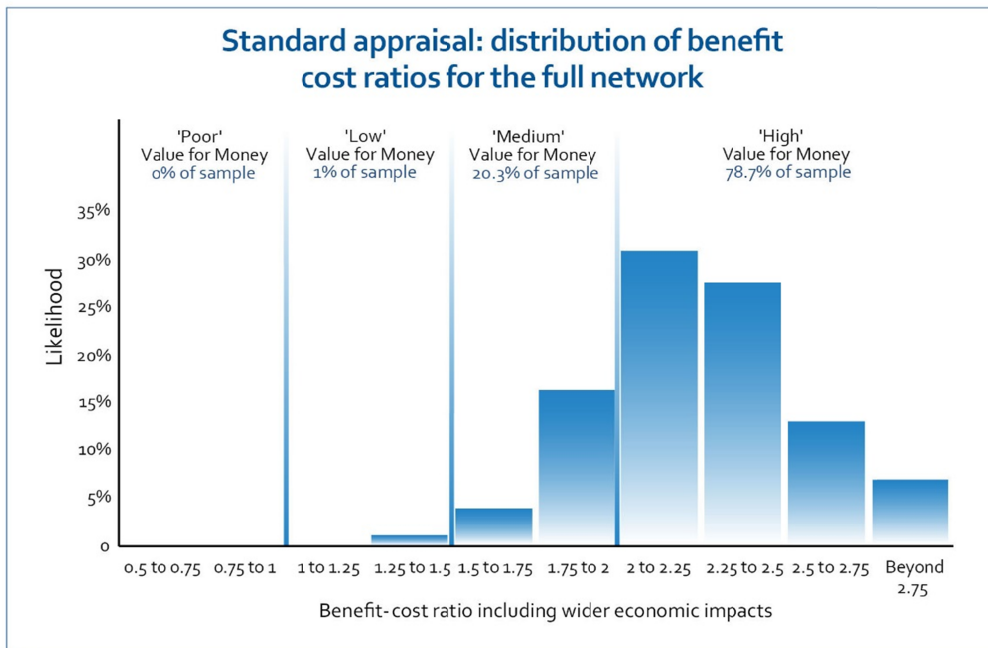
## Summary

- 2.74** The case for HS2 is clear. HS2 delivers the step change in capacity and connectivity we need to support future growth and help rebalance the economy.
- 2.75** The economic case for HS2 is also clear. The central case benefit cost ratio (BCR) for the full Y-network is 2.3, including wider economic impacts - higher than for the Jubilee Line Extension and Thameslink improvement project when they were approved.
- 2.76** The BCR of 2.3 assumes the demand is capped in 2036. If the demand cap is extended to 2049 the BCR increases to 4.5, which represents very high value for money.
- 2.77** The economic case explains our level of confidence in these BCRs, based on probability analysis of specific economic variables. It shows that, with the standard demand cap, there is a 75% probability that HS2 will be high value for money, and a 99% probability that it will be high or medium value for money (Figure 2.13).
- 2.78** If the demand cap is extended to 2049, our analysis shows there is a greater than 99% chance that HS2 will be high or very high value for money (Figure 2.14). This is a convincing and compelling case for investing in HS2.

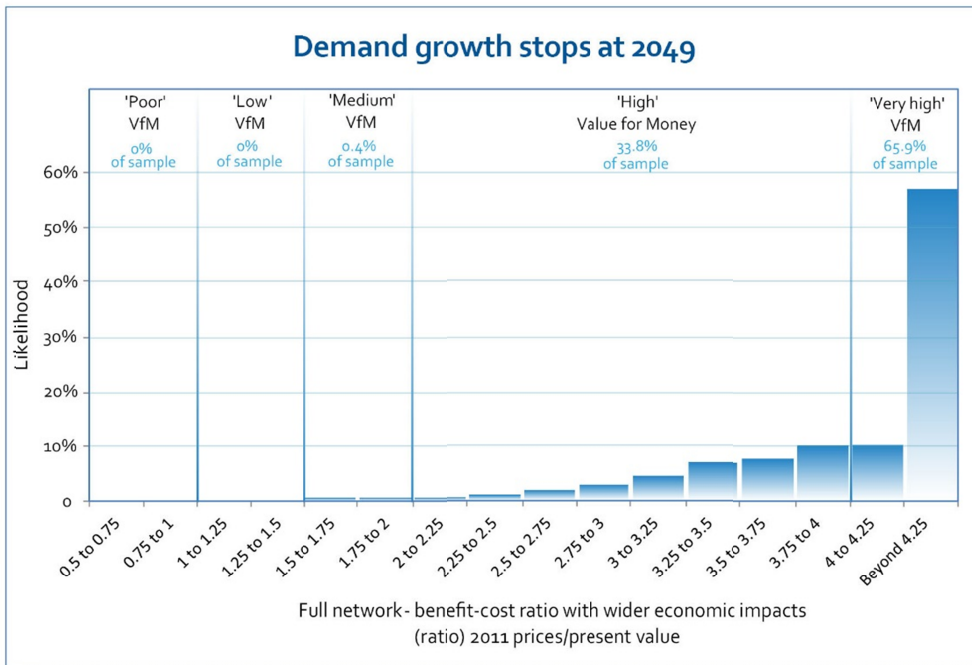
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<sup>72</sup> HS2 Ltd (2013), *The Economic Case for HS2*, p.85

**Figure 2.13 BCR distribution with standard Demand Cap (2036)<sup>73</sup>**



**Figure 2.14 BCR distribution with 2049 Demand Cap<sup>74</sup>**



<sup>73</sup> Source: HS2 Ltd

<sup>74</sup> Source: HS2 Ltd



