

1. Rail Decarbonisation

1.1. Prototype hydrogen and battery trains will be demonstrated during COP26, but “let’s be under no illusion, the way to run a green, clean railway is using renewable electricity powering lightweight trains through overhead line electrification”¹. While much of the Welsh rail network is a long way down the queue for electrification, the long life of rail vehicles means that new trains being built today will still be with us in the late 2050s.

1.2. The design of new trains therefore needs to be fit for purpose, not just today but in 2055. It is not good enough to say we will scrap diesel trains in 2040; a significant amount of greenhouse gas (GHG) was emitted manufacturing those trains, smelting the aluminium etc. - scrapping them before the end of their useful lives means ‘wasting carbon’. We therefore need **long-term** planning to **prevent** future problems, two of the Future Generations Act’s five ways of working.

1.3. Unfortunately many of those responsible for planning the future of Britain’s railways do not appear to have been taking the necessary long-term view. 77 class 197 CAF Civity DMU (Diesel Multiple Unit) trains are under construction for TfW. These trains utilise mechanical transmission and lack future-proofing. This means that any conversion to electric traction would be complex, expensive, time-consuming and likely unfeasible. Contrast this to a future-proofed diesel-electric design where a pantograph could simply be fitted following electrification.

1.4. Rail electrification is mentioned twice in ‘Llwybr Newydd’, once as a priority for the next five years and once under ‘Prevention’ within the ‘five ways of working’. However, proceeding with the current order for diesel-only trains will mean the majority of TfW’s fleet will be unable to make use of electrification until long after we need to have passed net-zero GHG emissions.

1.5. Network Rail’s decarbonisation strategy (TDNS)² recommends extensive additional electrification, allowing most diesel trains to be replaced by electric. The few lines remaining un-electrified would, according to the TDNS, be operated by hydrogen or battery trains. Many of these would spend a portion of their time ‘under the wires’ on electrified routes. For example, in the TDNS, services between Aberystwyth and Birmingham would utilise hydrogen trains but would be running on an electrified route east of Shrewsbury.

1.6. To maximise utilisation of electrification infrastructure, it is therefore likely that hydrogen and battery trains would also be capable of electric operation, conserving hydrogen stores for the non-electrified section and/or utilising the overhead line infrastructure to charge batteries. This renders the CAF Civity DMUs unsuitable due to the impracticality of converting them to do this. The TDNS also advises that “Procurement of diesel-only vehicles is only undertaken where there is clear strategic and economic rationale for doing so.”

1 Martin Frobisher, Group Safety & Engineering Director at Network Rail. Quoted from page 5 of Modern Railways’ “Building A Sustainable Railway” supplement included with the October 2021 issue.

2 The ‘Traction Decarbonisation Network Strategy’
<https://www.networkrail.co.uk/wp-content/uploads/2020/09/Traction-Decarbonisation-Network-Strategy-Interim-Programme-Business-Case.pdf>

2. Behavioural Injustice

2.1. It is very welcome that “Modal shift is at the heart of Llwybr Newydd”³ We echo the message from other respondents that we need fewer cars, regardless of whether they are electric; ‘fewer not (just) newer’.

2.2. However, the 2018 Wales & Borders rail franchise offered little to attract motorists onto its long-distance services. With the exception of three sets of mark 4 coaches for Holyhead-Cardiff services, quantity not quality appears to have been the order of the day. Far from thanking passengers for choosing rail, “new trains are furnished with seats recovered from former Stasi interrogation centres”⁴. The original specification for the new diesel fleet ordered from CAF was ‘ironing board seats’. This is an example of how the 77 new diesel units were specified as relatively basic trains, apparently to keep costs down while still delivering a headline-grabbing complete fleet replacement.

2.3. While TfW funded a variation order to avoid the ‘ironing boards’, the new trains will now be fitted with the ‘interrogation centre seats’ found on GWR’s Intercity Express Trains. These appear to be almost as unpopular as the ‘ironing boards’. Meanwhile, passengers on the Cambrian Coast Line (one of the world’s most scenic railways) currently benefit from 16 bay tables on the class 158 trains, virtually all of which are perfectly aligned with the windows. The new diesel trains ordered to replace them have just 10 bay tables, only four of which appear to be aligned.

2.4. The new fleet proposed for long-distance routes also has over 10 fewer seats per two carriage unit than the current the Cambrian Line fleet of class 158s and just one toilet, compared to two toilets per unit currently. Consequentially the new fleet would fail to meet the rail-industry best-practice for provision of toilets on long-distance services. Space for standing passengers is to be increased, despite the fact that TfW agree no passengers should have to stand on such long-distance routes. While legroom would improve on the Cambrian lines as a result of the reduction in seats, the legroom provided would still be less than found on the class 175 trains that TfW mainly use on their services to/from Manchester Piccadilly. As well as superior legroom, the class 175 units offer more tables, more toilets and (on a 2-car unit) more seats than the new fleet intended to replace them. Even on the 3-car units, the new trains manage to squeeze in only two extra seats compared to a 175.

2.5. All the while, car manufacturers are trying to make their products ever more comfortable and the UK Government at least* continue building a long line of bypasses to speed up car journeys. Rail passengers on long-distance routes in Wales are to be punished for choosing a more-sustainable option while motorists are rewarded for choosing to drive. That is a grave injustice.

* The Welsh Government, despite commissioning a very welcome review of road projects, failed to order their contractors to stop while this was carried out. As a result, trees have been felled for a scheme which is under review.

3 ‘Llwybr Newydd’, page 48

4 Modern Railways <https://www.keymodernrailways.com/article/class-93-tri-oomph>

3. Summary And Options

3.1. In conclusion, the order for 77 class 197 ‘Civity’ DMUs from CAF as part of the 2018 Wales & Borders rail franchise was a poor decision for the following reasons:

3.1.1. they are not fit-for-purpose on the long-distance routes they were ordered to work due to insufficient toilets and other downgrades compared to the current trains

3.1.2. they are diesel-only trains with the potential to remain in service until 2060

3.1.3. conversion to electric traction would be impractical and electrification could require them to be scrapped, wasting the ‘embedded carbon’ from their manufacture

3.2. Regrettably, as of 10-Oct-2021, four of these new diesel trains have already been completed and, in all probability, the bodyshells have already been fabricated for a large number of subsequent units. The ideal solution of redesigning the entire fleet is therefore no longer an option without enormous waste of manufacturing emissions. However, these bodyshells are not entirely useless.

3.3. While unsuitable for long-distance services, the design is adequate for short-distance stopping services, with the exception that most of these are priorities for electrification. Furthermore, even if the existing fleets were retained, around 26 of the new units would be needed to facilitate the enhanced frequencies planned by Transport for Wales.

3.4. The Welsh Government therefore has a choice between doing nothing or retaining the existing class 158 and 175 fleets alongside a reduced fleet of new class 197s. Doing nothing, by default, commits them to the full fleet of 77 new class 197s. Leasing company Angel trains has offered to fit the class 175 units with a fuel-saving hybrid system if they are retained.⁵

3.5. Reducing the number of new trains would:

3.5.1. reduce the potential for wasted carbon in the event of electrification

3.5.2. allow the choice of future traction (diesel, electric, battery or hydrogen) for some routes to be deferred rather than effectively choosing diesel for all routes now

3.5.3. allow the less-comfortable new units to be restricted to shorter-distance journeys with the existing trains retained on longer routes

3.6. Unfortunately reduction of the new fleet requires a variation of the contract with CAF for supply of new trains before production has exceeded the desired number. This is likely to be **before the end of 2021**. The urgency of this matter cannot be stressed enough. Once each new diesel train is completed it is here to stay and assembly is well under way.

5 Angel Trains evidence to Economy, Infrastructure and Skills Committee’s inquiry into decarbonisation of transport. <https://busnes.senedd.cymru/documents/s95618/EIS5-29-19P4%20Tystiolaeth%20gan%20Angel%20Trains%20Saesneg%20yn%20unig.pdf>