High Speed Rail (HS2) Briefing No. 3

HS2 ALTERNATIVES

Arguments for building HS2 are based on the need to **increase rail capacity**, and **improve connectivity** between north and south through reduced journey times. However, alternatives are available which would **meet capacity demands at a fraction of the cost and years earlier**, and with only marginally longer journey times than on HS2. These alternatives have been researched by Atkins for the Government but are now being ignored, despite the fact that they, unlike HS2, comply with the Government's new Hierarchy for Infrastructure Investment. This states that:

- First, public money should be used to make better use of existing assets
- Next, public investment should be targeted at tackling "stress points" in the networks, such as road and rail bottlenecks
- Finally, major investment in new infrastructure should only be undertaken where maintenance or small-scale investment will not meet future needs

Capacity increases achievable without HS2

The Government expects demand for travel on the West Coast Main Line (WCML) to increase by slightly more than 100% by 2043. Atkins' **Rail Package 2** (RP2) produces a capacity increase of 135%, through lengthening all train-sets on the WCML to 11 cars, increasing the number of train-sets from 56 to 90 and dealing with seven infrastructure bottlenecks. The HS2 Action Alliance has shown that lengthening train-sets to 12 cars would increase total capacity by 165%, and that further benefits could be achieved by reclassifying some underused first-class seats on the WCML.

In addition, neither HS2 nor RP2 takes account of the implementation of **ERTMS in-cab signalling** (planned for completion on the WCML in 2030), which will allow 140-mph running and increase the number of available train paths, thus freeing up further capacity on the WCML.

Furthermore **Chiltern Railways' main line** has just been upgraded to enable ca. 90 minute journeys between London and Birmingham (only 10-15 minutes longer than on the WCML), with cheaper fares and the scope to provide more capacity.

The London-Birmingham leg of HS2 would not be operational until about 2026. A package of alternatives centred round RP2 could be introduced incrementally, in line with increases in demand. RP2 would cost £2bn as against £33bn for HS2.

High Speed vs. Ultra High Speed

Many European countries have benefitted from high-speed rail. However the UK's geography and existing infrastructure mean the benefits cannot be replicated here. Inter-city services are already generally good and distances between cities relatively short. In Europe, many high-speed trains use existing rail infrastructure and not dedicated lines. Most high-speed trains travel at between 173-250kph rather than at the Ultra High Speed (400kph) proposed for HS2. Indeed, the UK's WCML, East Coast Main Line and Great Western line are classed as high-speed lines in European terms.

Ultra High Speed has several disadvantages: it consumes more energy and produces higher carbon emissions; it generates more noise, vibration and pollution; it has issues around wind resistance, and the line has to be very straight. Ultra High Speed is not necessary for the future – it is a 'Concorde cul-de-sac'.

Richard Branson has stated that with £1bn of investment it would be possible to get the WCML running at 140mph within 3-5 years, with reductions in journey times to all WCML destinations, including London to Birmingham in less than one hour and London to Glasgow in under four hours.

If the case for a new line is proven, far less damaging routes could be followed with a lower maximum line-speed. At **up to 150mph**, the route could closely follow the M1/M6 motorways, increasing the London-Birmingham journey time by **only 12 minutes** over the proposed route. At 90-125mph, the route could run alongside the M40, but would increase journey times by 19 minutes.

HS2 Routes

The criteria used by HS2 Ltd to select a route appear to be based solely on speed and cost. Various comments about tunnelling/cuttings to protect the environment seem to have more to do with ensuring the proposed lines' gradient than protecting the environment. The Government's preferred route ignores impacts on the Chilterns AONB and other environmental factors.

Summary of Alternative Routes for HS2

Shortlisted alternative routes

Three routes (2.5, 3, and 4) were short-listed by HS2 Ltd from their original seven, of which Route 3 is the Government's preferred route. A further option, Route 1.5, was developed by HS2 Ltd during investigations in 2010 of options for serving Heathrow, but not taken forward.

Route 2.5 (crosses the Chilterns AONB via Hughenden Valley)
Developed as an alternative route through the Chilterns AONB that would reduce impacts on larger population centres, this route would cost £0.5bn more than Route 3 (£0.8bn with risk). London-Birmingham journeys would be about 1.5 minutes longer. The route would cross the AONB on the surface for 5.5 miles (rather than the 8.5 miles of Route 3). It would require a 700-metre-long viaduct across the Hughenden Valley, and would have a greater effect on townscapes than Route 3, at Haddenham, Ilmer, Chearsley, Dorton and Kingsey.

Route 4 (crosses the Chilterns AONB near Berkhamsted)
Would involve considerably more tunnelling than Route 3 and would cost about £1.4bn more (£2.5bn with risk). The London-Birmingham journey time is estimated to be 1.5 minutes longer than Route 3. It would cross the AONB at surface level for 4 miles. Sustainability impacts are in some instances less (on water resources and flood risk), and others greater (more SSSIs affected). However, forging a direct link from Route 4 to Heathrow would be expensive (an additional £4-5bn), and would involve **a second new line crossing the Chilterns AONB**, from Berkhamsted via Amersham to near Gerrards Cross.

Route 1.5 (Heathrow/M40 corridor)
Route 1.5 is similar to the route identified by Arup for a 'Heathrow Hub'. It would provide a direct link to Heathrow but increase London-Birmingham journey times by about 3-4 minutes. It would involve significantly more tunnelling and would cost £3-4bn more than Route 3 without a Heathrow loop or spur. It would cross the AONB at surface level for 2.5 miles and would pass through the Grade II listed Langley Park.

Other rejected routes

Route 1 (Heathrow/M40 corridor)
5-6 minutes slower than Route 3 and £3.5bn more (£5.5bn with risk). This route would impact on several protected sites including the internationally-designated Aston Rowant Special Area of Conservation. The more promising part of this route was reused in Route 1.5.

Route 2 (Chiltern Mainline and M40 corridor)
2.5 minutes slower than Route 3 and £2.5bn more (£4bn with risk). No better in terms of sustainability than Route 3. The southern element was reused in Route 2.5.

Route 5 (M1 corridor)
About 5 minutes slower than Route 3 and with no possibility of a direct link to Heathrow. Would cost £4.4bn more (£7bn with risk). Notionally described as an M1 route, but to avoid large population centres would actually cut through open countryside rather than be near the M1. No direct impact on the AONB but would involve major tunnelling (e.g. at Luton) to avoid large-scale demolition. Too far to the east to serve Heathrow, and even a link to Old Oak Common would prove difficult.

Route 6 (Midland Mainline corridor)
About 9 minutes slower than Route 3 and with no possible link to Heathrow. Would cost £4.6bn more than Route 3 (£7.3bn with risk). Like Route 5, avoids the Chilterns AONB but would require significant amounts of tunnelling to avoid major population centres.

Provided by the Wendover HS2 Campaign. www.wendoverhs2.org. Other briefing sheets are available on environmental impacts of HS2 and the business case.
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