



DECARBONISING THE WESTERN

A Network Rail strategy sets out a six-stage approach to eliminating diesel trains

Decarbonisation remains a topic of considerable importance to the railway. Network Rail's Traction Decarbonisation Network Strategy (TDNS), published in 2020, set out high level ambitions for a major electrification programme, but since then NR has continued its work and is now beginning to break this down at a regional level.

Wales and Western Region has produced its own Regional Traction Decarbonisation Strategy, dated February 2022 and obtained by *Modern Railways*. The strategy identifies six 'tranches' of decarbonisation schemes, starting with the deferred elements of the Great Western Electrification Programme (GWEP) and in broad terms moving westwards, with main lines and routes with heavy freight use prioritised. This sequence was identified based on the decarbonisation benefits (removal of diesel miles, passenger impact,

dependency on decarbonising other routes and diversionary route capability) and deployment efficiencies (rolling stock, signalling and availability of power supply).

HENDY TAIL

Tranche 0 covers the so-called 'Hendy tail' – the schemes removed from GWEP following the review of the Control Period 5 enhancements programme by Network Rail Chair Sir Peter Hendy.

The strategy notes that electrification from Chippenham to Bristol can utilise spare capacity in the feeder station at Thingley and could cut journey times by up to 2.5 minutes. On Filton bank (Bristol Parkway to Temple Meads), the potential for South Wales to Bristol EMUs is noted, as are the environmental benefits of decarbonisation in an urbanised area.

Wiring Didcot to Oxford would permit the restoration of stopping

services between Oxford and London which were split at Didcot to allow the introduction of EMUs. There would also be benefits for freight and in the electrification of the carriage sidings at Oxford for use by EMUs. A potential extension to Hanborough on the North Cotswold line is also mooted. Acton to Willesden, meanwhile, covers a 'missing link' for freight decarbonisation between the Great Western and West Coast main lines.

Due to the development work which was carried out on them before they were cancelled, these schemes are described as 'mature', with power supply in place and signalling immunised in readiness for electrification.

BERKS AND HANTS NEXT

Tranche 1 focuses primarily on the two main routes to Exeter, assuming electrification has reached Bristol Temple Meads in Tranche 0 and following on from the current extent

of electrification on the Berks and Hants route as far as Newbury.

Benefits cited include the removal of diesel from London to Exeter services via either route and the ability to operate EMUs on Bedwyn to London services (the original intention was to use bi-mode Intercity Express Trains on these, but now most trains operate as a DMU shuttle from Bedwyn to Newbury with an EMU or IET connection from there).

But freight is also an important component of Tranche 1, which includes routes serving the Somerset quarries at Merehead and Whatley, with the strategy highlighting that long, heavy freight trains mix with passenger services, with a switch to electric haulage offering significant performance benefits.

This tranche includes two other sections: Bathampton and Thingley Junction to Westbury / Warminster, which the strategy



Suitable for alternation traction?
Nos 150238/249 pass Carbis Bay
with the 11.33 St Ives to St Erth on
25 August 2021. **TOM MCATEE**

says is required to deliver the full benefits of decarbonisation for both passenger and freight. Also included is the route north of Oxford to Aynho Junction, south of Banbury, a key enabler for CrossCountry and freight decarbonisation.

Given GWR's large fleet of bi-mode IETs, the strategy highlights that electrification would enable decarbonisation without a change of fleet. However, it cautions that little prior development work has been undertaken on these schemes.

BRISTOL NORTH

Tranche 2 incorporates a range of schemes to cover the remaining lines traversed by Bristol suburban services, as well as the route north to Bromsgrove (the limit of electrification south from Birmingham), the North and South Cotswold lines and the route from Gloucester to Severn Tunnel Junction. Also included are connections to Westerleigh oil terminal and Tytherington quarry.

This tranche would enable the removal of diesel trains on London services from Worcester and Cheltenham. The importance of diversionary routes is stressed in the strategy, justifying the inclusion of Gloucester to Severn Tunnel Junction to decarbonise the main diversionary route from London to South Wales avoiding the Severn Tunnel. With Tranche 1 completed, Tranche 2 would also enable decarbonisation throughout of CrossCountry services from Exeter/Bristol to Manchester.

THAMES VALLEY BRANCHES

Tranche 3 of the strategy covers the four passenger branches in the Thames Valley, plus the freight branches to Brentford and Colnbrook.

For the former, the strategy favours alternative traction rather than electrification, highlighting the forthcoming Greenford branch trial with a Vivarail battery Class 230 (p62), although a note of caution is applied in the strategy around tight turnaround times at some branch termini. It is understood Great Western Railway would like to have a single fleet of battery trains for these routes ('Moving Wheels').

For the freight branches, the strategy says 'a logical solution might be electrification' given the link to the electrified main line and the prioritisation of Acton to Willesden in Tranche 0, but the length of the branches and the fact a solution would be required in the terminals means



Filton bank: No 43188 leads a 2+4 HST on the 12.00 Cardiff Central to Taunton at Filton Abbey Wood on 19 August 2021, with No 43194 on the rear. **KEITH FENDER**

'consideration should be given to whether a bi-mode locomotive or battery tender is suitable'.

The strategy suggests this tranche could offer 'a relatively independent and potentially rapidly solution to removal of diesel stock' and may be attractive to alternative funding mechanisms, potentially allowing it to be brought forward.

DEVON

Tranche 4 turns the focus to all routes in Devon, where replacement of the regional rolling stock will be a key driver of decarbonisation.

For the branches, it is suggested a homogenous fleet is desirable, so the characteristics of the longest branch (to Barnstaple) would dictate the strategy and the choice of a common traction and power supply. Given the age of the current fleet in Devon and Cornwall, which is likely to be life-expired before infrastructure is installed, it is suggested a replacement fleet should be adaptable, potentially requiring a modular concept where the power unit is replaced rather than the complete train. The strategy says there may be an opportunity to harness the potential of emerging technologies being developed in

the area, such as the proposed hydrogen hub centred on Plymouth.

On the main line, the challenge of the coastal section between Starcross and Teignmouth is highlighted, with similar issues on the Exmouth branch. This, suggests the strategy, may favour a bi-modal solution. The strategy also notes that while the frequency of long-distance freight services to and from Cornwall is limited, the gradients of the Devon banks are constraining for these services.

CORNWALL

Tranche 5 covers all routes in Cornwall – the main line and the passenger and freight branches.

Again, the age of the regional fleet is highlighted as a driving factor for decarbonisation. The strategy weighs up the benefits of a homogenous fleet for all services in Cornwall against the possibility of having a specialised fleet of alternative traction rolling stock for the short and self-contained Cornish branch lines (Gunnislake, Looe, Falmouth and St Ives). The exception is the Newquay branch, which is considerably longer and plays host to through trains to destinations beyond

Plymouth in the summer, so a strategy here would need to align with the approach taken to main line rolling stock.

On the main line, a bi-mode concept for local and inter-regional services is mooted, which the strategy says 'may require sections of electrification'. The IET fleet could utilise overhead wires or be modified to replace diesel engines with alternative traction.

For the freight branches (Moorswater, Fowey and Parkandillack), it is suggested end-to-end decarbonisation will be difficult, with a 'genuinely bi-modal non-diesel locomotive or significant sections of electrification' needed.

FUNDING

Clearly, delivering a programme such as this will be dependent on funding. The strategy suggests there are multiple potential avenues of funding, including from third parties and from private financing, and advocates 'active and innovative pursuit of these opportunities'. It also emphasises the need to develop a detailed understanding of work scope before starting delivery, learning the lessons of GWEP. 

SIX TRANCHES TO DECARBONISE THE WESTERN

Tranche 0:	Acton to Willesden; Bristol Temple Meads to Bristol Parkway (Filton bank); Chippenham East to Bristol Temple Meads; Didcot to Oxford (and potentially on to Hanborough)
Tranche 1:	Newbury to Cogload; Bristol to Exeter; Westbury to Thingley, Bathampton and Warminster; Somerset quarries; Oxford to Banbury
Tranche 2:	Bromsgrove to Westerleigh (including Worcester); Swindon to Standish Junction; Gloucester to Severn Tunnel Junction; Norton Junction to Hanborough; Severn Beach and Hallen Marsh lines; Westerleigh and Tytherington quarry
Tranche 3:	Thames Valley passenger branch lines – Greenford, Windsor, Marlow and Henley-on-Thames; freight branches – Brentford and Colnbrook
Tranche 4:	Exeter to Plymouth and Paignton; Barnstaple, Exmouth and Okehampton branches; West of England main line
Tranche 5:	Plymouth to Penzance; Cornish passenger branches: Gunnislake, Looe, Newquay, Falmouth and St Ives; freight branches: Moorswater, Fowey and Parkandillack