



When to invest in high speed rail – British experience

Chris Nash

Research Professor

C.A.Nash@its.leeds.ac.uk





HS1 benefits and costs (£m)

Benefits	(1998 Appraisal)
User benefits -International Services	1800
User benefits - Domestic Services	1000
Road Congestion	30
Environmental benefits	90
Regeneration	500
Total Benefit	3420
Costs	1990
NPV	1430
BCR	1.72
(excluding regeneration benefits)	1.5

- 30% shortfall in patronage depressed user benefits
- Subsequent estimates of regeneration and other wider economic impacts much greater than in the original appraisal
- But are they reliable? Do the regeneration benefits reflect net gains or reallocation?

The Atkins study in Britain- results



UNIVERSITY OF LEEDS

Figure 1.1 – HSL Route Network

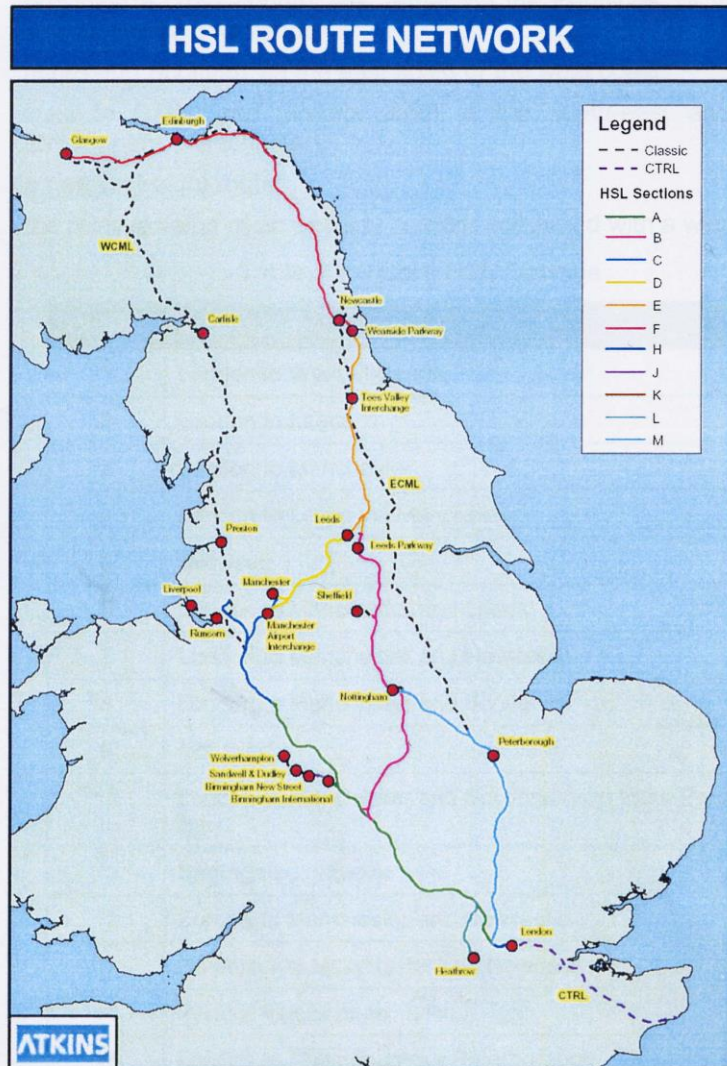


Figure 1.1

Appraisal of Options 1 and 8 (£bn PV)

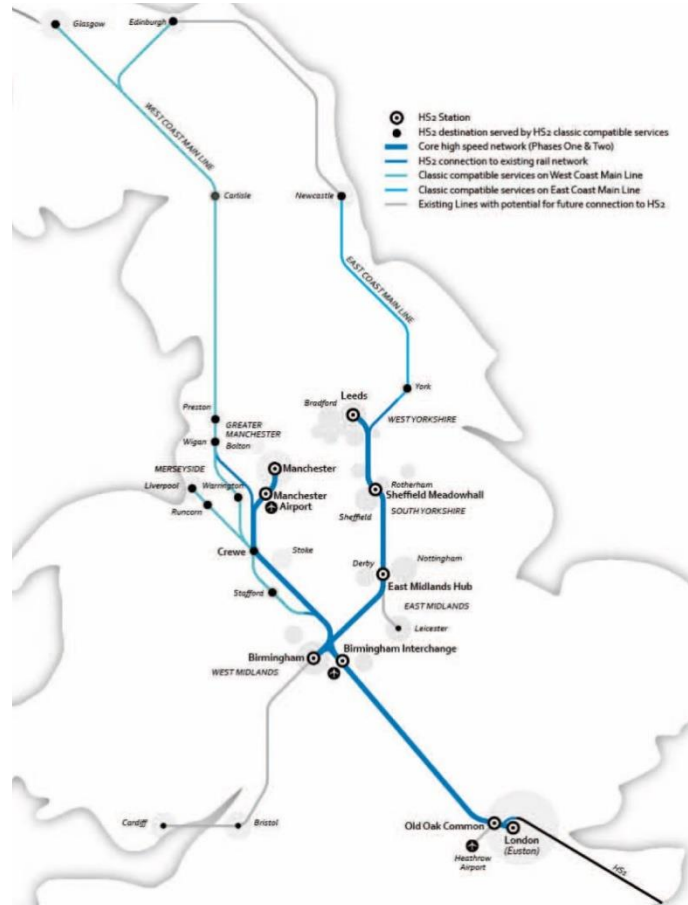


UNIVERSITY OF LEEDS

	Option 1	Option 8
Net revenue	4.9	20.6
Non financial benefits	22.7	64.4
Released capacity	2.0	4.8
Total benefits	29.6	89.8
Capital costs	8.6	27.7
Net operating costs	5.7	16.3
Total costs	14.4	44.0
NPV	15.3	45.7
B/C	2.07	2.04

Source Atkins (2003) Summary report, Addendum, Table 2.1 with transcription errors corrected





**HS2 Standard appraisal – discounted costs and benefits (over 60 years)
(£b 2011 prices)**

Source: DfT (2013)



UNIVERSITY OF LEEDS

	Phase One	Full Network
	<i>Oct 2013</i>	<i>Oct 2013</i>
Transport benefits (Business)	16,921	40,529
Transport benefits (Other)	7,673	19,323
Other quantifiable benefits	407	788
Indirect taxes (loss to Govt)	-1,208	-2,912
Net transport benefits	23,793	57,727
Wider economic impacts	4,341	13,293
Total costs	29,919	62,606
Revenues	13,243	31,111
Net cost to Government	16,676	31,495
Benefit cost ratio (inc WEIs)	1.7	2.3



Debates about routeing

- Chilterns versus M1 corridor
- Old Oak Common, Euston or St Pancras?
- How to link to Heathrow?
- How to link to HS1?
- Out of town sites for Sheffield (Meadowhall) and Nottingham-Derby (Totton)

Criticisms of appraisal



UNIVERSITY OF LEEDS

1. Unrealistic demand forecasts (2.5% growth p.a. to 2036)
2. Overstated value of business time savings
3. Failure to examine adequately cheaper alternatives
4. Debate about wider economic benefits

Incremental benefits and costs compared with 51M proposal



UNIVERSITY OF LEEDS

	51M	Y shaped increment
Benefits	7.108	46-52
Costs to gov	1.173	25-23
BCR	6.06	1.6-2.3

Source: derived from Atkins (2012)

Average change in connectivity by region in 2037 after investment in HS2

Source: KPMG (2013)



UNIVERSITY OF LEEDS

City regions	Change in labour connectivity by rail	Change in business connectivity by rail
Derby-Nottingham	14.7%	23.2%
Greater Manchester	1.4%	18.8%
Greater London	6.9%	8.8%
South Yorkshire	31.8%	22.5%
West Midlands	15.7%	21.1%
West Yorkshire	9.1%	19.7%
Rest of G. Britain	5.3%	11.3%





KPMG estimate of impact on GVA

- KPMG regress labour productivity on rail connectivity using cross section data
- Finds a strong relationship, suggesting that HS2 will add £15b p.a. to UK GVA
- But rail connectivity highly correlated with car connectivity and other aspects of city centre location
- How can these effects be disentangled?

- The central business case looks strong, but is a BCR of 2 adequate in current budgetary conditions?
- Like any megaproject, HS2 requires decisions in the face of great uncertainty.
- Value of business travel time and wider economic benefits savings priorities for further research