



Our Electric Future

The benefits for Bristol, Bath and the West of
England from the modernisation and electrification
of the Great Western mainline

Build Back Better

Message from

Mark Langman, MD, Wales and Western



Mark Langman
Managing Director,
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The need to rebuild our local economies and communities has never been greater and the railway must play a leading role in getting the country moving again.

We know economic prosperity, booming business and thriving communities are a by product of improved transport links and at the heart of that is a high performing railway that does much more than just transport passengers and freight.

We have successfully delivered the biggest upgrade to the railway in our region since it was built and we know that by investing in the right areas we can deliver thousands more seats, quicker journeys, greener travel and best of all, create thriving towns and cities. This is what we need more than ever after the challenges of 2020.

We have brought towns and cities closer together by speeding up journeys, we are protecting our environment for future generations by enabling greener electric travel, we have created better journeys by allowing more trains to run. We have increased freight capacity, meaning we can better support the economy by moving 370,000 tonnes of freight every week which means shelves in our shops are stocked with food, our NHS has medical supplies, petrol is in our pumps and much more.

Modernising the railway is a building block for economic success; given the current pandemic it would be easy to put the brakes on, but to properly plan for the growth of our local economies, our housing and education needs, our transport, technology and infrastructure requirements we must continue to plan for growth.

Irrespective of Covid-19 the number of households in England is projected to increase by 1.6 million (7.1 %) by 2028 with one the fastest growing areas in the south west, the region served by Network Rail Wales and Western, where the projected growth of households is 9 % from 2.3m households to 2.6m households by 2028. In Wales huge increases are also projected with a 10 % rise in households to 1.47m by 2039 – with Cardiff (32 %) and Swansea (17 %) expected to grow the quickest.

Whilst the pandemic may challenge our current thinking on where we will work and live, population growth is a given that we need to jointly plan for. And this planning must be environmentally sound. The public want greener transport and the UK has committed to a target of bringing all greenhouse gas emissions to net zero by 2050. Our railways play a critical part in the long-term decarbonisation of England and Wales.

It is important that in planning for our future transport networks we capitalise on what we have learnt together as we delivered this huge investment programme, much of it in partnership with local authorities including the West of England Combined Authority, Bristol, Bath and North East Somerset. It's important that we remind ourselves of the successful outputs and benefits that we delivered through electrification and modernisation of the Great Western mainline for your region, and I hope that this summary helps us to do that.

The Sparks Effect – the benefits for Bristol, Bath and the West of England



Benefits at a glance.

Quicker journeys

Including new superfast services which run non-stop from Bristol and Bath to London Paddington.

- Between Bristol Temple Meads and Paddington up to 17 minutes faster
- Between Bristol Parkway and Paddington up to 7 minutes faster
- Between Bath Spa and Paddington up to 12 minutes faster and Paddington

More frequent services

- An extra three trains running superfast between Bristol Temple Meads and Paddington in the morning and evening peaks
- Four extra off-peak services a day from Bristol Temple Meads to Paddington, via Bristol Parkway.
- Two services in the morning and evening peaks running non-stop from Bristol Parkway (originating in South Wales) into London Paddington
- Nine extra services every Sunday on the Severn Beach line

More seats

- 20,000 additional weekday seats between Bristol Temple Meads and Paddington
- 15,000 additional weekday seats between Bristol Parkway and Paddington

Investing in Bristol, Bath and the South West - railway by numbers

£250m

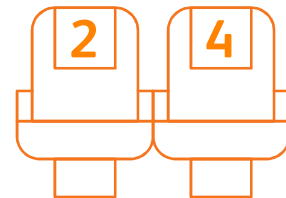
Improving Bristol's signalling, the biggest upgrade of its kind anywhere in the UK ever. Providing more reliable journeys for passengers across the West of England



We doubled the tracks between Bristol Temple Meads and Filton to four, unlocking a bottleneck on the network and providing quicker and more reliable journeys



New trains with more carriages between Bristol, Cardiff and the south west with 1,800 extra seats on these services every weekday



Up to 24% more seats on every train between the West of England and London



New ticket gates at Bristol Temple Meads to ease congestion through the station



Platform extensions at stations such as Bath Spa and Bristol Temple Meads so longer bi-mode Intercity Express Trains with 10 carriage trains can stop at the station with other extensions on the Severn Beach line so longer trains can call at stations along the line

Sparks effect: West of England Mayor, Tim Bowles, said:

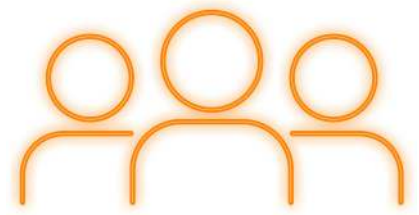
“The modernisation and electrification of the Great Western main Line is already benefiting residents right across the West of England... This is just the beginning and we’re using the capacity that this has created to bring forward our plans for an enhanced suburban railway line for the region in MetroWest.

“This multi-billion-pound investment in the West of England will enable our region to help recover from the Covid-19 crisis.”



John Lanchester, Tim Bowles and Mark Langman open new ticket gates installed at Bristol Temple Meads station to provide for a growing number of passengers.

The future is bright for Bristol, Bath and the South West



The huge investment modernising the railway over the last decade has unlocked increased potential for further passenger and freight benefits. This will be more crucial than ever in Bristol and the West of England with the region set to be one of the fastest growing in the country.

ONS projections have the population in Bristol to grow by 6.8 % by 2028, south Gloucestershire by 11.5 % , north Somerset by 9.2 % and Bath and north east Somerset by 8.5 % .

What's next?

- The transformation of the railway including signalling upgrades, doubling of the tracks and improving a bottleneck at Bristol East Junction will pave the way for MetroWest.
- A renovation of Brunel's historic roof at Bristol Temple Meads to future proof it for another hundred plus years plus a re-wiring of Bristol Temple Meads to enable more efficient services
- MetroWest will dramatically increase rail travel in the region, connect more people to the rail network and improve air quality.
- It proposes that the Henbury and Portishead lines will be reopened, new stations opened and there will be more frequent services to Bath, Westbury, Yate and Gloucester.
- MetroWest is a West of England Combined Authority and North Somerset Council initiative, in partnership with DfT, local councils and Network Rail. It is expected to generate over a million new rail journeys and give 80,000 more people access to train services.
- Commercial redevelopment has taken place near to Bristol Temple Meads station following the modernisation of the railway, and more is planned—including the Temple Quarter development and Bristol University's new campus.



Image: A bi-mode Intercity Express at one of Bristol Temple Meads' new platform

Why electrify, decarbonise and modernise our railways?

A total of 38 % of the UK's rail network is currently electric – much less than comparable European countries which are typically 60 % or more. Electrifying the Great Western mainline so far has increased the proportion of the UK's railway that is electrified by 8 %. Whilst technology continues to move fast, currently only electric and diesel traction can deliver the full range of requirements for high speed, long distance and freight haulage¹.

Electric railways are:

Better for the environment

- Electric trains are already one of the most environmentally friendly forms of mass public transport and typically an electric train emits between 20 to 35 % less CO2 per passenger mile than diesel². CO2 emissions from GWR's long-distance services have been cut by 60 % under electric power, and its Thames Valley services emit 34 % less CO2. Overall, GWR's bi-mode fleet emits 34 % less CO2 than it would otherwise do in diesel.

Cleaner

- Electric trains have zero emissions at the point of use – which is particularly important in cities and large towns reducing diesel fumes and particulates into the air and improving air quality.

Quicker

- Journey times are faster as electric trains can accelerate and decelerate quicker.

Reliable

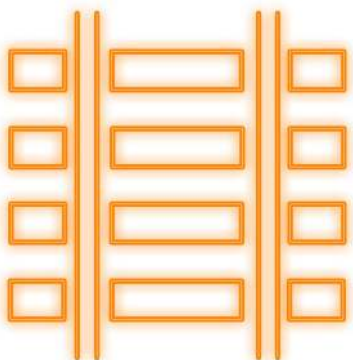
- Because of their faster acceleration and deceleration electric trains can get back to their timetable times faster when the timetable is impacted by unplanned disruption. This helps provide passengers the reliability they need. New electric trains long distance trains are 40 % more reliable and 300 % more reliable for suburban trains again, providing passengers with the reliability they need.

Quieter

- Electric trains produce much less noise pollution for those travelling, working on or living near the railway.

More cost effective

- Electric trains are lighter and more efficient. They cause less wear and tear on the track, reducing the costs of maintaining the railway.



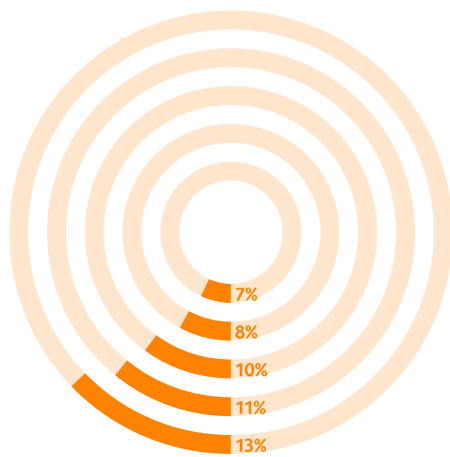
¹ RSSB Decarbonisation Taskforce Interim Report (2019)

² Press Release Dept for Transport (2015).

Improving passenger's satisfaction and experience

The programme replaced 1970s trains which operated slam doors and deposited toilet waste onto the track with new trains are easier to board and alight, with better wifi and at seat power connections.

The Autumn 2019 National Rail Passenger Survey (NRPS) reported:



13% improvement in passenger satisfaction with the reliability and punctuality of GWR services

11% increase in satisfaction with connectivity with other train services

10% increase in overall satisfaction

8% increase in satisfaction with the frequency of trains on that route

7% increase in satisfaction with the length of time the journey was scheduled to take



The output from the modernisation and electrification programme

The £5.58bn programme resulted in:

190mi

Electrification of 190 miles of railway

14,200

14,200 masts and booms erected

400mi

400 miles of wire

49

49 new structures

- Complete modernisation of Reading station unblocking a major congestion point, increasing passenger space and enabling freight services to operate without affecting passenger services
- Doubling of train lines into Bristol Temple Meads at Filton Bank to reduce congestion by separating commuter and high-speed services as well as enabling future growth
- Doubling train lines between Swindon to Kemble to increase capacity, provide a diversionary route avoiding the Severn Tunnel
- Our biggest ever signalling upgrade which means Bristol is now signalled from the state-of-the-art Thames Valley Signalling centre, replacing 1970s analogue equipment.
- Complete resignalling around Reading and Swindon, which enables signalling to operate without interference from 25kV overhead lines, and to enable more trains to run through Reading removing a bottleneck.
- 93 new IET bi-mode trains with 24 % more capacity than the 1970s trains they have replaced

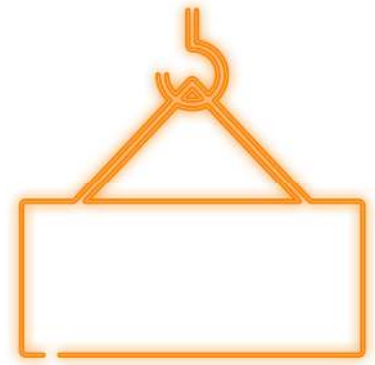
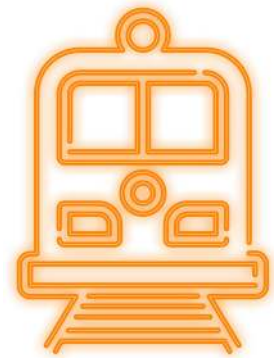


Image: New OLE gantry at Bristol Parkway

- 33 new Electrostar (Class 387) electric commuter trains, each with four carriages, for the Thames Valley which allowed the cascade of higher capacity Turbo trains to the West of England
- X number of platform extensions to accommodate new, longer trains across the Thames Valley, Cotswolds and cascaded longer trains to the West of England. Richard Cole back for figure
- Passenger lifts installed at 27 stations to improve accessibility³.

³ Funded between GWRM, Crossrail and Access for All schemes

Improving freight – a more sustainable mode of moving goods and materials



Providing greater choice and reliability for freight services

Freight serves several major industries, including the Port of Bristol, car plants in Swindon and Oxford, aggregate industries in Somerset, petroleum businesses in Berkshire and steel in south Wales.

Providing good, reliable rail services for freight goods and materials is vital to support our regions economically whilst removing 11 million lorries each year from our congested road networks. We forecast a 45 % increase in demand of freight on our region by 2043. To meet that demand we will:

- Improve reliability and be able to increase freight capacity
- Continue to support “jumbo” stone trains, which consist of 34 wagons against the normal 21, freeing up extra capacity on the network by moving more freight in one go
- Work with freight operators to maximise opportunities to increase length of trains
- Look to improve freight facilities and introduce ‘pop-up’ terminals
- Transfer ownership of redundant lines / assets to secure better opportunities for redevelopment

These will build on the successes already made, including:

- A new 2km flyover near Reading which separates passenger and freight trains. This has unlocked a bottleneck, sped up freight journeys, improved reliability and means more services can operate
- A ‘dive under’ has also been built on the main line near Acton. Previously, passenger services passing through were competing with long freight trains entering and leaving a nearby freight yard. The dive-under allows passenger services to pass under the slower freight trains.

Industry learnings & legacy

Delivering the electrification and modernisation of the Great Western mainline was not without problems. Well publicised failings led to several reviews and as a result Network Rail and the Department for Transport have now changed how they work together to deliver major projects.

Through Great Western electrification Network Rail updated UK electrification technology which was three decades old. In doing so the

programme leaves several notable legacies which have the potential to help future electrification programmes:

- A whole new electric power supply and overhead line equipment system was developed – the new Series 1 Overhead Line Equipment - to give excellent reliability.
- The new systems were built on the results of a review into existing electric power systems and their failings, and over 80 types of common failure were systematically designed out.
- Well-developed expertise in construction methodology – how to build the best overhead electric line equipment based on experience and innovation
- Successful electrification of several tunnels – all with unique engineering challenges, not least the Severn Tunnel – a novel rigid overhead contact system was created for some of these tunnels.
- Stronger understanding of all the elements of successful major programme delivery, including information management, cost control, programme management, commercial activities and delivery of public planning and consents.

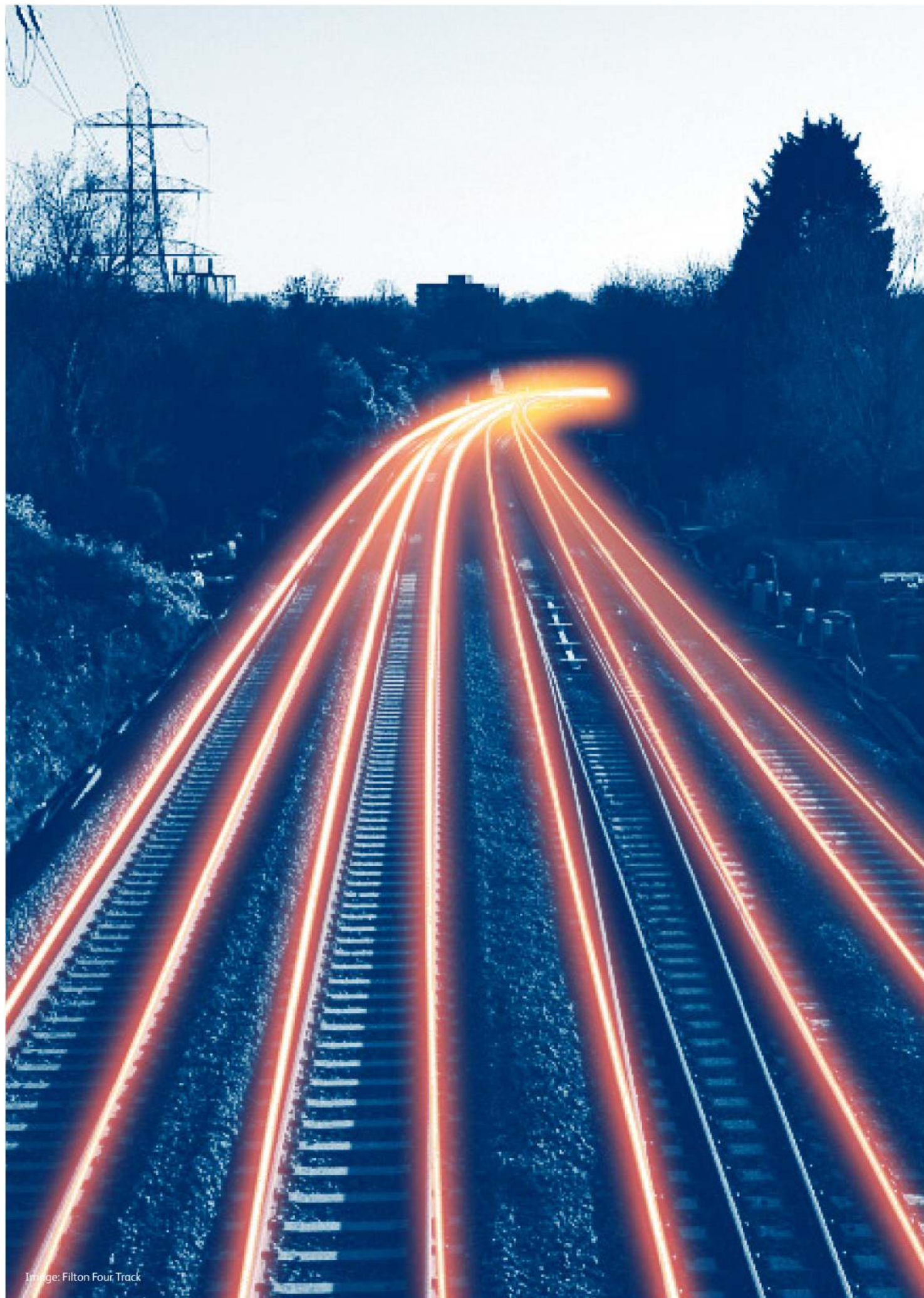


Image: Filton Four Track