

# The Next Steps

*for high-speed rail in Britain*

November 2007



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## Executive Summary

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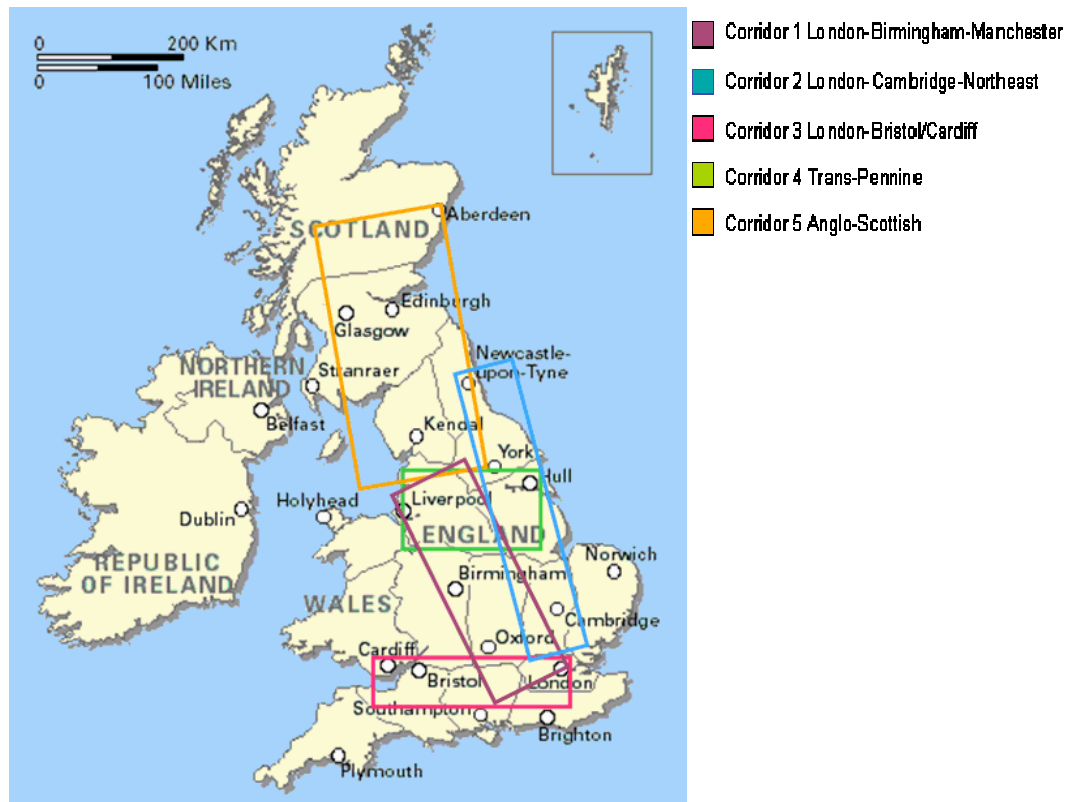
Britain's first high speed railway, High Speed 1, is now open for business and is set to transform railway travel between Britain and Europe. With the launch of domestic services in 2009, together with investment in stations at St Pancras, Stratford, Ebbsfleet and Ashford, the transport and economic benefits of High Speed 1 will spread across the south east.

This good news is accompanied by signs that the Government is now prepared to contemplate a future High Speed Two, our next high speed railway, linking London with Birmingham and Manchester. Government discussion document *Towards a Sustainable Transport System* released in October has signalled that additional capacity will be needed by 2024 to meet growing rail demand and that this capacity might be provided by a new railway line. The document says that cutting journey times and carbon emissions are key policy objectives in this corridor. This is a positive response to last year's reports from Eddington and Stern. Earlier, in July, the Rail White Paper *Delivering a Sustainable Railway* highlighted capacity alone as key policy driver and prioritised the London - Birmingham - Manchester corridor for action.

*Greengauge 21* welcomes these developments, which are consistent with the proposition, *High Speed Two*, we put forward in June 2007. The new transport planning framework now proposed by Government is an opportunity to consider the long term economic, environmental and social challenges that Britain's transport system must address. It will allow the merits of high speed rail to be assessed rigorously against other policies and investments across the transport modes.

The opportunity now needs to be grasped to consider the case for a strategic high speed rail *network* for Britain, to ensure that its benefits are shared across the country. We outline in this report how Government could take this forward by looking at not one, but five, potential corridors for high speed rail. Such a network would need to be developed in stages, but efficient planning of each stage requires a long-term vision. This report identifies the strategic issues arising in each of these five corridors and highlights the actions needed to make good progress.

## Route Corridors



Government aims to develop a long term transport plan by 2012. It will need to identify the role of a high speed rail network for Britain. Timescales may appear generous, but getting objectives clear and agreed, integrating thinking on high-speed rail with other plans and policies, making decisions on financing and the role of the private sector and building consensus should save much time and delay later in the process.

High Speed One took twenty years to bring to fruition. With 2024 as a target year, this work needs to proceed with all due urgency.

High-speed rail for Britain is now on government's policy agenda. Until very recently, while government had not rejected high-speed rail out of hand, the impression given was that this would be a path chosen with some reluctance.

In fact, Sir Rod Eddington, whose report on transport and its economic importance was published in December 2006 and the Rail White Paper which followed in July 2007, each provided important milestones in government's thinking on the issue. The most recent report, *"Towards a Sustainable Transport System"*, was published by the Department of Transport last month<sup>1</sup>, and, upon its launch, Secretary of State Ruth Kelly, speaking of the London – Birmingham - Manchester corridor, said:

*"Additional capacity will be needed by 2024... We might have to increase capacity through conventional rail or a high-speed line"*<sup>2</sup>.

This was not a policy turnaround, but there has clearly been - as we shall see - a warming to the idea of high-speed rail.

We need to trace the development of this thinking, because the new approach to planning involves government making its policy objectives clear at the outset, and well before specific transport schemes are defined.

### The Latest Government Report

Government is about to embark on an integrated, across-the-modes form of strategic planning of transport provision in Britain that recognises the need to plan for the longer term and the inevitably lengthy lead time in bringing major transport investments to fruition.

Of particular relevance to high-speed rail is the part of this latest report entitled *Towards a Sustainable Transport System*<sup>3</sup> which explains how the new process would be applied to an individual corridor, and for this purpose they happen to have selected London – Birmingham - Manchester, which is the corridor identified for High Speed Two<sup>4</sup>. We attach the discussion of this corridor at Annex A, given its importance.

There are three particularly important points made in the Department for Transport's document in relation to this proposed corridor level assessment.

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<sup>1</sup> *Towards a Sustainable Transport System: Supporting Economic Growth in a Low Carbon World*. Department for Transport, London. Cm 7226 October 2007. This report forms the Department's response to the Stern Report on Climate Change as well as the Eddington Transport Study.

<sup>2</sup> Financial Times October 30<sup>th</sup> 2007 p1

<sup>3</sup> *Towards a Sustainable op cit*

<sup>4</sup> See *"High Speed Two"* Greengauge 21, June 2007.

The first is that, even allowing for the further enhancements planned and anticipated on the West Coast Main Line which could add perhaps 50% to the route's passenger capacity, the benefits of these improvements will be exhausted by 2024 as growth continues. This implies a recognition of the urgency of the situation that was lacking as recently as the July White Paper. The lead times for investments such as high-speed rail are such that implementation before 2024 requires a start on planning right away.

The Department specifies the challenges and the priorities for this corridor, and this gives rise to the second important point. Having explained the capacity shortfall that can be anticipated and the range of solutions, across the various transport modes, that should be considered, it says that the priorities will be:

*“Cutting end-to-end journey time for goods and people moving through the corridor and reducing the CO<sup>2</sup> footprint of those journeys”.*

This is a new departure. The Eddington Transport Study, and indeed the Rail White Paper that followed it, both expressed satisfaction with the journey times on offer across the modes on Britain's transport network. It would seem that this particular complacency is over.

The commitment to seek to reduce the carbon footprint is also, while recognisably consistent with the Stern Report on Climate Change, a bold response, since Stern was rather concerned to relieve the transport sector from early obligations on carbon reduction on the grounds that transport is a sector where behavioural change is relatively harder<sup>5</sup>.

There is more. The third notable point is the reference, when discussing domestic aviation<sup>6</sup>, to the role of higher speed rail services:

*“Experience since the completion of the West Coast Main Line (sic) between London and Manchester shows that improvements in rail services can contribute to reduced demand for domestic air services”.*

Previous documents have shied away from the idea of actively pursuing a re-balancing of modal shares to achieve wider policy aims. While there is no weakening in support for aviation in general, given its perceived importance to national economic competitiveness, the recognition that faster rail services may change the need to accommodate demand growth on the short-haul domestic sector is new.

In short, we have a recognition with respect to high-speed rail that the position is urgent (given planning lead times), that journey times need to be reduced in a dependable way for customers, that it will be necessary to reduce carbon emissions from transport in our busiest interurban corridors and that it is worth considering the benefits of achieving a switch in market demand from domestic aviation to high-speed rail.

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<sup>5</sup> A view contested by, for example Phil Goodwin, UKERC Workshop - Carbon Abatement in the Transport Sector, Centre for Transport and Society, UWE, Bristol

<sup>6</sup> Towards a Sustainable , *op cit* p56

<sup>7</sup> *Ibid.*

## The Rail White Paper (July 2007)

The previous report of most relevance from government, the Rail White Paper<sup>8</sup> of July, purported to be a 30-year strategy for the railways, to accompany the first statement on what Ministers ‘wanted to buy’ for the railways over the next five years (the High Level Output Statement, set against a Statement of Funds Available).

In relation to high-speed rail, this report was helpful in saying what government was *not* prepared to take forward. Specifically, in seeking solutions to the capacity challenge on the national rail network it explicitly ruled out:

- Building a separate route for railfreight (because little freight travels on the network during the peak periods when capacity relief is needed, so diverting freight to other routes wouldn’t help)
- Building new tracks immediately alongside existing lines (based on advice from Network Rail and London & Continental Railways, who pointed out the adverse impact of disruption to existing services)
- Building a new line with innovative technology, and specifically MAGLEV (because it saw the risks and costs being much greater than its proponents had suggested)<sup>9</sup>.

*Greengauge 21* welcomed this aspect of the White Paper, since it helpfully ‘narrowed the field of search’ for solutions to the rail capacity problem. It left the Department, once all other sensible measures such as train lengthening had been carried through, with the option of building new routes. The White Paper saw this need arising only in one corridor - from London to the West Midlands and the North West.

Prioritisation on this corridor is consistent with the view that *Greengauge 21* had expressed in *High Speed Two*, a report which identified the reasons why this corridor was most suitable for the next stage of high-speed rail development in Britain. But that is not to say that other corridors aren’t equally worthy of attention for the same reason, namely a likely shortage of capacity in the longer term.

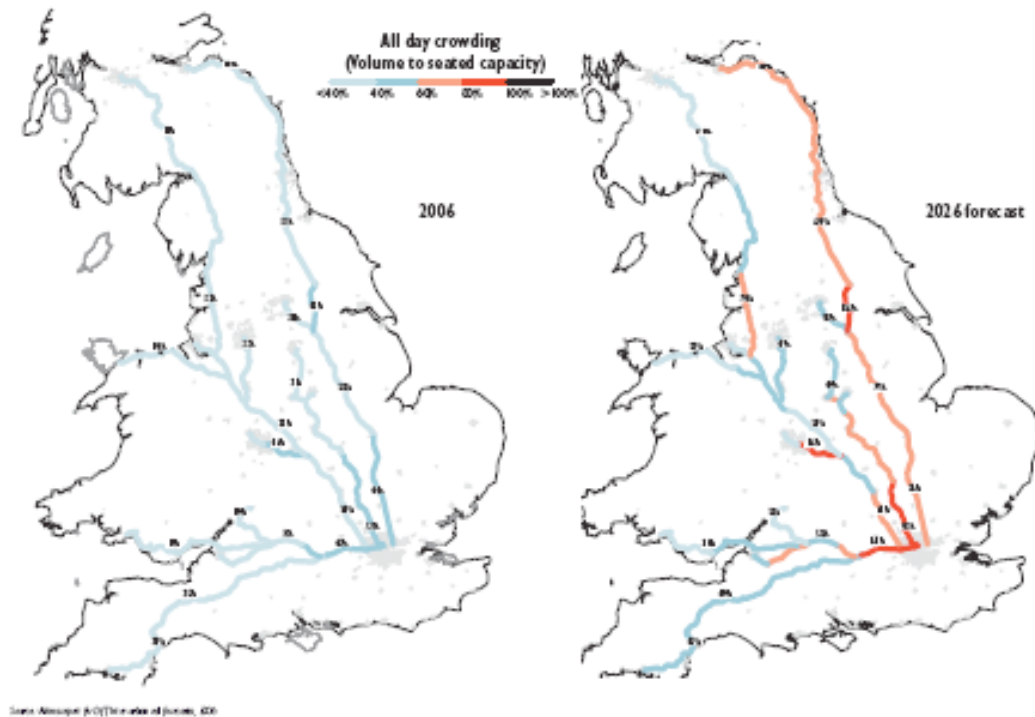
It is notable in this respect that the government’s forecasts of demand and capacity on the nation’s main railway corridors had earlier shown that there were also very significant problems to be expected on the Great Western Main Line out of Paddington, the Midland Main Line from St Pancras to Bedford and the East Coast Main Line, pretty much over its whole length from Kings Cross to Edinburgh.

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<sup>8</sup> Delivering a Sustainable Railway Cm 7176, Department for Transport, July 2007.

<sup>9</sup> A supplementary report published alongside the July White Paper on this subject was written for the Department by Professors Kemp and Smith, and is available on the DfT website.

Fig 1.1: Rail Demand 2006 - 2026<sup>10</sup>



The major schemes announced in the White Paper provide for a resolution of the capacity bottleneck on the Great Western Main Line at Reading and, through the Thameslink project, for a major uplift in capacity on the Midland Main Line. So that would address two of the three overloaded routes. But while the Intercity Express Project will lift train capacity on the East Coast Main Line (with timetable improvements, perhaps of the same magnitude as are identified for the West Coast), it seems unlikely that the East Coast will be facing an easier position than the West Coast by the mid 2020s.

Besides its questionable focus on a single corridor for high-speed rail, the July White Paper offers evidence on the issue of whether any new rail capacity should be built for high speeds, or whether it would be better to settle at today's line- speed<sup>11</sup>. It concludes that for several reasons, new capacity might be better provided at today's lower speeds. The arguments it uses are worth examining, and we set them out in Annex B, where we show them to be rather easily refutable.

<sup>10</sup> Diagram reproduced from the Eddington Transport Study – Volume 2, Figure 3.9, Crown Copyright

<sup>11</sup> The difference is between 300km/h (or higher – say 330 or 350 km/h design standards) against 200km/h. Conventional high-speed rail in Europe has adopted 300km/h, although some routes and rolling stock are now designed for higher speeds; in Britain the Great Western and East Coast Main lines have operated at up to 200km/h for over 25 years, and now, with the successful use of tilt technology, the West Coast operates at this speed too.



### High Speed Two

*Greengauge 21* published its report on High Speed Two (HS2) in June 2007<sup>12</sup>. It showed how a north-south high-speed line can be extended from HS1 at St Pancras, connect into Heathrow Airport and provide a new fast link to Birmingham and the North West<sup>13</sup>.

It has a total cost of £11bn including the additional 66% optimism bias adjustment prescribed for major projects at an early stage of development.

The endorsement of the same corridor in subsequent government reports indicates a convergence of view on where the priorities lie for more detailed examination.

There was a widespread welcome for the *Greengauge 21* report, the production of which was sponsored by the Railway Forum. The report was included in the August edition of *Modern Railways* in full.

In *Greengauge 21's Manifesto*, published in January 2006<sup>14</sup>, as well as in *High Speed Two*, we argued that what was needed was a tightly defined network of High-Speed lines in Britain, not a single scheme. The parallel can be drawn with the decision facing the nation at the onset of the national motorway network in the 1950s: if motorways were a good idea, then it wasn't a question of deciding where to build one, but how to use the concept to maximum advantage for the nation as a whole. *Greengauge 21* continues to believe that it is possible to extend the benefits from the high-speed network across the whole of Britain.

### HS3 and More

It is critical to consider a long-term high-speed rail network strategy at the outset, even if detailed planning has to follow later. This way, the scope for efficiency in investment decisions is increased and the likelihood of wasting expenditure on parts of the rail network that will be relieved by high-speed rail in due course can be minimised.

We believe that at this stage five broad corridors can be identified where there might be a case for investment in high-speed rail. They are shown in Figure 2.1.

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<sup>12</sup> High Speed Two *op cit*

<sup>13</sup> We have not published detailed alignments at this stage. The connection into the West Coast Main Line allows trains to proceed over the upgraded and capacity-enhanced section of that route. If the solution to the outstanding bottleneck at Stafford is to create a cut-off line to bypass the congested junctions at Stafford and Norton Bridge then it would be appropriate, in our view, to specify the construction of this short section of new railway to high-speed line standards, even if decisions have not yet been taken on HS2 as a whole.

<sup>14</sup> Also available on the Greengauge 21 Website.

Fig 2.1: Route Corridors



Here we identify three routes centred on London, the trans-Pennine corridor and an Anglo-Scottish area. Even these broadly defined corridors do not indicate the full extent of the areas that would benefit from high-speed rail. For instance, much of East Anglia would in practice benefit from Corridor 2, where a high-speed route would link London and the North East. Cross country connections can also be offered using high speed lines, as was illustrated in *High Speed Two*<sup>15</sup>, which showed how services between the Southampton area and the West Midlands/North West could operate over HS2<sup>16</sup>.

<sup>15</sup> Ibid

<sup>16</sup> Guillaume Pepy, head of SNCF and Chairman of Eurostar, when delivering the Sir Robert Reid memorial lecture in London in January 2007 pointed out that the fastest area of demand growth on the TGV network was on the services which connected pairs of provincial destinations, and he acknowledged that this had not been initially seen as a likely market for TGV.

The five corridors are selected because of the need to address capacity shortfalls. However, whereas those centred on London can be seen to correlate closely with the areas of forecast future stress on the national rail network as shown in Figure 1.1, the trans-Pennine corridor has been identified as critical to economic expansion<sup>17</sup> and the Anglo-Scottish corridors have a different type of capacity challenge, arising as much from the mix of passenger and freight use as from the passenger crowding issues on the East Coast Main Line. Consideration of these latter two corridors needs to draw on the opportunities thrown up by a wider high speed rail network that includes Corridors 1 and 2.

While capacity concerns may be a common policy driver, the nature of the solutions to be considered in these corridors varies as does the set of benefits that can be created.

### ***Corridor One: HS2 London – Birmingham – Manchester***

A significant aspect of this priority corridor for high-speed rail is that it should afford direct high-speed rail access to Heathrow (as well as Central London), both from the north (the Birmingham - Manchester corridor) and from the south, allowing high-speed services to operate from continental European cities through London (Stratford), where a key use for the International Station would be established, and onwards direct into Heathrow. The access to Heathrow and connection to HS1 is of great significance to the wider development of a sensible national strategy for high-speed rail, embracing the other corridors, and this was one of the reasons why *Greengauge 21* identified this corridor as a priority for HS2.

The remaining corridors have no particular priority, but each has the potential to offer excellent value for money, matching the benefit:cost ratios of 2:1 already identified for high-speed rail in feasibility studies. Good value for money will stem from a careful consideration of the options in each case, rather than a relentless application of the same prescription. And the consideration of alternatives will need to embrace consideration of modes of transport besides rail.

### ***Corridor Two: London – Cambridge – North East***

There are broadly two ways in which benefits equivalent to those created by HS2 can be conferred on the east side of the country. The preferred way is to look at the whole corridor from London to the North East in its own right.

An alternative approach would be to fashion a high-speed connection from a suitable point on HS2 in the south Midlands to form a branch for the Yorkshire/Humber region.

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<sup>17</sup> See: “Northern Way calls for high-speed links” press release 21<sup>st</sup> September, 2007. This statement also identified the wider economic benefit from high-speed rail through agglomeration benefits, totalling £10bn over the life of the project.

Such a solution was examined in the Atkins study for the Strategic Rail Authority<sup>18</sup>, but later rejected (in the same study). *Greengauge 21* similarly believes that it would be unsound to burden the HS2 route with the need to accommodate services for the east side of the country as well as the west. Ultimately, the routing involved would bring only modest gains in journey time to Yorkshire/the North East, the ‘trunk’ part of HS2 will become overstretched<sup>19</sup> and there would be no opportunity to bring direct benefits to the critical London - Stansted - Cambridge - Peterborough corridor.

There is every reason to suppose that investment in high-speed rail in Corridor Two would be just as beneficial an investment as HS2:

- Analysis of high-speed rail in this corridor, made on the assumption that there will *not* be a major upgrade to the East Coast Main Line in the interim, reveals a high benefit:cost ratio (2.67:1)<sup>20</sup>
- The southern part of this corridor includes the strong growth pole of Cambridge and Stansted Airport. While there is a temptation to study the transportation problems of population growth in the wider south east and the expansion of the congested airports in the south east under separate headings from the longer distance transport issues, this would be a mistake. This line of thinking could lead to parallel projects and inefficient investment
- The network reach of this corridor is not limited to today’s East Coast Main Line destinations. High-speed rail in this corridor can also serve Nottingham and Sheffield, for instance, and bring capacity relief to the Midland Main Line and to the West Anglia Main Line as well as the East Coast Main Line.

South of Peterborough, there is a remarkable focus of expected population growth, as indicated in the East of England Spatial Strategy (see Figure 2.2). Taken together with the pressures created by Stansted Airport expansion, this suggests that it would be prudent to look hard at this corridor - which contains the East Coast Main Line and the West Anglia route - for high-speed rail as well. The region is expected to need to accommodate over 1 million new residents in the next 20 years.

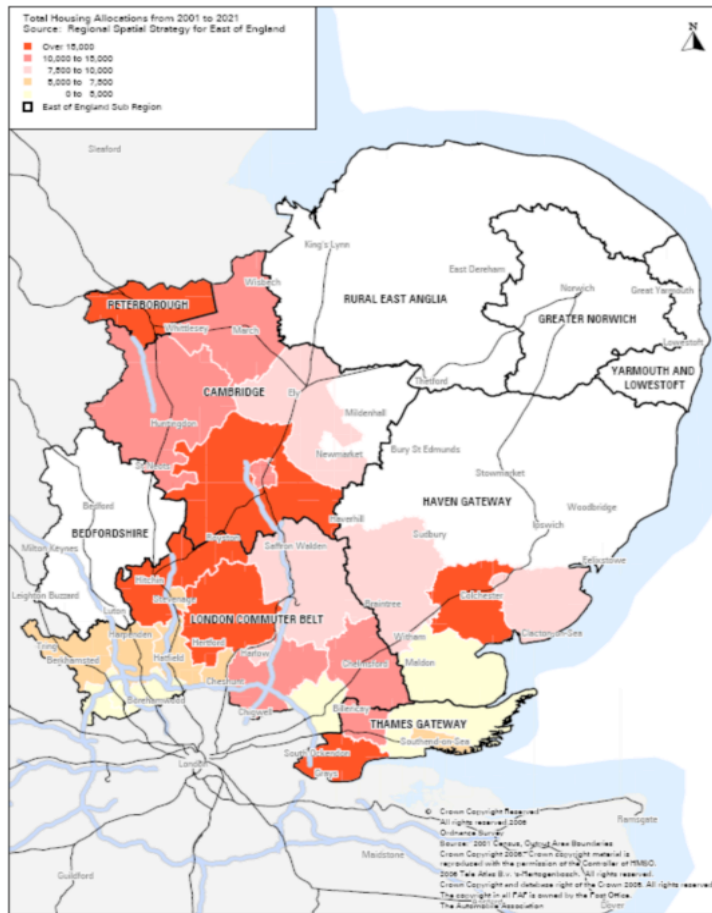
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<sup>18</sup> Atkins *op cit*

<sup>19</sup> It is interesting to see that the Paris Lyon TGV Route is now operating at capacity through the day; the route between Paris and Lille is also operating very close to capacity, as demand on these routes continues to grow.

<sup>20</sup> Atkins *op cit*.

Fig 2.2: East of England New Housing Allocations to 2021<sup>21</sup>



A high-speed line in this corridor could serve Stratford or Canary Wharf in central London. It may also be possible to use the east-west cross-London connection afforded by the combination of HS1 and HS2 to access Heathrow. As with HS2, careful consideration would need to be given to the right way to serve a major airport (Stansted in this case) in the London area.

Capacity challenges arising from demand growth would indicate the need for a new line in the southern part of this corridor (broadly speaking, south of Peterborough). Further north, the challenge and opportunities are somewhat different. Daytime inter city train frequencies on the East Coast Main Line are no more than 5 trains/hour, constrained by the need also to operate a significant and growing number of inter-modal freight trains to/from the important ports on Britain's east coast, as well as a number of other train movements, both passenger and freight which have an impact on junction capacity in particular.

There are broadly two ways of addressing this, and there is a parallel here with the two instruments that have been used in Germany to fashion faster intercity rail services.

<sup>21</sup> Source: East of England Regional Spatial Strategy.

There a distinction is drawn between *Neubaustrecke* (new construction lines) and *Ausbaustrecke* (improved lines). Typically the former will create routes capable of supporting 300km/h operation, while the latter entail works to existing lines, eliminating level crossings, introducing cab-signalling, capacity enhancement (at junctions especially) and as needed, line straightening, to create routes capable of supporting 200-250 km/h operation. Here the choice would be between upgrading the East Coast Main Line, improving on its 200 km/h maximum linespeed a notch or two or creating a new high-speed line (and just such a proposition was developed in considerable detail by Virgin Stagecoach in a franchise bid seven years ago - see the outline in Figure 2.3).

Fig 2.3: East Coast High Speed Rail Proposal  
(Virgin Stagecoach Franchise Bid 2000)



The problem with upgrading the existing line north of Peterborough further for higher speeds, is that the capacity conflicts with other slower moving traffics become intensified. Speed would be gained at the loss of network capacity. This might be surmounted by the creation of a suitable parallel route for freight (and the Midland Main Line would seem to be a possible candidate) and a set of changes to the route junctions and stations. But such an approach may prove to be expensive, while still yielding less benefit than a new high-speed line. In any event, these two generic options need to be assessed, along with the possibility of development of other transport modes.

### ***Corridor Three: London – Bristol/Cardiff***

The investments in Reading and in Crossrail now committed by Government will provide tremendous benefits in this corridor, decongesting the critical bottleneck and overcoming the relative inaccessibility of Paddington station to the key destinations in central London. These developments, together with the relatively short distances and the high speed offered by the existing rail lines (capable of supporting faster speeds than today's 200km/h with suitable train control systems), suggest that an emphasis on line of route upgrade would be a possible way forward. For the lengthier journeys to the West Country, it will also be sensible to look at tilting train technology, since, with a relatively curvy alignment, there are substantial time savings to be had. Britain probably leads the world in the successful application of reliable tilt train technology.

One frustrating problem that will remain is the lack of direct access to Heathrow Airport, where passengers in this corridor have the choice of a coach connection from Reading or a double-back connection via London using Heathrow Express. While the region's airports have expanded considerably in the last few years, it is inevitably the case that Heathrow serves the region not just as an international gateway, but also as a local airport for residents to the south and west of London. The creation of a new high-speed train station at Heathrow forms part of the HS2 proposal and it could be fashioned to accommodate direct services from the Great Western Main Line too. But it would be necessary to know when developing the detailed specification for the new station at Heathrow Airport as part of HS2 whether it is expected to serve this additional function too in due course.

This is an example of the need to think forward to a long-term network strategy if the planning of the next steps - HS2 is to have adequate 'future-proofing'.

### ***Corridor Four: Trans-Pennine***

The cities of Leeds and Manchester are experiencing strong growth and are re-inventing themselves as modern city regions, with a shift away from manufacturing and into the service sector. The key cities in the north will experience a broadening of commuter demand, as has happened in the south of the country as these changes work through. This will create substantial demand for better transport, for access to employment opportunities and for business travel.

The Northern Way has shown that better, faster, connections between the northern cities would add 40% to the wider 'agglomeration' economic benefits of a high-speed rail network if a trans-Pennine connection is included<sup>22</sup>.

The Pennines are a significant barrier to efficient transport. The M62 will gradually fill up and no doubt will be subject to 'Active Traffic Management' to get the very best use out of the capacity available. Improved TransPennine Express rail services continue to attract increased market share, but suffer from slow, unreliable journey times and congestion at key locations. Investment in the Manchester Hub announced in October 2007 may bring essential relief.

But in the longer term, with the potential of high-speed lines on both the eastern and western sides of the Pennines, a new east-west connection could offer many benefits. It would not only offer capacity and speed advantages to journeys between, on the one hand, Liverpool, Manchester, Preston and Chester and on the other Sheffield, Leeds, Bradford, York, Hull, Middlesbrough and Newcastle. It would also offer the opportunity to exploit the new north-south high-speed routes to connect (for example) Manchester with Cambridge, and Liverpool with Newcastle, with fast direct services. Such considerations again point to the advantage of thinking about high-speed rail in Corridors 2 and 3 with a long-term network perspective, not as isolated schemes.

While the terrain is likely to make per mile construction costs relatively high, distances across the Pennines are short: just 39 miles from Manchester to Sheffield, for instance, yet this is a journey that takes over an hour on average by road. The scope for better efficiency through time saving is immense.

Again, the choice will be in practice between enhancing existing routes and building anew. Many of the critical choices are likely to arise in areas of urban development. High-speed rail is pointless if it fails to reach the heart of the city centres where business, retail and cultural activity peaks and where there is a concentrated focus of public transport capacity to address the challenge of 'dispersion' from high-speed rail stations. The trans-Pennine corridor also crosses an environmentally-valuable area. Difficult though some of the challenges will be, these are problems around a transport system that actively reinforces the concept of sustainable development, rather than what we have been used to for the last 60 years, which is pressure from road network and airport development towards dispersal and a diffuse pattern of peri-urban development.

### **Corridor Five: Anglo- Scottish**

Between London/south east England and central Scotland, air dominates the travel market. Rail share of both the Glasgow and Edinburgh travel markets has fallen to well below 20%. The scale of air demand is reflected in the existence of six airlines competing in this travel market, and 125 flights from central Scotland to the London airports each day. This is where high-speed rail can offer the greatest scope for a reduced dependence on aviation, and the greatest saving in carbon.

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<sup>22</sup> Northern Way *op cit*.



High Speed Two, together with improvements to the West Coast Main Line could offer journey times of perhaps around 3h 35 between London and both Glasgow and Edinburgh. This would lead to a significant switch from air to high-speed rail, but it would be impossible to insulate high-speed rail from the constraints of operating on the existing mixed-traffic rail network on the northern part of the route. It will be rather akin to the situation that Eurostar was in prior to the opening of CTRL, and the Department's aim of delivering dependable shorter journey times may be compromised.

To achieve a majority share of the market, high-speed rail needs to offer journey times of 3 hours, and the route has to be broadly insulated from the impact of other rail services sharing the line that might induce unreliability. A three hour journey time is achieved in the Paris – Marseilles corridor, over a route length some 100km longer than London - Glasgow/Edinburgh, with trains operating at 300km/h. The implication is that a complete north-south rail route would achieve journey times well below three hours (perhaps as low as 2h 40). More realistically, journey times of around three hours could be obtained from a combination of extending HS2 and judicious upgrading of existing lines, with the creation of parallel freight routes.

The capacity challenge over this broad corridor on the rail network stems from the mix of train types. Since there are three cross-border lines, it is possible to separate the traffic mix by route. Enhancement of existing lines would possibly also create the cut-offs needed to allow mixed use to continue. But to get to three hours, some further high-speed line construction, beyond either of the lines envisaged in corridors 2 and 3 is needed.

An issue that will be of some significance is the use of tilting technology, as used by the Pendolino fleet now operating so successfully on the West Coast Main Line. These trains are capable of operation at slightly higher speeds (225 km/h) than they do today. To achieve the interim journey time improvements identified above from the creation of HS2, it would be essential to have a fleet of trains that could operate both at (say) 300 km/h in non-tilt mode over the high-speed line and, in tilt mode at the lower speed (200-225 km/h) over the northern section of the West Coast Main Line. This is a combination of proven technologies and operating practice in Britain that poses no significant new technological risks, but it does mean a new fleet of trains will be needed for Anglo-Scottish services once High Speed Two is built.

If the preferred route for the development of high-speed across the border is in the West Coast corridor, then there could be the facility to use the same enhanced infrastructure to create a faster link between Edinburgh and Glasgow. Investments that have been considered over the last few years into Glasgow's rail network would help create the terminal capacity needed<sup>23</sup>.

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<sup>23</sup> See for example the Scottish Strategic Rail Study, Scottish Executive, 2003.

## Conclusion

There are five corridors where high-speed rail needs to be considered as potentially the best means of tackling the challenges identified by the Department's document *Towards a Sustainable Transport System*. In some of these corridors, route upgrades may be a better prospect than new line construction, but in others, there is already clear evidence of the case for new high-speed rail lines.

The case for high-speed rail is therefore not limited to HS2. And in each corridor considered, there are important interface issues which serve to underline the need to take a strategic *network* view of high-speed, before embarking on any individual project. Such a view will be needed to meet the new planning system's appetite for a national policy statement for rail.

### Developing a Long Term Strategy

The need to set out a long-term strategy for inter-urban transport provision is compelling. The lead-time in developing major projects is lengthy. Government is clear that it will not revert to 'predict and provide' but instead wants to pursue specific aims, as described earlier.

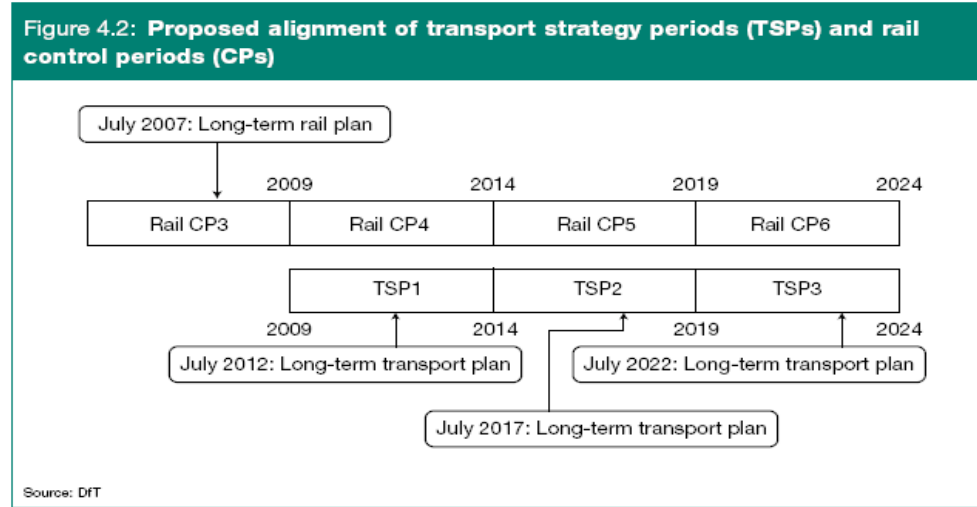
For government, a long term strategy brings the prospect of spending efficiencies, avoiding the expenditure that comes from looking at individual transport modes in isolation and from avoiding disruptive and costly incremental improvements when sometimes a more radical approach is needed.

The long term nature of the transport planning process was highlighted in the Eddington Transport Study. This proposed changes to the way the Government develops transport plans:

- A 20-30 year outlook should set out objectives, current and future pressures and opportunities, based on strong evidence
- 10-20 year strategies need to identify future options to meet the strategic objectives
- 5-10 year statements should establish the transport outputs to be secured, with clear commitments to specific interventions and funding.

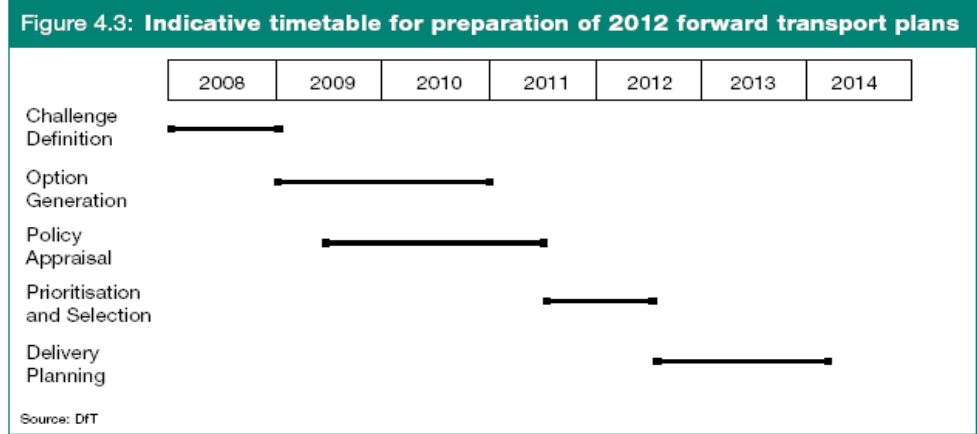
This approach is now reflected in Government thinking: *Towards a Sustainable Transport System* which sets out in some detail how long term transport plans will be developed in future. From now on, the Government will align decision-making cycles across modes, in line with the 'Control Periods' already adopted for the railways by its independent regulator. The approach is illustrated in Figure 3.1 below. This alignment of planning cycles is seen as a key step to allow the impacts of choices for different modes to be assessed alongside each other. It will allow for example, the potential impact of any future road user charging policy on the demand and case for high-speed rail investment to be assessed.

Figure 3.1: The Department for Transport’s New Planning Timetables<sup>24</sup>



*Towards a Sustainable Transport System* says that the Government will produce its first long term transport plan in July 2012. A critical element of the new approach is early consultation with stakeholders to help define long term goals and challenges for the transport system (see Figure 3.2). To work, these need to include an examination beyond narrow transport-focused goals and contemplate the contribution the rail network makes to economic growth, social goals and environmental sustainability.

Figure 3.2: The Steps to Producing a Strategic Transport Plan<sup>25</sup>



This process will also be a test of the ability of central government and regional and city-regional agencies to work together. A characteristic of both the road and rail networks is that they are mixed-use: catering for freight as well as passenger movement and local/regional journeys as well as longer distance trips. Aviation too arouses strong local and regional views, because of the perceived importance to the business sector and, in some cases, the continuing local authority ownership of airport facilities.

<sup>24</sup> DfT, *Towards a Sustainable op cit*, Crown copyright.

<sup>25</sup> *Ibid.*

## Planning for Projects of National Importance

Several government departments have collaborated on the widespread reforms to the planning system, as set out in the *Planning for a Sustainable Future* White Paper<sup>26</sup>. These reforms are designed to address what has come to be seen as a bottleneck in the nation's ability to invest in essential infrastructure, including in facilities such as nuclear power. Transport too will come under this approach. The reforms will see the input of Ministers change: instead of having the final say on planning applications, the views of government will be reflected at the outset in a set of national policy statements. These are intended to provide the policy framework for planning decisions on infrastructure development, and avoid wasteful debate in lengthy public inquiries. While these will still take place, an independent Infrastructure Planning Commission will oversee them and seek to induce a less confrontational approach. The days of the planning QC and witness trial by cross-examination could be over.

The new processes cannot start at the level of individual schemes until the national policy statements are produced and they themselves may well be contentious and will certainly entail a significant level of consultation. There is a brief cross-reference to this new planning system in *Towards a Sustainable Transport System*, with the suggestion that the Department of Transport would use its new strategic framework to help develop the national policy statements (on transport).

There are two potential problems to note. The first is one of timescale. However elegant the new cross-mode strategic approach is on paper, until there is an approved National Statement on Transport (which seems to depend on getting a long way through a DfT process that won't deliver until 2012), there can be no new approach to progressing the planning powers for individual schemes. Without compromising the necessary consultation with interested parties, this needs to be accelerated.

The second point is that the Planning White Paper envisaged a suite of national policy statements that omitted rail projects - apparently on the basis that no major new rail projects likely to arouse the interest of the proposed infrastructure planning commission were foreseen. We believe that this has been recognised as an oversight, and no doubt can be rectified. Clearly, if the new system is to work at all, it has to cover high speed rail projects.

## Conclusion

*Greengauge 21* has called for a recognition that high-speed rail is not about solving the narrow problem of a congested rail network, but is about meeting the wider challenges the nation faces. The changes to the planning approaches envisaged could allow these wider issues to be debated and resolved into a useful set of policy frameworks before individual schemes come before a (reformed) public inquiry process.

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<sup>26</sup> *Planning for a Sustainable Future*, Cm 7120, Communities and Local Government, Department for the Environment, Food and Rural Affairs, Department of Trade and Industry, Department for Transport, May 2007.

The changes could also allow time to ensure that the necessary funding is put in place, probably in conjunction with the private sector, to avoid further delays to project implementation (which are often attributed - not always correctly - to the planning process).

The need to align planning cycles across the transport modes and to embark on a serious and strategic planning exercise is a fresh departure and will entail the Department for Transport in an engagement in planning matters that it has traditionally farmed out to its agencies and to regional/local government. It will need additional resources for the task ahead.

The Department of Transport has set aside 2008 for 'Challenge Definition'<sup>27</sup>. This period will precede the serious study of individual corridors of the type identified in Chapter 2. It is a period that also must be used to carry out a number of important preparatory pieces of work.

We have identified the tasks that should be undertaken during 2008, consistent with the Department's programme, as being:

- A strategic high-speed rail (HSR) network assessment
- The development of suitable technical standards for HSR in Britain
- Identification of key sites, especially in city centres that should be protected for high-speed rail developments
- A programme of consultation on the work that has been done to date on high-speed rail
- An assessment of the options available for public sector funding and financing of HSR schemes, and of the role that the private sector should play in their development.

In addition, it will be necessary to:

- Develop a policy statement on National Rail Infrastructure for the new planning regime.

Unless these tasks are tackled with energy and enthusiasm, there is a risk of vagueness in the identification of high-speed rail options when it comes to corridor level studies, and an absence of 'smart thinking' on areas such as interfaces with existing transport networks and with planned land use developments. It may also mean that ultimately costs will be inflated by the time high-speed rail options come to be assessed and planning powers sought.

The aim should be to avoid doubt and uncertainty over the nature of the best high-speed rail solutions so that the analyses are not peppered with caveats and with costs augmented by risk and uncertainty provisions. The wider network benefits that high-speed rail can bring are particularly difficult to assess in a hurry. It would be therefore no bad thing to carry out some preliminary work into the first corridor(s) that would be subject to more detailed study.

### **Strategic Network Assessment**

This would examine the need and potential for high speed rail in the five corridors identified here and explore the linkages between them and issues of sequencing, of technical standards and of construction and financing capacity. This work could help frame the national policy statement for rail, for use by the new independent Infrastructure Planning Commission.

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<sup>27</sup> "Towards a Sustainable..." *op cit* Fig 4.3. Repeated here as Figure 3.2.

### Technical Standards

While these are defined by European law (Technical Specifications for Interoperability) the British applications of high-speed are likely to entail long-distance commuter operations (such as the *Javelin* service on HS1) and possibly the use of tilt technology. Standards will need to be developed specifically to address the explicit governmental policy aims including to help reduce the overall carbon footprint.

Applications of these standards will include issues such as the interface with HS1 (which has a non-compliant train control system) and geometric design standards (including the provision for easy access for the mobility impaired and the use of dual-deck train designs).

It might be that this would be a task for the Rail Standards and Safety Board to progress, at the invitation of the Department for Transport.

### Protecting Key Sites

This should be carried out as a matter of some urgency, starting with the central city locations in Manchester, Birmingham, Leeds, Newcastle, Glasgow and Sheffield, together with various sites in London, including the interfaces and access to HS1.

This work will inevitably involve close collaboration with the planning authorities in each of these key areas. *Greengauge 21* has carried out preliminary studies that can be made available for this work.

### Consultation

The final stages of the Atkins work<sup>28</sup> into high-speed rail, while it is now four years old, could be subject to a useful consultation exercise with key stakeholders. This should include consultation on the work carried out since, including by *Greengauge 21*. This would be a prudent step prior to the conduct of any corridor studies, and may reveal areas where analysis already available can be safely re-used or updated.

### Private Sector finance, funding and participation

*Greengauge 21* considers that each of the high-speed line schemes can be made subject to a private sector finance approach, but that the lessons of PFI and PPP experience to date will need to be taken on-board. The private sector will be keen to participate, of course, and it is important that government sets out from the outset how it wants to see this participation in practice. Rival route proposals are not likely, for instance, to help.

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<sup>28</sup> Atkins *op cit*.



An important question here will be the extent to which there is a genuine commercial return to be gained from this area of investment. While a ring-fenced high-speed rail project may look attractive to the private sector, questions of planning uncertainty will not. So timing of risk transfer is an important consideration. Government has to consider as well the impact on the finances of the existing rail network which is likely to lose higher fare-paying customers from intercity routes, with adverse consequences for existing franchise economics. It is not likely that, from a stand-point of public sector finance, there will be high-speed rail that does not require public sector money.

Government will also want to consider carefully the role of Network Rail in such an exercise. As envisaged here, the benefits of high-speed rail cannot be secured by contemplating its development in isolation from the rest of the network.

## Conclusion

*Greengauge 21* has identified five key work areas that need to be progressed as a matter of some urgency, alongside the five corridors that should be studied for high-speed rail.

## Annex A

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### Extract from Towards A Sustainable Transport System<sup>29</sup>

#### Applying the new approach to the Manchester-Birmingham-London corridor

The Manchester-Birmingham-London corridor links the three biggest cities in England. It is served by the M6/M1 and M6/M40, by the West Coast Main Line (WCML) and by domestic air services. It connects to Scotland via the M6 and WCML, and to the Channel Tunnel and ports via the M25 and M20.

Both the road and rail networks experience peak congestion problems, particularly on the approaches to major cities, where commuter and long-distance journeys overlap. Rail demand has been growing by 2½ per cent a year for long-distance travel and by over 5 per cent for travel to work in Birmingham and Manchester. Road demand and London rail commuter demand have been growing more slowly, but start from a more congested position. Demand for domestic air services between London and Manchester has fallen, since the completion of the modernisation of the WCML.

On top of the recent upgrade of the WCML, the rail White Paper has identified further measures that can increase the capacity of the existing line by 50 per cent. Even allowing for that increase, however, if current demand growth continues, very substantial additional capacity will once again be needed by 2024. In line with Eddington, the White Paper concludes that the any decision on additional rail capacity cannot be taken in isolation from the other modes.

The Eddington approach to any transport policy decision involves starting by being clear about the challenges we want to address. This is essential if we are to avoid falling into the trap he identifies of pursuing 'solutions in search of a problem'. Cutting the predictable end-to-end journey time for goods and people moving through the corridor and reducing the CO<sub>2</sub> footprint of those journeys will be priorities. Impacts on noise and regional economic growth may be particularly important.

The next step is to generate a broad range of options. This might include widening of motorways, active traffic management, road-pricing, or the construction of new rail capacity either through a conventional (c. 125 mph) or a high-speed (c. 200 mph) line. Equally, the right solution might be a combination of two or more of these. Some radical options (double-deck motorways, Maglevs and dedicated freight links) have been considered and rejected as inappropriate or unaffordable, but others may emerge in the option generation process. Value for money will be a key consideration.

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<sup>29</sup> *Op cit.* Crown copyright.

## Extract Cont

### **Applying the new approach to the Manchester-Birmingham-London corridor** *(continued)*

The right mix of solutions requires an understanding of the origins, destinations and purpose of goods and people movements through the corridor. We need this data – and a transport model capable of processing it – to establish how transport demand will be changed by the policy options considered. Some types of trip will be more readily transferable from one mode to another (air to rail, for example). The modelling needs to be good enough to pick up small shifts from road, which could have a big impact on rail, as the ‘minority mode’. And the analysis will need to look at both medium- and long-term CO<sub>2</sub> implications.

Making a success of this sort of cross-modal analysis of options will not be easy, but it is clearly necessary. We cannot take sensible decisions on one mode without understanding the implications for the others. We will apply a similar approach on other key route corridors, starting with consultation on the key challenges, as described in paragraphs 5.6 to 5.10.

## Annex B

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### The Rail White Paper (July 2007)

The July White Paper offers evidence on the issue of whether any new rail capacity should be built for high speeds, or whether it would be better to settle at today's linespeed<sup>30</sup>. It concludes that for several reasons, new capacity might be better provided at today's lower speeds. The arguments it uses are worth examining.

The first argument is in effect this: *we've already got an excellent transport network. Either by air or rail, it's possible across Britain to travel 'there and back' in a day for a business meeting. So we don't need to go any faster.*

Aside from this being a London-centric view, this notion of the country conducting its business affairs with time available for lengthy and unreliable journeys seems out of touch with contemporary realities – as well as with the Department's own adoption of measures of agglomeration benefit based on proximity/ease of access for considering the wider economic benefit of transport investments. A successful business cluster depends on being able to set up face-to face contact in short time slices of an hour or even less. The relevant measurement is minutes, not half-days or days, in a global economy. High-speed rail as proposed by *Greengauge 21* offers the prospect of ready access to Heathrow and to the City in short time slices for the major cities of the Midlands, the North and potentially Scotland. Failure to offer this will relegate much of the national economy to the second division in global economy terms. High-speed rail offers the chance to extend the success of the London economy across Britain. The north-south divide isn't narrowing<sup>31</sup>.

Then, the White Paper argues, based on customer research conducted for Passenger Focus<sup>32</sup>, that cutting journey times is not a priority for passengers. It refers to a summary chart on what passengers value most<sup>33</sup>, which does indeed show that 'Journey Time' is ranked only 13<sup>th</sup> out of some 30 journey attributes. But this was a result obtained when today's passengers were asked about a reduction of just 5 minutes. Of course, High-Speed Rail offers much more than this (half an hour or an hour typically), and certainly offers as well a step-change in punctuality (which of course *is* a priority for today's rail users, but not one the Department recognised in its assessment of high-speed rail in this White Paper).<sup>34</sup>

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<sup>30</sup> The difference is between 300km/h (or higher – say 330 or 350 km/h design standards) against 200km/h. Conventional high-speed rail in Europe has adopted 300km/h, although some routes and rolling stock are now designed for higher speeds; in Britain the Great Western and East Coast Main lines have operated at up to 200km/h for over 25 years, and now, with the successful use of tilt technology, the West Coast operates at this speed too.

<sup>31</sup> IPPR North, 5<sup>th</sup> August, which shows data on GVA/head in 1997 and 2005

<sup>32</sup> Department for Transport *Delivering a Sustainable Railway* cm7176 July 2007 p62

<sup>33</sup> *Ibid* p95

<sup>34</sup> It is helpful that this unsound use of a straightforward piece of research has been so rapidly forgotten. Now, as we have seen, *Towards a Sustainable Transport System* talks in terms of the need to shorten reliable journey times.

The main cause of departmental unease over high-speed rail, however, arose from an apparent discovery about energy consumption and carbon emissions. Referencing evidence prepared by the LEK consultancy, released with the White Paper ("Summary of Key Research and Analysis"), they said that: 'This significantly dilutes the carbon savings available'. The piece of evidence in question is a chart which, in contrasting carbon emissions/passenger between London and Edinburgh/Glasgow by mode of travel, quite properly acknowledges the influence of assumptions on seat occupancy.<sup>35</sup> Unfortunately, the assumptions made across the transport modes it compares are implausible. Planes have a 65% load factor, and existing inter-city trains 45% on these routes. But a high-speed train is expected to achieve only a 33% load factor!

We are even told how this assumption came to be made. The demand on an existing inter-city train was taken as being the right load to assume for a high-speed train, which, we can therefore deduce, must have been presumed to offer greater capacity (which indeed it will have) and hence it was awarded a lower load factor. This is highly misleading. The obvious evidence to use is the Eurostar service to Brussels and Paris. This achieves a load factor of roughly twice the level assumed here for domestic high-speed rail<sup>36</sup>. If that had been used, the carbon/passenger for high-speed rail would be about half the level shown, and the Department needn't have surprised itself. Because high-speed rail offers greater per train capacity *and* achieves higher load factors than today's inter-city rail, **the Department would have concluded (correctly) that high-speed rail carbon/passenger would be about the same as is achieved on today's inter-city rail offer.** This in turn is *several times less* than the carbon emissions per passenger from either car use over this journey length as well as being much less than is incurred by domestic aviation.

In summary, the Rail White Paper's conclusions on the case for new rail capacity being provided at existing rather than at European-standard high-speed is flawed, and may be safely disregarded.

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<sup>35</sup> Delivering a Sustainable Railway *Summary of key Research and Analysis* LEK, for Department for Transport, July 2007 p86

<sup>36</sup> Current (pre-HS1 operation to St Pancras) load factors are on average 70% for the London-Paris route and 65% for the combination of London-Paris and Brussels routes.