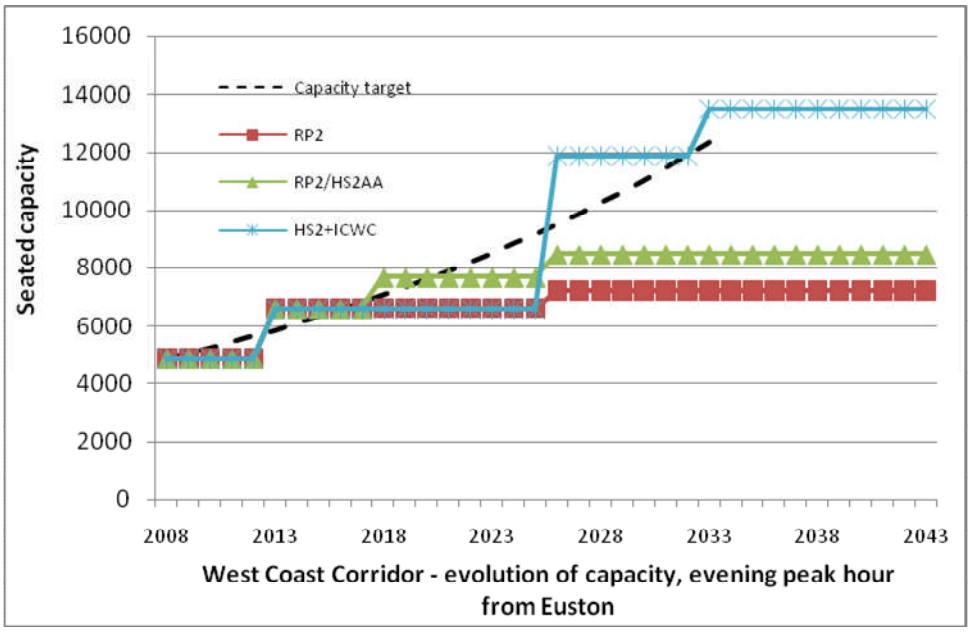
## Capacity comparison for HS2 and alternatives




1) The analysis concentrates on trains leaving London Euston in the evening peak hour (17:00 to 17:59). This represents the period of high-value business and greatest demand, so is when the greatest single portion of benefits are generated. This is taken as being a more valid representation of reality than an all-day average.
2) Scenarios considered are:
   - RP2 – suggested conventional upgrade to WCML as set out in the February 2011 update to the High Speed 2 Strategic Alternatives Study (DfT/Atkins), featuring 11-car operation and infrastructure changes to accommodate additional trains. For this purpose, RP2 and RP2a are identical
   - RP2HS2AA – additional scenario proposed by High Speed 2 Action Alliance, based on 12-car trains and conversion of one First Class coach to Standard Class
   - HS2 + ICWC – the sum of capacity on HS2 and ICWC trains, i.e. the overall capacity on the West Coast Corridor served by HS2 and the West Coast Main Line (WCML). HS2 capacity is of course zero before 2026. The basis of the calculation is 11 trains per peak hour, as set out in the Technical Appendix to the 2009 set of reports by HS2 Ltd.
3) The 2008 base capacity, with 11 ICWC departures, each with 442 seats, is the starting point for all scenarios. I am aware that one of the 11 trains is in fact formed of 2 x 5-car Voyager (492 seats), but have assumed Pendolinos throughout as this is a likely future scenario within the next franchise, and for simplicity.
4) The 2013 step based on conversion of all evening peak hour trains to 11-car sets is also common to all options other than HS2.
5) Key events in the evolution of capacity for RP2 are then:
   - 2026 – one additional evening peak 11-car departure. Additional suburban (Northampton line) departures are also proposed, but are disregarded as not being

part of the West Coast (WC) corridor services. This service might be introduced earlier than 2026 but schemes to enable this have not been developed to the point of being able to assume this. The extra non-WC trains just referred to might also be introduced earlier if enabled by the Ledburn grade-separation alone, but further infrastructure work is assumed to be required to enable the WC train.

6) Key events in the evolution of capacity for RP2/HS2AA are then:
    - 2018 – introduction of 12-car trains with reduced First Class accommodation. This date is purely nominal, since as far as I know no timescales have been determined, but it is likely that enabling works would be completed before 2026
    - 2026 – one additional evening peak departure, as for RP2, but of 12-car formation with reduced First Class.
7) HS2+ICWC represents the capacity of HS2 plus the capacity of residual trains on the Classic line serving the WC corridor, and so until 2026 consist of Classic trains alone.
    - Capacity for HS2, introduced in 2026, is based on 4 x Captive departures to Birmingham, each with 1100 seats, and 7 x Classic Compatible departures, each with 550 seats, made up of 2 x Liverpool, 1 x Glasgow, 1 x Preston and 3 x Manchester.
    - Opening of Phase 2 is assumed in 2033.
    - On opening of Phase 2, I have assumed no extra trains, but simply that the Manchester trains will be converted to Captive. It is not currently clear whether there will be additional trains to WC locations with Phase 2. There will of course be extra trains, but as the implication is that these will be to Leeds they are regarded as not relevant to this WC comparison. Heathrow and HS1 services are also outside this comparison.
    - Other means of increasing capacity through the operating concept may exist – e.g. running two Classic Compatible sets coupled to Manchester then split for Liverpool and Glasgow.
    - It is currently unknown how many residual trains there will be after 2026. My assumption is 6 per evening peak hour – this is 4 serving Milton Keynes as suggested in my April 2011 article in Modern Railways, plus 2 others – simply a plausible working assumption to populate this analysis, slightly less than now on the expectation that capacity will be absorbed by extra stops compared with now.
8) Capacity Target:
    - I do not have an actual base figure for the 2008 evening peak hour to apply this growth to, so have taken the 2008 capacity as being equal to the demand, a reasonable starting point for peak services. The best interpretation of this line, therefore, is to take it as representing the growth in capacity required to maintain the balance with demand at its 2008 level.
    - The 2008 capacity has been uplifted by the weighted average of the forecast growth from 2008 to 2033 for the key WC locations of Birmingham, Manchester, Glasgow and Liverpool given in the Demand and Appraisal Report, which represents growth of approximately 150%.
    - Interpolating between the start and end years on a straight line basis leads to higher annual growth rates in the early years and lower in the later years. Through trial and error, an annual growth rate of 3.8% was identified to lead to the 2033 figure and is

used in this analysis. This is in line with the range of growth rates identified by Network Rail in the WCML Route Utilisation Strategy for growth to 2025.

- The assumed growth rate would have to be reduced to 2.3% per annum in order to bring the target and the RP2/HS2AA figures into line in 2033.
- The actual annual growth rate for franchised long-distance operators since 2002/3 is about 5.5% (National Rail Trends).