

High Speed Rail (HS2)

A case for alternatives to HS2

Discussion Paper prepared by HS2 Action Alliance

Revised July 2010

Contents

	Page
Summary	03
1. Will the demand needed for HS2 happen?	04
2. Are the benefits an illusion?	10
3. Do we need a new railway to get capacity?	12
4. Uncertainty and HS2	14
5. HSR or HS2?	15
<hr/>	
Presentation at the HS2 Stakeholder Summit: The Business Case (organised by Buckinghamshire County Council), 18 June 2010	17

Summary

Demand

In support of the case for HS2 substantial increases in demand are forecast for rail, cars and air. The increase for long distance travel on the southern end of West Coast Main Line (WCML) is forecast to be 267% by 2033. Half this increase is expected to occur irrespective of HS2, and half as a result of its introduction. Neither the 'background trend' increase nor the response to the introduction of HS2 sits happily with the evidence of the recent past.

Total demand for transport is saturated – it has not been increasing since 1995 within the UK, and specifically has not been going up with Gross Domestic Product (as the demand models expect), which means that rail's growth has been modal shift. Modal shift cannot continue indefinitely. The recent service improvements by Virgin Trains increased demand but much less so than that predicted for HS2.

Benefits

Important benefits claimed for HS2 are an illusion, as these benefits were first claimed before HS2 Ltd produced their report, and are not supported by that report. Specifically HS2 is not 'green' and high speed rail travel is expected to create negligible 'wider economic benefits' (eg economic regeneration).

The principle benefit of HS2 (on HS2 Ltd's evaluation) is the value of the time saving to HS2 users. But the benefit is substantially over estimated as it presumes that time spent on trains is all currently wasted. The overestimation, will, with the passage of time, prove ever more extreme.

Alternative methods of gaining capacity

A key justification for building a new railway is the need for additional capacity, which if sought on existing lines is believed can only be achieved with serious disruption and excessive cost. In fact, in the case of WCML and the Chiltern Trains services to Birmingham, additional capacity can be obtained primarily through acquiring new rolling stock. If there is sufficient demand such additional capacity is actually commercially attractive and would not require public subsidy.

HS2 Ltd's own analysis of alternatives suggests more cost-effective ways of achieving extra capacity than they forecast for HS2 – all could be achieved incrementally as demand dictates.

Uncertainty

Doubts about HS2's demand forecasts and the robustness of the benefits claimed mean that there is considerable uncertainty about the economic viability of HS2.

The appropriate way to deal with such uncertainty, as DfT themselves previously commended in their 2007 White Paper, is to avoid adopting inflexible policies in advance of clear evidence of need, and take an incremental approach. HS2 is not compatible with such an approach.

Speed

Speed is not 'green' and leads to disproportionately higher energy consumption and noise, and requires the taking of additional land, destroying some of the remaining areas of tranquillity and natural beauty.

High Speed Rail (HSR) does not require the ultra-high speeds of HS2, so HSR might be achievable without the disadvantages and costs of building a new railway.

In practice it is possible to increase the speed of the existing route, allowing the existing Pendolino fleet to realise its design speed of 140mph (instead of the current maximum speed allowed of 125mph). London to Manchester might be achievable in under 2 hours.

Bruce Weston

Hilary Wharf

1. Will the demand needed for HS2 happen?

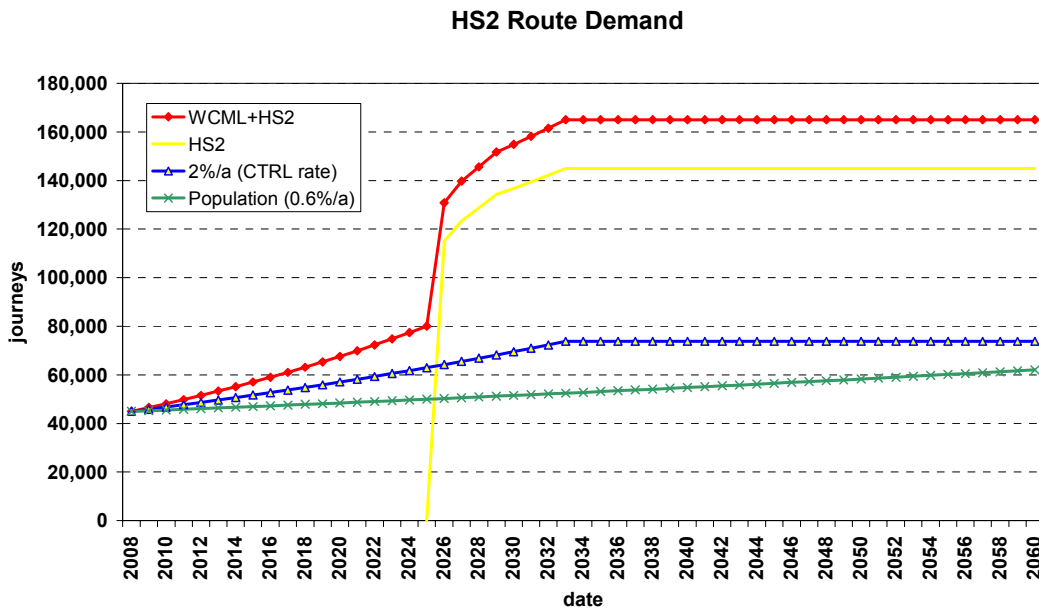
HS2 will only deliver the benefits that HS2 Ltd forecast for it if the demand that they project actually arises.

Demand forecast for HS2

HS2 Ltd forecast substantial increases in the demand for travel over the next 23 years. They estimate:

- A 267%¹ increase in demand for long distance travel on the West Coast Main Line (WCML) and HS2 route, by 2033. This is made up of
 - a ‘background trend’ increase of 133% by 2033 – or 3.4%² per annum, plus
 - an uplift of an extra 84% of entirely new trips plus extra modal shift of 25% from air and 25% from cars, generated by HS2
- An increase of 44%³ in long distance car trips by 2033
- A 178%⁴ increase in domestic air passengers by 2033

The graph below puts the HS2 Ltd forecast for WCML/HS2 demand in the context of the Channel Tunnel rail link (CTRL) and population growth forecasts (the latter increasing by 16% to 2033).



based on Bluespace Thinking

The table below shows the elements of the 2033 forecast.

¹ The 267% increase in passengers by 2033: a 133% increase from 2008 (45k) to 2033 without HS2 (105k); plus extra 84% from HS2 itself (38k); extra 25% each from air and from car (22k together). Demand figures are from Command Paper page 91 and 92.

² HS2 Ltd cite 3.3%, but this does not quite match the demand figures given in the Command Paper page 91.

³ HS2 Baseline Forecast Report 1.28 page 7

⁴ HS2 Baseline Forecasting Report 1.31 page 7

Passenger demand in 2033: WCML plus HS2 (source HS2 Ltd)

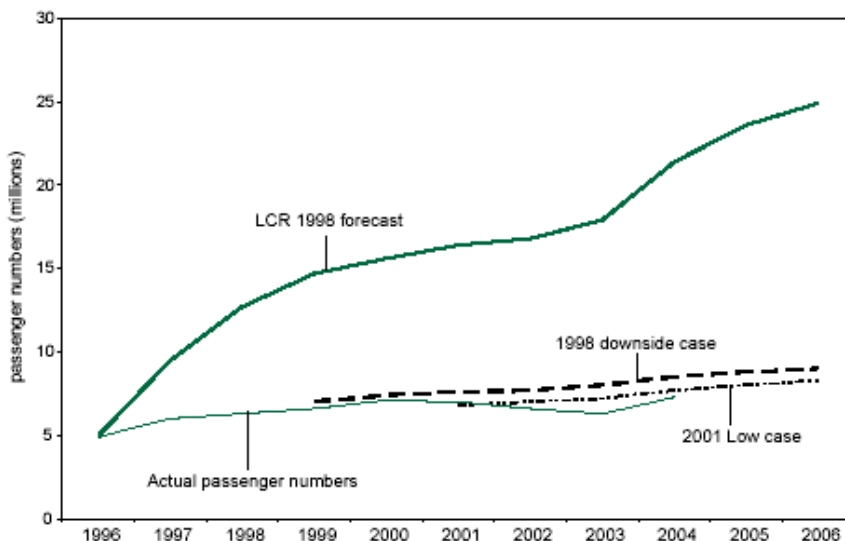
	passenger journey/day (k)	percentage increase
2008 base	45	
'Background trend' increase	60	133%
HS2 uplift : new journeys	38	84%
modal transfer from air	11	25%
modal transfer from car	11	25%
2033 total	165	267%
of which: transfer to HS2	85	
HS2 uplift	60	71% of transfer
total HS2	145	
remain on WCML	20	
Passenger journeys from Command Paper pages 91/92		

These transport demand forecasts are the result of sophisticated models that have been developed over many years by several respected consultancies for DfT. So should we be confident that they are right?

There are reasons to be cautious. While the modelling is undoubtedly sophisticated, their performance in practice is questionable.

Bluespace Thinking⁵, observe that demand forecasts for Channel Tunnel Rail Link (CTRL, also referred to as HS1) were persistently too high, as shown in the graph below. The graph shows that actual demand was little over a third of the levels forecast, and worse than both the lowest case scenarios produced in 1998 and 2001. A Select Committee (for whom the graph was prepared) criticised DfT for persistent over-estimation of demand for CTRL.

CTRL passenger numbers



Source: C&AG's Reports (HC 302 of Session 2000/1, Fig. 6; HC 77 of Session 2005/6, Fig. 8)

⁵ Bluespace Thinking Ltd. 'A Review of High Speed Rail - HS2 proposals', April 2010

Recently (on 4 June 2010) the government announced that the plans for additional rolling stock procurement under the HLOS programme are being scaled back, because the forecast demand has not happened due to the economic downturn – as described in the National Audit Office report⁶.

Demand for total domestic travel is saturated

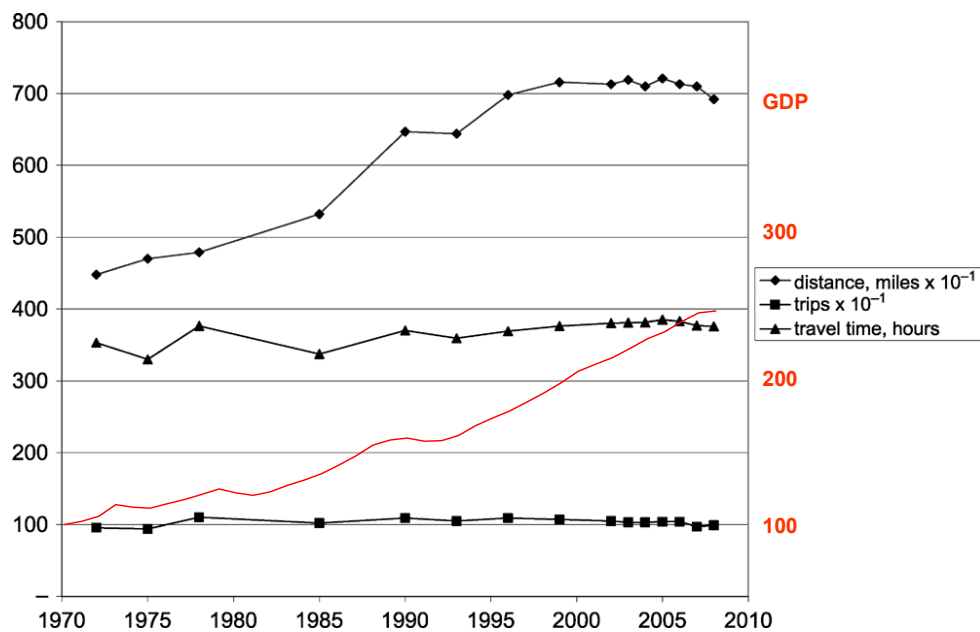
To assess projects with as long a timescale as HS2, forecasting is unavoidable. Forecasts are normally based on observing trends and relationships in the past and projecting them into the future. So if we look back at domestic travel in the longer term, what does it tell us about the HS2 Ltd forecasts?

The projected growth in total transportation demand by HS2 Ltd does not reflect the recent past. The problem is that demand for transport per person no longer seems to be increasing. The National Travel Survey collects information on domestic travel and publishes it. As shown by work done Dr David Metz⁷, there seems to be no increase in the number of trips made or total distance journeyed since 1995. This was also noted by Bluespace Thinking (op cit).

The following graph is taken from Dr Metz’s paper, but the red line has been added, which shows Gross Domestic Product⁸ (GDP) indexed to 1970. It shows a clear relationship between distance travelled per person and GDP until 1995. After this GDP continued to increase, but travel per person plateaued.

Since 1995/97 there has been a 38% increase in GDP but no increase in distance travelled per person. This may explain the overestimation of the ‘background trend’ growth in demand by HS2 Ltd, as the models used by DfT to forecast demand presume that there is still a relationship between GDP and demand for transport.

Travelling time, journey numbers and distances per person (compared with GDP)



Source: Dr Metz based on NTS 2008 Table 2.1 with GDP trend added

⁶ National Audit Office, ‘Increasing Passenger Rail Capacity’, 4 June 2010

⁷ Dr David Metz, (Saturation of Demand for Daily Travel’, 11 May 2010, Centre For Transport Studies, University College London

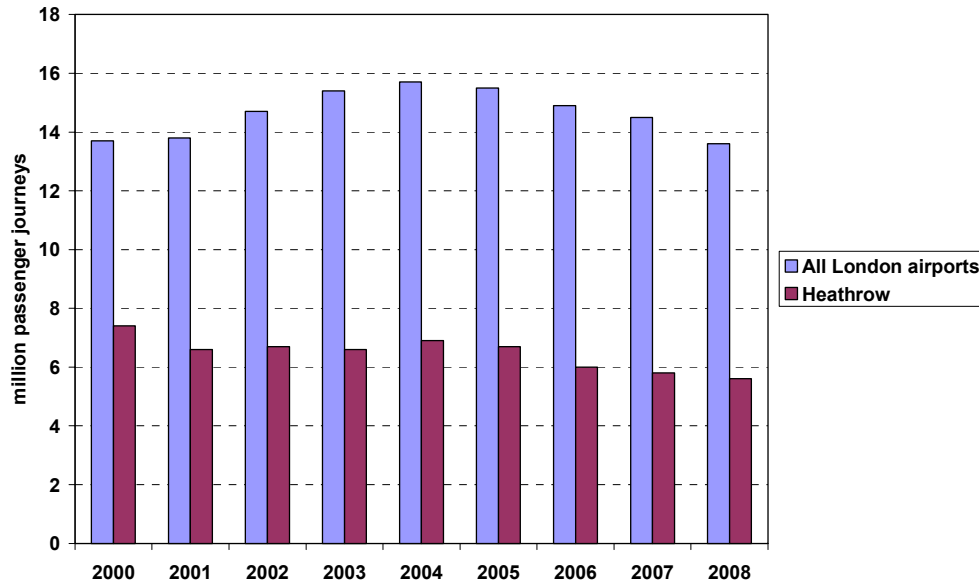
⁸ Office for National Statistics (ONS), series ABMI

Bluespace Thinking report (op cit) a similar pattern with long distance journeys (over 100 miles) for all forms of travel.

Quite possibly the spread of electronic communications has had a role in breaking the relationship between GDP and the demand for transport. The UK now uses the internet more than any other country, with the average person on line 34 hours/month⁹. Foreign travel will have replaced domestic holiday trips for some, and road congestion will have deterred others

Domestic air traffic has been increasing. But what matters for HS2 is domestic air traffic to/from London, as HS2's green credentials are popularly considered to rest on replacing air.

Domestic air traffic to and from London airports is not growing (source CAA)



As the graph shows, CAA figures demonstrate that air travel to and from London is similarly stagnant: domestic air travel to and from London has stopped increasing.

The evidence is that demand for total domestic travel is saturated. If demand only increases in line with population ($0.6\%/a$)¹⁰, demand for transport will only increase by 16.7% from 2008 to 2033.

Modal shift

It is well known that demand for rail has been increasing. So how has this been achieved in a saturated market?

Since 1995, National Travel Survey figures show that rail usage has gone up (by $3.7\%/a$) and coach and car have declined (by an average of $2.6\%/a$ for private and long distance coach, and by $0.3\%/a$ for car). While there has been sustained growth in rail travel, it seems it must be growth in rail's share of a saturated market.

⁹ Francesco Caio, 'The Next Phase of Broadband UK', Sept 2008

¹⁰ ONS, 'National Population Projections October, 2008 –base', 21 October 2009

Travel trends 1995 to 2008 (National Travel Survey 2008, Table 3.2)

	miles per person			annual avge rate of change
	1995/97	2008	change	
walk/cycle	243	235	-8	-0.3%
car/van/motorcycle	5,786	5,560	-226	-0.3%
private coach	134	110	-24	-1.6%
local				
bus/underground	328	387	59	1.4%
long distance coach	94	56	-38	-4.2%
surface rail	321	495	174	3.7%
air/ferry/light rail	75	80	5	0.5%
all modes	6981	6923	-58	-0.1%

The key question is why should we believe that long distance rail usage will keep on growing faster than increases in GDP, as the HS2 Ltd demand models predict?

We believe that there are substantial problems with the modelling of demand done for HS2 Ltd, and recognise that this is an area that merits detailed consideration.

Unprecedented increase in demand from HS2 itself

Besides the 3.4% 'background trend' growth in long distance rail demand, HS2 Ltd predict a large uplift in passenger numbers, 60k/day (ie a 71% increase over the 85k/day that transfer from conventional rail). This is expected to happen in response to the improvement in services that HS2 makes and is **on top of** the forecast growth trend of 3.4%.

The recent upgrade of WCML could be considered to be a model for the expected changes, and might give an indication of how reasonable the expected uplift is. The substantial improvements to Virgin Rail's (who operate the long distance trains on WCML) services have delivered increases in demand, but, as described below, are less than HS2 Ltd predicts for HS2. This is despite the reality that if rail growth is essentially modal shift, it cannot continue indefinitely.

On the WCML there have been major improvements to the services from May 2004 to the December 2008 timetable: shorter journey times and more frequent services. Taking the standard off peak hours from London, there have been large reductions in 'generalised journey times' (GJT):

- Birmingham journey time cut from 99.5 mins to 84 mins, with a service interval decreased from half hourly to 20 minutes – a 20 minute reduction in GJT
- Manchester journey time cut from 164 mins to 128 mins and GJT reduced by 56 mins
- Glasgow journey time reduced from 334 mins to 275 mins (ie 58 mins), and services increasing from 9 trains a day to 13.

GJT is time on the train plus half the interval between services – ie journey plus waiting time.

Virgin West Coast achieved substantial improvements in punctuality. They had only 74.8% of trains arriving within 10 minutes of the scheduled arrival time in 2003/4 but 82.8% for 2009¹¹.

These reductions in GJT and improvements in punctuality have created considerable modal shift. There was a 70% increase in passenger journeys over 5.75 years¹². To put figure in the

¹¹ National Rail Trends

same coin as the HS2 forecast (ie without the 'background trend' increase in demand), the uplift reduces to 41% above trend. This compares with the 71% above trend forecasted by HS2 Ltd.

But inter-modal switching cannot continue indefinitely:

- It is already dominant for journeys such as Manchester city centre to London. Virgin Trains say that they already have 80% of the market, and air only 20%¹³.
- If you need a car when you arrive, or you start from or are going to a final destination remote from the station, taking the car on holiday, or travelling with the whole family, rail travel is often not really an option.

If we accept that further growth in rail is primarily at the expense of other modes of transport, we might have expected such expansion to reach its limit before HS2 has been built. Notwithstanding, HS2 Ltd include further shift from road and air when HS2 starts to run – equivalent to 26%¹⁴ (22k/day) of the journeys they expect to transfer to HS2 from conventional rail, and an additional 44%¹⁵ (38k/day) that otherwise would not have occurred at all.

While the recent improvements to WCML services have been very substantial, the response in terms of the increase in journey numbers is smaller in percentage terms (41%) than the 71% uplift (from new journey and road/air modal shift) calculated for HS2, and of the order of a third¹⁶ the number of additional rail journeys that HS2 is projected to attract.

Can the HS2 Ltd's estimate be realistic?

Competition

The London to Birmingham stage of HS2 limits competition between HS2 and conventional long distance rail. 'Classic compatible' HS2 trains will take the greater number of train paths for fast trains north of Birmingham, limiting alternatives to HS2 trains north of Birmingham. In subsequent stages of HS2, competition with the conventional railway is likely to seriously challenge both market share and pricing.

However, for the London-Birmingham phase there will still be some competition with the remaining fast trains on the WCML, and there will also be competition with the planned fast services on the Chiltern Line. While slower than HS2, Chiltern trains are likely to offer a substantially cheaper route (as existing Chiltern services do now compared to WCML). This will either challenge HS2's ability to deliver the projected fares (based on RPI+1% annual price increases) or mean that HS2 will lose market share.

What affect would reducing the demand from HS2 Ltd's forecasts have?

On the assumption that benefits (and incremental fares) are proportional to rail demand, and we assume that HS2Ltd's claimed benefits are correct, then:

- If demand increases by less than 214% (instead of the 267% projected) HS2's Net Benefit ratio (NBR) would be below 2.
- If demand growth is less than 104%, the NBR would be below 1.

¹² NRT 2003/04 (14.9m), and 29 Dec 2009 Virgin Trains (25.4m)

¹³ Virgin Trains 29 Dec 2009

¹⁴ Modal shift from road and air (22k) are an extra 26% of projected transfers from classic rail (85k).

¹⁵ Sources of HS2 passengers at 2033 (145k): 85k from rail (57% of total); 38k new journeys (27%); and 22k from air and car (16%). New journeys (38k) are 44% of projected transfers from rail (85k). NB percentages given in Command Paper (p91-92) do not exactly align.

¹⁶ Calculated as 41% of the 2008 demand of 45k journeys/day, ie 18k, compared to the 60k additional journeys that HS2 is forecast to attract.

While the economic case for HS2 depends on very substantial demand growth, both the background growth and the uplift for improved journey times look seriously out of line with the evidence of recent experience.

2. Are the benefits an illusion?

Five material benefits are claimed for HS2:

- A beneficial environmental impact
- Major economic regeneration
- A reduction in journey time, that has a large value that dominates the HS2 Ltd evaluation
- The creation of capacity that meets demand and relieves crowding on rail and road
- Generating more fares income

In total HS2 Ltd claim benefits with a value of £32.3bn, together with £15.1bn of additional fares income (that they treat as off-setting cost).

Interestingly HS2 Ltd do not claim all five benefits. However, many of its supporters do. But then these supporters claimed these benefits before HS2 Ltd published the results of their analysis. People 'knew' it had these benefits before they had the facts. They still seem to 'know' the answer despite the information HS2 Ltd has produced.

As John F Kennedy said¹⁷ :

'The great enemy of the truth is very often not the lie - deliberate, contrived and dishonest - but the myth - persistent, persuasive, and unrealistic'.

Environmental impact

Although the coalition Government put HSR under the environment as a heading, HS2 Ltd claim no more than carbon neutrality¹⁸ – ie contributing no reduction to carbon emissions or producing about the same level of CO₂ as its alternatives. This contrasts, for example, with extending electrification, which would reduce carbon emissions.

Wider economic benefits

HS2 Ltd assess the level of benefit for wider economic effects, eg economic growth, but it is a modest part of the total benefits even on HS2 Ltd's own estimation, £3.6bn out of £32.3bn total.

Imperial College (*Graham and Melo*) advised HS2 Ltd on the wider economic benefits of the high speed services themselves. The benefits they identify are around £8m/a for a scheme like HS2. They conclude:

'the results show very small potential agglomeration benefits.'

The £3.6bn of wider economic benefits is actually from the freed conventional rail capacity and some relief of road crowding. These are benefits of additional capacity – not high speed.

¹⁷ Newhaven Connecticut, 11 June 1962

¹⁸ Command Paper 5.59, page 95

Perhaps the reason that the wider economic benefits are modest for the scale of investment is because investing £17.8bn to have a new high speed railway – that does not yield such benefits – is a costly way to create additional conventional rail capacity and relieve road congestion – that does have such benefits.

Reducing journey time:

The key benefit ascribed to HS2 is the value of journey time saving. But this is based on:

- An unjustifiably high value of business time saving per hour, because as argued by Bluespace Thinking (op cit), it implies an annual salary in 2010 money of £70k/a, which is an implausible average for the 30% of passengers forecast to be on business by HS2 Ltd.
- The presumption that time spent on trains is non productive and unpleasurable. Whereas reports including by NPS, Transform for Scotland¹⁹ (for Virgin Rail) and those sponsored by the DfT²⁰ show this is not the case. Free wifi and power points for lap-tops and chargers are not yet universal, but as they become so, the usefulness of time during long distance train journeys will increase.

HS2 accredit £8 of benefit for every journey to users²¹ which suggest that they are accrediting a time saving to every journey. HS2 say they accredit the new passengers generated by HS2 itself (entirely new journeys and modal shift) with half the benefit of existing customers²².

There is plainly no basis for accrediting time savings to the new people who would not otherwise have travelled; however they should get a benefit. On average this benefit would be equivalent to the value of the difference between the actual reduction in journey time and the level of reduction that is needed before they would make the journey on HS2. This fits with what HS2 Ltd have done.

On the basis of HS2's demand projections²³, transport user benefits for passengers on conventional trains are £2-4bn and for road users are £2bn – leaving about £23.7bn for HS2 users. Apparently £13bn of this is from time saving and reliability. The remaining £10bn will include some benefit from a reduction in crowding, but total crowding benefit is only £5bn. We are not yet clear what the other sources of benefit are.

As we said above, we believe that HS2 Ltd have assumed that 100% of the travelling time that is saved would not have been useful. If so, they have overestimated the value of the time saving (the £8/journey).

If we assume that a third of time saving would otherwise be unproductive:

- Total HS2 user benefits would be £15bn (at £4/journey)
- Total benefits become £20.5bn (instead of £32.3bn) and a NBR of 1.7 (not 2.7).

Capacity

As discussed in section 3 below, large increases in capacity can be obtained at low cost and to a considerable extent without disruption. The capacity benefits including reduction of crowding can therefore be achieved at relatively minor cost.

¹⁹ Jolin Warren, 'The Railways Mean Business' Transform for Scotland, November 2007

²⁰ The Mott MacDonald IWT Consortium 'The Productive Use of Rail Travel Time and Value of Travel Time Saving for Travellers in the course of Work', 2008

²¹ Report by High Speed 2 Ltd, 4.2.5

²² HS2 Baseline Forecasting report 2.65, page 19

²³ High Speed Rail London to the West Midlands and Beyond, 4.2.10

Generating more fares income

The additional fares income depends upon the extra demand generated by HS2, 63%²⁴ of which are journeys that otherwise would not have occurred.

Creating demand is a doubtful benefit. It would seem potentially more productive and green to encourage travel-free communication than create and accommodate a large increase in travelling activity – particularly as much of the time spent in travel is unproductive (getting to and from the stations, waiting for trains).

3. Do we need a new railway to get capacity?

The former Chairman of High Speed 2 Ltd, Sir David Rowlands said²⁵ that the reason for building a high speed network

‘...is not about speed *per se*: it is about capacity.’

But while you can get more capacity on the existing rail routes, doesn't this mean years of disruption, delays and cancelled services, together with the inflated costs of resulting from trying to do major work on an operational railway?

While this is a common view, in this instance there are reasons to think otherwise.

De-classifying 1st Class

Virgin Trains currently operate 9-car trains, with 5 standard class cars and 4 1st Class. While standard class is reasonably busy, 1st Class is lightly used. This reflects reduced 1st Class travel from cost savings by the private sector. With the recent (May 2010) change announced for Civil Service travelling rules, 1st Class will be even emptier.

Available capacity can be increased overnight by de-classifying one or two 1st Class carriages, creating more standard class space while still accommodating all 1st Class business.

Declassifying 2 of the 4 1st class cars gives about a 30% increase in effective capacity for virtually nothing – with no lead time or disruption, or cost (as 1st Class revenues remain unchanged).

Capacity can be further increased by changing the declassified cars seating arrangements to the more dense standard class configuration. Modifying the seating of 2 of the 4 1st class cars gives a total of 51% of additional capacity for the cost of minor refurbishment, with minimal deviation from normal servicing arrangements. Although total capacity only increases by 14%, crowding is normally a standard class issue where capacity increases by 51%.

²⁴ Based on the journeys caused by HS2 itself (38k) as % of the increase in passengers (60k) from the 105k in 2033 without HS2 to 165k with HS2

²⁵ Transport Times May 2010

Pendolino Capacity (seats per train²⁶)

	current configuration		declassify from 1 st 2-cars		modify seating		
	1 st	Standard	1 st	Standard	1 st	Standard	total
seats per train	146	296	56	386	56	448	504
% increase			-62%	+30%	-62%	+51%	+14%

11-car Pendolinos

Some of the 9-car Pendolinos are to be extended to 11-car and 4 additional 11-car sets are to be introduced for 2012²⁷. This requires some works, eg to station platforms, to accommodate them. This will add 32% to total seated capacity. We believe that this is incorporated in HS2's baseline assessment. However, another 14% more capacity could be provided by lengthening the remaining sets (assuming additional seating is standard class²⁸), giving a total of 46% more capacity. This would apparently require no further infrastructure work eg to station platforms.

12-car Pendolinos

HS2 Ltd themselves assessed alternatives to HS2, in the form of different 'rail packages'. Running longer trains is considered by HS2 but dismissed as a sole solution, and not incorporated in other solutions. However, they say that 12-car running (except to Liverpool?) could be achieved without further infrastructure changes – this could add further seating capacity on trains to a total of 65% (assuming the extra seats would be standard class) more than with the current 9-car. This is achievable at the cost of more rolling stock that should be commercially attractive, and with no disruption.

Unlike HS2, a commercially attractive means of developing additional capacity does not require public subsidy.

Chiltern services

For services to Birmingham, the committed Chiltern Railways lines improvements provide faster journey times from Marylebone to Birmingham. At 1hr 40 minutes²⁹ this service will be just 15 mins longer than the WCML 125mph service. It offers huge potential for increasing capacity through running longer formation trains. This will be achievable for solely the cost of additional rolling stock and with no disruption to services. If there is the demand, this also would be commercially attractive.

HS2 Ltd's alternatives

Finally, Rail Package 2³⁰ provides virtually sufficient additional capacity by itself (through more frequent services) even in 11-car formation. But it is made up of numerous elements that could be implemented on an incremental basis.

It includes the replacement of the slower commuter trains (Desiros) that use the fast lines south of Milton Keynes with trains capable of matching the Pendolino timings.

This package does have material costs, but on HS2 Ltd's own assessment has a better NBR (3.63) than HS2 itself (2.7) – even with the inclusion of the costs of disruption that they have

²⁶ Pendolino seating plan (including wheelchair provision): Virgin web site

²⁷ Virgin Trains, July 31 2008, Virgin web site

²⁸ Assuming 76 seat cars

²⁹ James Abbott 'Chiltern plans second Oxford route' Modern Railways, page 52, March 2010

³⁰ High Speed 2 Strategic Alternatives Study Rail Interventions Report (Atkins)

built in. Presumably HS2 Ltd did not recommend this alternative on the basis that it did not deliver the required new railway.

So capacity is not the problem, as solutions to capacity shortages can be implemented with short lead-times. We might get 65% more seats on the long distance WCML services with no more infrastructure changes than those due for 2012, and this is without the extra capacity from declassifying some of the existing 1st class cars. The planned Chiltern line fast services can be lengthened to give greatly increased capacity to Birmingham. Such changes could contribute benefit both incrementally and well in advance of the completion of a new railway.

Should even more capacity be required, HS2 Ltd's Rail Package 2 provides a smorgasbord of enhancements, which can be progressed as emergent demand dictates.

4. Uncertainty and HS2

Failure has real costs

The economics of HS2 rest on what seem to be implausibly high demand and unrealistic assessment of benefits. And it is an all or nothing project. It can't be half built and get half or even a quarter of the benefits. If the new line is constructed but the expected growth has not occurred, the options are throw good money after bad and have a new railway we don't need, or cut the losses and write off billions of pounds of investment.

The costs of HS2 are not loose change, £17.8bn investment for the London to Birmingham section, instead we could have:

- 85% of the population connected to optical broadband³¹
- 9 years of the accident and emergency service³²
- electrify the rest of the UK rail network for two thirds of HS2's cost.

And the costs are not just in money, and what we won't have because it has been wasted. We will have destroyed some of the remaining unspoilt areas of tranquilly in our crowded island. And we will have blighted the lives of many who live along the route.

DfT's advice

Good decision processes avoid such outcomes. DfT know this – they say it themselves in the 2007 White Paper 'Delivering a Sustainable Railway'

'Forecasts have been wrong before, and any strategy that tried to build a rigid investment programme based on fixed long-term forecasts would inevitably be wrong again. To overcome this challenge, the guiding principles in this strategy are:

- *To invest where there are challenges now, in ways that offer the flexibility to cope with an uncertain future; and*
- *To put in hand the right preparatory work so that, as the future becomes clearer, the necessary investments can be made at the right time.'*

The case for HS2 involves projecting benefits over an extraordinarily long period. The project has a 60 year assessment period – not starting from now but from when the railway is planned to be complete in 2026. So costs and benefits are projected through to 2085 ie 75

³¹ Review of Barriers to Investment in Next Generation Access - Final Report, Figure 4

³² Guardian and The Institute for Fiscal Studies

years from now. This is equivalent to deciding in 1900 to build a new railway, to get it built by 1916, and assess its benefits from 1916 to 1975. However such a line might well have been closed in the Beeching cuts of the mid 1960s.

No one can be certain exactly how much increase in rail demand there will be. It seems implausible from recent trends that it will be as much as HS2 Ltd forecast.

Growth

HS2 Ltd's demand forecasts are driven by forecasts of economic growth. Only Monday 14 June 2010, the Office for Budget Responsibility revised down the forecast economic growth, with the expectation of a permanent loss of growth. Lower economic growth on HS2 Ltd's approach worsens the economics of the project.

The sensitivity analysis that HS2 have done may not do justice to the possibility of very limited demand growth, but it does show the fragility of HS2's economics. They show:

- A 25% reduction in the projected 'background trend' growth from 3.3% to 2.7%/a, or saturating in 2027, both reduce the NBR to 1.5
- These sensitivity cases still assume a doubling in passengers on the WCML – and still make the large special additions for HS2 itself.

An incremental solution

What is needed is an approach that avoids the risks of building a new railway, which is incremental, that doesn't:

- Address problems before we have a sound basis for believing they are real, or
- Look to benefits that may have entirely disappeared due to social and technical changes.

We should not repeat the mistakes of HS1, with demand only reaching a fraction of that used to justify the scheme.

5. HSR or HS2?

Speed is not green

Speed is the antithesis of 'green' – especially ultra-high speed. High speed trains will use more than twice as much power as conventional electric intercity trains, and perhaps four times as much running at 400km/hr³³. Unlike French TGVs, they will not start running on nuclear power. As long as fossil fuels (without carbon capture) are the marginal source of fuel, HS2 would cause more carbon to be emitted than a conventional intercity train.

An increase in speed causes a disproportionately large increase in noise, and noise pollution is a major drawback of very high speed rail. HS2 plans initially to run at speeds (a maximum of 360km/h) beyond the level at which noise data is available (350km/h)³⁴. The design line speed (a maximum of 400km/h) is well beyond this.

³³ Trains travelling at 300km/h (186mph) use 2.25 times as much energy as the same train travelling at 200km/h (125mph), 2.72 times as much at 330km/h (205mph), and 5.06 times as much at 450km/h (280mph). Source Institution of Mechanical Engineers 'Transport Policy Statement: 09/03 High Speed Rail'

³⁴ FOI request response to Mr Colin Allen, 28 May 2010.

The UK is a small country, with small distances between major centres of population. There is neither the opportunity nor the need to run at very high speeds. Furthermore, it cannot be done without degrading the environment.

The inability of trains at ultra high speed to run on anything but the gentlest curvature, means that ultra-high speed lines cannot follow the alignment of existing major transport corridors, and so must take new land and blight new areas, destroying the limited reserves of tranquillity and natural beauty.

The energy requirements for their construction and the disposal of spoil contribute to carbon emissions.

London to Manchester in under 2 hours

It is probable that with only limited track improvements the journey time from London to Manchester (and beyond) be reduced by 12 minutes, and that to Birmingham by 5 minutes. In particular the construction of the planned 'Stafford by-pass' would both reduce journey times for some services and eliminate one of the remaining bottlenecks on the route. Line speed improvements on the current slow route section to Manchester via Stoke on Trent, might also be cost effective.

WCML could be upgraded to HSR

The EU Directive on High Speed Rail tells us that a new high speed railway must operate at speeds of at least 250km/h or 155mph.

But upgraded lines do not need to be as fast – 200km/hr or just under the 125mph. Several of our intercity routes already allow this speed, including WCML.

ERTMS

ERTMS is expected to be implemented on the network from 2014. This is the European standard signalling system. It will bring in-cab signalling that allows trains to run above the existing maximum speed for colour light signalling of 125mph. Pendolinos are designed to run at 140mph on existing track, and therefore will be capable of running faster services when ERTMS is fitted.

Does it make sense to press for ultra high speed when it comes with such a high price tag and seems to offer so little in benefits (slightly shorter journey times that have limited value to those enjoying them)?

Presentation of 18 June



Economics Summit

A case for alternatives to HS2

Bruce Weston
Hilary Wharf

Aylesbury, 18 June 2010

1

Outline



-
- Will the demand needed for HS2 happen?
 - Are the benefits of HS2 an illusion?
 - Do we need a new railway to get capacity?
 - Uncertainty and HS2
 - HSR or HS2?

2

Will the demand for HS2 happen?



HS2 Ltd forecast for 2033:

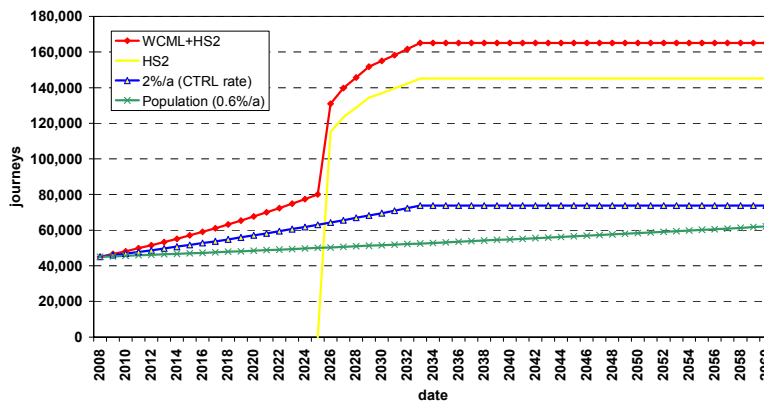
- Huge rail increases – 267%
- Long distance car increases – 44%
- Considerable domestic air growth – 178%

3

Will the demand for HS2 happen?



HS2 Route Demand



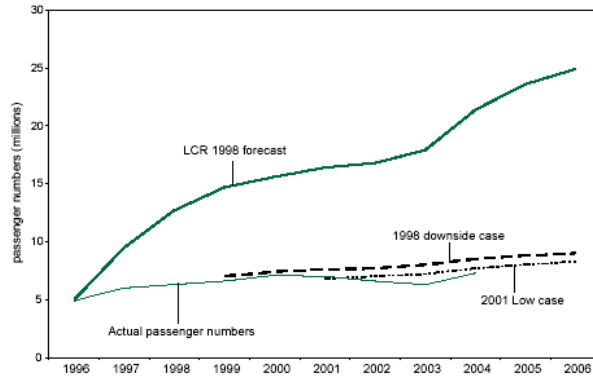
based on Bluespace Thinking

4

Will the demand for HS2 happen?



Channel Tunnel Rail Link passenger numbers

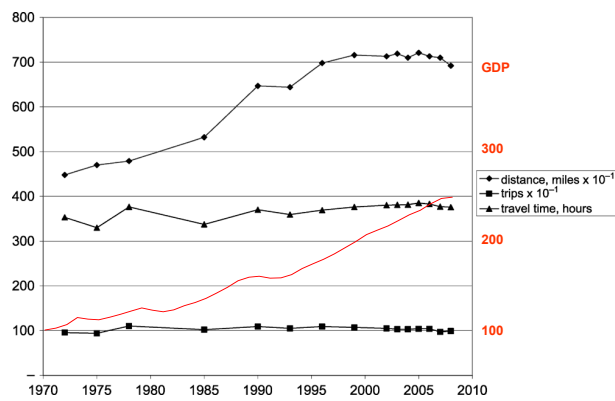


- So they can get it wrong! 5

Will the demand for HS2 happen?



Total transport per person (graph Dr D Metz with GDP added)

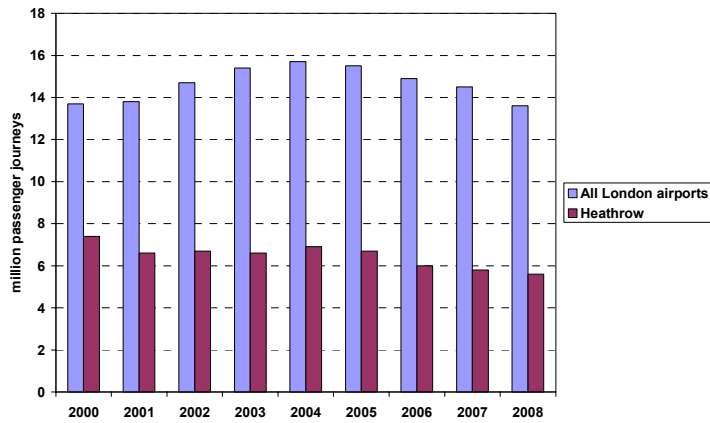


- So demand is saturated? 6

Will the demand for HS2 happen?



Domestic air travel to/from London (CAA data)



- So demand is saturated here too? 7

Will the demand for HS2 happen?



Total domestic travel (NTS 2008)

	miles per person			annual avge rate of change
	1995/97	2008	change	
walk/cycle	243	235	-8	-0.3%
car/van/motorcycle	5,786	5,560	-226	-0.3%
private coach	134	110	-24	-1.6%
local				
bus/underground	328	387	59	1.4%
long distance coach	94	56	-38	-4.2%
surface rail	321	495	174	3.7%
air/ferry/light rail	75	80	5	0.5%
all modes	6981	6923	-58	-0.1%

- So rail growth is modal shift, but can it keep happening? 8

Will the demand for HS2 happen?



What about the (60k/day) step increase in HS2 demand?

- **WCML service improvements were large**
- **WCML demand increased: 18k/day above trend**
- **Modal shift won't go on forever**
- **Despite this HS2 is forecast to generate much bigger increases**
- **If demand increases by < 104%, NBR <1**

Can HS2 Ltd's forecast be realistic? 9

Are the benefits an illusion?



Major benefits claimed for HS2:

- **Good environmental impact**
- **Economic regeneration**
- **£bns of journey time saving**
- **More capacity without disruption**
- **More fares income**

10

Are the benefits an illusion?



'The great enemy of the truth is very often not the lie - deliberate, contrived and dishonest - but the myth - persistent, persuasive, and unrealistic'. (John F Kennedy)

- **Environmental impact**
 - HS2 only claim carbon neutral
- **Wider economic benefits**
 - HS2 claim looks modest – until look at expert advice!

11

Are the benefits an illusion?



- **Reduced journey time**
 - How much is business time worth?
 - Is time on trains really wasted?
 - Studies say not
 - And the future?
 - If half the time is useful NBR becomes 1.7
- **Generating more fares**
 - Do we want people to travel more?
 - Information not people?

12

Need a new railway to get capacity?



- Sir David Rowlands says..... ‘it is not about speed *per se*: it is about capacity’

- Must increasing capacity on existing lines mean massive disruption and spiralling costs?

- Perhaps not?

13

Need a new railway to get capacity?



Reclassify 1st Class

Pendolino Capacity (seats per train)

	current configuration		declassify from 1 st 2-cars		modify seating		
	1 st	Standard	1 st	Standard	1 st	Standard	total
seats per train	146	296	56	386	56	448	504
% increase			-62%	+30%	-62%	+51%	+14%

- Capacity for free! 14

Need a new railway to get capacity?



- Lengthen some Pendolinos to 11-car +4 sets **+32%**
- Lengthen all Pendolinos to 11-car **+14%**
- Lengthen Pendolino fleet to 12 car **+19%**
+65%
- Lengthen Chiltern fast services
- Selective implementation of 'Rail Package 2' elements

- Shorter lead-times, smaller cost, incremental

15

Uncertainty and HS2



- **Failure has real costs**
 - A half built railway is worth nothing
 - What will we give up instead, worth £17.8bn
 - Fibre-optic broadband for 85% of the country
- **DfT's advice:**

'Forecasts have been wrong before, and any strategy that tried to build a rigid investment programme based on fixed long-term forecasts would inevitably be wrong again. To overcome this challenge, the guiding principles in this strategy are:

 - *To invest where there are challenges now, in ways that offer the flexibility to cope with an uncertain future; and*
 - *To put in hand the right preparatory work so that, as the future becomes clearer, the necessary investments can be made at the right time.'*

- Delivering a Sustainable Railway, 2007
- **An incremental solution**

16

HSR or HS2?



- **Ultra speed is not green**
 - Energy consumption
 - Noise generation
 - Take new land for gentle curves
- **Manchester to London in under 2 hours**
- **ERTMS**
 - Pendolinos 140mph
- **WCML upgraded to HSR?**
 - Upgraded lines can qualify at 125mph

- Is ultra-speed worth the cost in money and the environment?

17

Discussion



- **Will the demand needed for HS2 happen?**
- **Are the benefits of HS2 an illusion?**
- **Do we need a new railway to get capacity?**
- **Uncertainty and HS2**
- **HSR or HS2?**

18