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The train market in the UK continues to be a vibrant one and passengers are benefiting from investment in new trains across the country. We are seeing train manufacturers like CAF and Stadler joining Hitachi, Bombardier and Siemens in opening new facilities in the UK to build or maintain trains. Investors have been keen to put their money into the future of the industry with new trains for Northern, TransPennine and Anglia soon to enter into service as well as on the Gt Western and East Coast intercity routes.

Private companies are showing how they can marry opportunity and innovation to repurpose existing stock like the Viva Rail trains, Angel’s HyDrive or Porterbrook’s tri-mode vehicles, and develop new ultra-light trains for metro services like the ones being designed by WMG in Dudley which is supported by both Network Rail and Eversholt Rail.

We need to see much closer working between train operators and Network Rail and a much greater alignment of goals so that it is in both party’s interests to succeed in delivering the rail network the country needs. As more digital systems are introduced to the railway (like automatic power changeover for bi-mode trains) it is increasingly important that the industry takes a track-and-train whole system approach to design to ensure that the trains and the track-mounted equipment work together when introduced.

Jo Johnson MP,
Minister of State at the Department for Transport and Minister for London
Rolling Stock Perspective

1. Introduction

This is the fourth issue of our Rolling Stock Perspective, in which we signal to train manufacturers, owners and operators the types of improvements and innovation we want to see in the railway industry. In this issue we will revisit many of the themes covered previously as well as discussing new challenges the industry must face.

Since the last issue there have been over 600 new carriages ordered for the West Midlands, Essex Thameside, Crossrail and Welsh services. Many of these trains will be manufactured by Bombardier, who have secured the majority of these orders for their Derby factory and CAF who are building two fleets of its Civity trains and opening a new factory in Newport in autumn 2018. In addition, a new rolling stock funder has entered the market, all of which demonstrates that there continues to be healthy competition between train owners and manufacturers to build and fund the procurement of new trains for UK passengers.

Northern's new Class 195 diesel train
We are pleased to see that some innovative ideas are starting to become reality with Alstom working with Eversholt on the conversion of class 321 units to bi-modes using hydrogen fuel cells, Viva rail breathing new life into its class 230 trains with a hybrid power pack option, Angel trains working with Chiltern to introduce hybrid class 165 HyDrive trains in 2019, and Transport Design International making good progress on building their Very Light Rail (VLR) manufacturing and test facility in Dudley.

These light weight, refreshed and re-purposed vehicles, offered to the market at competitive rates, could strengthen the case for the reopening of disused lines. As the demand for housing and business premises that are well connected to the mainline increases, the reopening of these old alignments would reinvigorate local services. We would welcome proposals, via our Rail Network Enhancements Pipeline, for schemes that include the use of affordable rolling stock for these routes and we expect train manufacturers, franchise holders and ROSCOs to engage with operators and local authorities alike to examine the opportunities and the case for these.

We are pleased to see that Rolls-Royce have agreed the delivery of MTU Hybrid PowerPacks that will convert Porterbrook’s Class 170 Turbostar DMUs from diesel-only to Hybrid operation. This Hybrid technology will enable a reduction in exhaust gasses around stations and urban areas. Porterbrook have also entered into a partnership with the Birmingham Centre for Railway Research and Education (‘BCRRE’) to create HydroFlex – the UK’s first hydrogen powered train. Porterbrook will provide a ‘Class 319’ electric unit to BCRRE for conversion by their technical and research experts into a hydrogen powered train, allowing both organisations to demonstrate how this fuel-of-the-future might be deployed across the UK’s rail network.

There is good news for UK-based vehicle equipment designers. The ‘Infinity Train’ will offer suppliers, especially SMEs, the unique ability to demonstrate new products and technology in a real passenger train environment. Based at Long Marsden and formed from one of Porterbrook’s currently off-lease class 319 units the Infinity Train will also allow British based companies to showcase their technology to customers from both the UK and overseas, supporting the Rail Supply Group’s ambitious plans to grow UK rail exports.

In this issue we will be revisiting our key objectives for rolling stock i.e. improving journeys for passengers; digitising the railway to reduce costs and increase capacity; getting most out of the assets we have; improving train connectivity and information for passengers; and reducing the impact that the railway industry has on the environment.

2. Decarbonisation

In February 2018 the Rail Minister Jo Johnson set out his vision to decarbonise the rail industry and set out an aspiration for the removal of all diesel-only trains from the network by 2040. Rail Delivery Group appointed Malcolm Brown to lead an industry taskforce to address this challenge for traction, property and infrastructure. The taskforce’s remit is to show how the UK can become the world’s leading low-carbon railway by 2040 and have an industry that is a world leader in developing and delivering low carbon rail transport solutions for all.
The taskforce’s initial report will set out the range and feasibility of lower carbon options. It will build on wide consultation within the industry and research into developments in rail in other countries and how other transport modes are developing decarbonisation solutions. The taskforce will follow up on its initial findings in 2019 with a final report incorporating an economic appraisal and route map to deliver its recommendations.

There has been significant research and development on decarbonisation, especially in recent years as the UK’s statutory climate change commitments have come to influence public transport policy. The taskforce’s challenge was not to drive innovation. Rather, it was to find ways to catalyse existing innovation and find practical ways to bring lower carbon options to a point where they can be implemented without compromising rail’s obligations to provide a timely, reliable and comfortable service to passengers and a reliable, cost-competitive service to freight shippers.

A key issue for the taskforce is to find other traction options that are able to provide lower carbon outcomes at a reasonable cost.

The taskforce will be exploring all options critically to ensure that the right long-term choices are made. This involves setting clear outcomes, specifying what the industry can do and proposing actions to ensure that the right policy and investment climate is established to enable the recommendations to be delivered.

3. Alternatives to Diesel Fuel

Rail remains the most environmentally friendly form of transport in terms of carbon emissions per passenger mile. Nevertheless, we want to see train manufacturers, owners and operators working together to develop trains capable of storing power on board from the electrified network where it exists and using this stored energy when operating away from the electrified parts of the network. Where diesel engines are used as part of the solution we want those engines to be the cleanest (in terms of engine exhaust) possible.

Recent advances in energy storage technologies like batteries and hydrogen are at, or approaching the stage, where they will be suitable for some types of journey which do not have such high energy and power demands, such as rural branch line and suburban commuter services. It is expected that this technology will develop quickly in the coming years.

Whilst new trains are being introduced onto Gt Western, East Coast and Anglia services many other diesel-only passenger trains in service today were built before the 2014 European regulations on train exhaust emissions were introduced. A challenge for owners of these trains is to find cost effective ways of improving their exhaust emissions if they are going to be seen as credible options for franchisees in delivering their environmental strategies.
A recent Network Rail report highlighted that there are specific parts of the network that suffer more than others with pollution build up due to their city centre location, the amount of train engine idling done at those stations and their physical layout. We want to see measures put in place to reduce this pollution at its source, like using auto engine stop-start software, electric launch systems and station shore supplies during long dwell periods.

We expect train owners and manufacturers to further develop cost effective proposals to convert their existing or future diesel trains to bi-mode or use an alternative energy source to diesel. Using current technologies, it should be possible for bi-mode and alternative fuel trains to be capable of operating without diesel engine emissions from the moment they approach platforms until they are clear of the station environment, thereby improving the level of air quality for waiting passengers and those working in the immediate area.

We have placed requirements in our most recent franchises to develop, test and deploy new and emerging technologies during the franchise. These new technologies could include hydrogen fuel cells, batteries, supercapacitors or other energy storage systems. Such deployments must include the supporting infrastructure, supply chain and maintenance arrangements necessary to ensure a reliable train service.

4. Disabled Passenger Benefits
Inclusive Transport Strategy: achieving equal access for disabled people.

Earlier this year the Department set out the Government’s plans to make our transport system more inclusive across all sectors (road, rail, sea and air) and to make travel easier for disabled people. While it is focused on the inclusion of disabled people, many of the improvements will also benefit other travellers.
1st January 2020 is the deadline for ensuring that all trains meet the accessibility standards. The standards set requirements for handholds, signage, wheelchair spaces etc. which rail vehicles must meet in order to enable those with reduced mobility to use trains more easily. A lot of good work has already been done with the number of trains that meet these RVAR and PRM-TSI requirements higher now than it has ever been. This is partly due to the large number of newly-built trains being introduced to the network but also due to wholesale train fleet refurbishments enabled by the franchising process.

There is still a small percentage of trains that do not meet the RVAR or PRM-TSI standards. We expect train owners and operators to target these vehicles for upgrade in the coming months.

Much can still be done to make travelling around the rail network easier for those with disabilities or for those with reduced mobility. Whilst work to improve the passenger environment has delivered a measurable uplift in accessibility, the challenge of bridging the gap between the train and the platform remains. Rolling stock with retractable steps, filling the gap between the train and the platform, are due to be introduced on Greater Anglia services in 2019 making it easier for those with wheelchairs, prams or heavy luggage to use services with a greater degree of independence. We want to see innovative approaches used on trains and stations to remove the remaining physical barriers to travel.
People who use train services independently but who may be partially sighted, deaf or suffer from dyslexia or have learning disabilities or dementia may struggle to get the information they need about those services. Many of those passengers rely on information screens, signage and audible announcements on trains to navigate around the network. We expect all train manufacturers, owners and operators to ensure that all the existing aids on their trains are in good condition and operating reliably.

Govia Thameslink Railway (GTR) has introduced Accessibility Communication Guides. These simple cards enable passengers to communicate with train and station staff simply by pointing to images that represent the information or assistance they need.

The ability to remotely locate assistance when it is needed is a valuable passenger benefit. We want to see train manufacturers and our franchisees introducing systems on trains that can help people with hidden disabilities find their way around the trains and communicate with staff.

Equally passengers who require accessible toilet facilities during their journey need to be certain that they will find them in working order. We want manufacturers and maintainers to use technology to monitor and maintain these systems to keep them in service whenever the train is in use.
5. The Passenger’s Environment

Maintaining a good travelling environment for passengers is a key outcome the Department seeks to achieve through its rolling stock design and franchising requirements. We expect our franchisees to have in place processes and procedures to deal with trains stood in any weather (hot or cold) so that a comfortable environment is maintained for passengers. Train designers should consider the continued operation of lighting, air-conditioning, toilets etc. when power to the train is lost.

The Department expects its franchisees to ensure that their trains are suitable for the kinds of journeys their customers are making. Guidance is given in section 8 on the attributes different train types should have. Such attributes include vehicle loading indicators and active occupancy detection systems. Train operators are encouraged to utilise the information from such systems to provide real-time carriage occupancy information to passengers on-board and to provide summary information to passengers in advance of travel, allowing them to make more informed decisions about their journey.

Interior of Northern’s new electric train

Passengers rightly expect wireless services on trains to keep pace with the facilities and information provided by other transport modes and in other public spaces. Train operators should not overlook the benefits to themselves of being able to keep passengers informed, especially during disruption, providing advice and information to passengers to relieve overcrowding at affected stations.
We expect our franchisees to buy fast and reliable Wi-Fi and mobile connectivity systems when procuring new or refurbishing existing trains. Trains should have a fast communications network and space reserved for future high bandwidth multi-media equipment capable of at least one (1) gigabit per second speeds and that can be increased in readiness for future 5G technology.

Train owners, operators and Network Rail must expect and plan for new technology to keep us at the forefront of the digital revolution. The industry must prepare for the introduction of a new cab radio system that will replace existing railway systems from 2025.

6. Parcels on Passenger Trains

The use of spare space on rolling stock is already being capitalised on by WeGo Couriers, who utilise non-passenger space on passenger trains to transport a wide range of consignments on East Midlands Trains. Eurostar’s EuroDespatch service also makes use of spare space on its trains to transport goods and large items of luggage between London, Paris and Brussels.

Converted passenger rolling stock has been used by Colas Rail and TNT to successfully trial the carriage of express parcels and perishable products for distribution in central London. The goods were then transferred into a fleet of TNT electric and low-emission vehicles to produce an end-to-end service that was reliable, faster than by road and resulted in reduced emissions.
The Department has provided £3.5m in funding via the Innovate UK First of a Kind competition to demonstrate “tomorrow’s trains today” from which £350k funding was given to 42 Technology Ltd to demonstrate the feasibility and value of an adaptable carriage. Their design featured seats that would automatically fold and slide along the sides of the vehicle, thus allowing the carriage of goods during under-utilised off-peak periods.

Our 2016 Rail Freight Strategy identified the potential to carry goods on passenger trains where there is spare capacity. The strategy considered the carrying of parcels directly between city centres on off-peak passenger services facilitated by adaptable rolling stock able to carry freight into cities.

A study undertaken by Arup on behalf of the Department identified that there is potential to develop the ‘goods on passenger trains’ model beyond the small-scale examples currently in operation. The market would be created by companies wanting to transport time-sensitive, high-value goods on the rail network to speed up their deliveries and reduce their carbon footprint. Such goods would be accommodated in specific areas of the train, segregated from passengers, be of a size that would be easy to load or unload within the dwell time and without the need for special handling equipment.
New trains with flexible areas for passengers or freight provide an opportunity for the carriage of goods with little impact on off-peak passenger services. Multi-purpose carriages provide an opportunity to offer additional revenue earning services and to make fuller use of the assets.

The Department expects to see train manufacturers, owners and operators taking full advantage of opportunities to use the assets the rail industry has to full effect.

7. Rail Digital Services

Transport Secretary Chris Grayling and then-Network Rail Chief Executive Mark Carne jointly launched Network Rail’s Digital Railway Strategy on 10th May 2018 and committed to ensuring all new trains and track signalling are digital or digital-ready from 2019. This means procuring new trains with modern in-cab signalling either fully or partially installed when built, reducing costs and the time needed to realise the benefits once the route has been updated.

Technologies that today are delivering benefits to passengers include automatic door selection at short platforms, automatic power changeover for bi-mode trains, the European Train Control System (ETCS), Driver Advisory Systems and Traffic Management Systems (TMS). These systems improve safety and allow us to optimise the use of the rail network.

With closer alignment of train operators, owners and Network Rail, we expect to see the industry work collaboratively, taking a whole system approach to support these initiatives. Systems such as a national defect and fault reporting system for ETCS and train stock and crew management systems must be interoperable with other systems (such as TMS) if we are going to fully realise the benefits available to the railway through digital technologies.

The testing of Thameslink services through the heart of London using ETCS and Automatic Train Operation has shown that with modern systems and ways of working much can be achieved for the benefit of passengers. The larger-scale deployment of similar systems could come a step closer if the trial of a hybrid system at the ERTMS National Integration Facility (ENIF) is successful. This trial is allowing level 3 ETCS fitted trains, which are able to run closer together, to operate between level 2 ETCS and non-ETCS fitted trains for the first time.

This would create more capacity, allow more frequent train services and provide a way of realising the benefits of ETCS whilst the nation’s train fleet and signalling systems are being updated. To that end, we will continue to invest the £450m National Productivity Investment Fund (NPIF) allocation in digital technologies for the railway and progress the First-in-Class programme, retrofitting existing passenger and freight vehicles with ETCS.

8. Rolling Stock Aspirations by Service Group

The aspirations for rolling stock on the coming pages are necessarily broad and do not take precedence over requirements set out in individual ‘Invitations to Tender.’ They provide a high level overview, which train operators should work towards. These aspirations are intentionally cast as output based and we expect train operators to take innovative approaches and use their experience to meet or exceed them.
We have divided services into five broad groups. It is important to note that trains can be used flexibly during off-peak periods. Britain has a busy railway, particularly during the morning and evening rush hours, and a train used on a metropolitan service in the morning may be used on inter-urban or rural services outside of the peak. It is also important to note that passengers’ perceptions of the type of service they are travelling on vary dependant on the time spent on the train and their reason for travelling.

It is essential for vehicles to have flexible interiors if train operators are to respond to increasing demands from passengers at manageable cost. In the long term this will ensure that rolling stock can be deployed on various routes with differing needs and ultimately allow train operators to prepare quickly and easily for occasions when passenger numbers put pressure on capacity e.g. high season holiday or festival traffic. Thought should also be given to providing flexible interiors suitable for large packages, luggage or bicycles.

**Metropolitan**

The metropolitan service group typically serves high-density traffic flows to meet a high volume of passenger demand during the peak hours, with passengers generally making relatively short journeys on services with frequent stops. Passenger expectations may focus on certain aspects of comfort and there is a recognition that operators must balance the need to transport high volumes of passengers against the expectation of a seat. These trains may also provide services to outer-suburban stations.

**Rural/Regional**

This service group will generally serve more rural communities at a lower frequency than the other service groups and have lower ridership but it performs a vital service for travellers, the local community and tourists as well as the regional economy.

**Inter-Urban**

Passenger expectations of the Inter-urban service group are similar to the InterCity group on services that are primarily express with limited stops but may be of a shorter duration. It transports leisure and commuter passengers between towns and cities. These trains may also provide services to outer-suburban stations.

**InterCity**

The InterCity service group is one of predominantly long distance services where passenger expectations are generally high given the nature of the market, length of journey and the transport modes against which operators compete.

**High-Speed InterCity**

These vehicles are envisaged as providing ultra-high speed (up to 360kph ~225mph) services between major cities in Britain. Passengers will have high expectations for the facilities on board and for modern state-of-the-art interiors that meet the needs of business, commuting and leisure travellers.
Accessible

- Compliant with accessibility regulations
- Doors and vestibules that minimise dwell times

Ambience

- Safe, secure travelling environment
- Uncluttered, practical, dependable trains and services

Technology

- Real-time travel information
- At-seat charging
- Wireless connectivity
- Vehicle loading indicators
- DAS and energy monitoring
- ETCS
- Infrastructure monitoring equipment

Accommodation

- Flexible storage areas
- Open saloons and gangways
- An appropriate mix of seats and standing areas
- Handholds and perches that aid standing passengers
Rolling Stock Perspective

Accessible
- Compliant with accessibility regulations
- Doors and vestibules that balance dwell times with saloon space

Rural/Regional
- Safe, secure, social travelling environment
- Comfortable, dependable, flexible trains and services

Ambience
- Real-time travel information
- Wireless connectivity
- Vehicle loading indicators
- DAS and energy monitoring
- ETCS
- At-seat charging

Accommodation
- Dedicated storage for larger items
- Toilets
- Seating suitable for medium to long durations
- Mix of seating arrangements
Accessible

Compliant with accessibility regulations
Doors and vestibules that balance dwell times with saloon space

Ambience

Safe, secure travelling environment conducive to working
Comfortable flexible trains and services

Technology

Real-time travel information
At-seat charging
Wireless connectivity
Vehicle loading indicators
DAS and energy monitoring
ETCS
Infrastructure monitoring equipment

Accommodation

Dedicated storage for larger items
Toilets
Seating suitable for long durations
Mix of seating arrangements
Rolling Stock Perspective

Accessible

- Compliant with accessibility regulations
- Doors and vestibules that maximise saloon space

Ambience

- Safe, secure and personal travelling environment conducive to working
- Flagship trains and services

Technology

- Real-time travel information
- At-seat charging
- Wireless connectivity
- Vehicle loading indicators
- DAS and energy monitoring
- ETCS
- Infrastructure monitoring equipment

Accommodation

- Defined luggage areas
- Toilets
- Seating suitable for long durations
- Mix of seating arrangements
High-Speed InterCity

Accessible
- Compliant with accessibility regulations
- Level access between the train and the platform on HS2

Ambience
- Safe, secure, modern travelling environment conducive to working
- Flagship trains and services

Technology
- Real-time travel information
- Intelligent seat reservations guiding passengers
- Active occupancy detection
- Wireless connectivity
- At-seat charging
- Infrastructure monitoring equipment

Accommodation
- Dedicated storage for larger items
- Toilets
- Seating suitable for medium to long durations
- Mix of seating arrangements
9. British Rolling Stock Fleet – Class by Class Overview

The following charts provide an overview of rolling stock in Britain, showing on which franchises or concessions they are currently operated, the date they are leased to as well as an indication of the year in which they were built. It is important to note that the quality of the vehicle is important, not its age. Good, high quality refurbishment can deliver a passenger experience comparable with new rolling stock.

The information contained within this section is indicative and has been prepared using Franchise Agreements and other material as available to the Secretary of State at the date of this document. Note that information on some Welsh and West Midlands services was not available at the time of publication. As such neither the Secretary of State nor his officials, appointed agents or advisers makes any representation or warranty (express or implied) as to the accuracy or completeness of the information. It does not include Open Access Operators. Sub-leasing arrangements have been simplified in some instances. The Department’s Rolling Stock Team welcome any ideas for future publications, comments or corrections and can be contacted at:

RollingStockPerspective@dft.gov.uk
DMU Rolling Stock (Post-1996 orders)

Key:
- CH: Chiltern
- EA: East Anglia
- EM: East Midlands
- GW: Great Western
- LO: LOROL
- SR: ScotRail
- TL: TransPennine Express
- WB: Wales and Borders
- WC: West Coast
- WM: West Midlands
- XC: Cross Country

Current Lease:
- Green lines indicate current leases.

19XX Indicative build dates:
- Green triangles indicate indicative build dates.

Vehicle Counts:
- 175 vehicles (1999 - 2001)
- 185 vehicles (2006 - 2008)
- 221 vehicles (2001 - 2002)
- 230 vehicles (2018)

Years:
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
AC EMU Rolling Stock (Pre-1996 Orders)

Key:
- EA: East Anglia
- NT: Northern
- SE: South Eastern
- SR: ScotRail
- TL: TSGN
- WM: West Midlands
- XR: Crossrail

**2017**
- **313** Class: 132 vehicles (1976 - 1979)
- **314** Class: 57 vehicles (1979)
- **315** Class: 70 vehicles (1980 - 1981)
- **317** Class: 202 vehicles (1983 - 1986)
- **318** Class: 56 vehicles (1985 - 1987)
- **319** Class: 192 vehicles (1987 - 1988)
- **320** Class: 56 vehicles (1990)
- **321** Class: 120 vehicles (1990 - 1990)

**2018**
- **313** Class: 57 vehicles
- **314** Class: 68 vehicles
- **315** Class: 68 vehicles
- **317** Class: 56 vehicles
- **318** Class: 56 vehicles
- **319** Class: 192 vehicles
- **320** Class: 120 vehicles
- **321** Class: 120 vehicles

**2019**
- **313** Class: 420 vehicles
- **314** Class: 320 vehicles
- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2020**
- **313** Class: 320 vehicles
- **314** Class: 320 vehicles
- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2021**
- **313** Class: 320 vehicles
- **314** Class: 320 vehicles
- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2022**
- **313** Class: 320 vehicles
- **314** Class: 320 vehicles
- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2023**
- **313** Class: 320 vehicles
- **314** Class: 320 vehicles
- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2024**
- **313** Class: 320 vehicles
- **314** Class: 320 vehicles
- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2025**
- **313** Class: 320 vehicles
- **314** Class: 320 vehicles
- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2026**
- **313** Class: 320 vehicles
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- **315** Class: 320 vehicles
- **317** Class: 320 vehicles
- **318** Class: 320 vehicles
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- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**2027**
- **313** Class: 320 vehicles
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- **319** Class: 320 vehicles
- **320** Class: 320 vehicles
- **321** Class: 320 vehicles

**Phased withdrawal of the fleet from 232 vehicles to zero**
AC EMU Rolling Stock (Pre-1996 Orders)

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<th>SR</th>
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</tbody>
</table>

- **Key**
  - WM: West Midlands
  - GW: Great Western
  - NT: Northern
  - SR: Scot Rail
  - TL: TSGN

- **19XX Indicative build dates**
  - 322: 1990

- **Current Leasing**
  - 76 vehicles
  - 20 vehicles
  - 51 vehicles
  - 40 vehicles
  - 78 vehicles
  - 120 vehicles

- **Total Vehicles:**
  - 322
  - 323
  - 365

- **Total Vehicles:**
  - 76
  - 20
  - 51
  - 40
  - 78
  - 120

High Speed Trains

Class

- Class 390
  - 2017 - 2020
  - 2010 - 2012
- Class 395
  - 2006 - 2009
- Class 800
  - 2014 - onwards

Key

- GW: Great Western
- SE: South Eastern
- WC: West Coast

Current Lease

19XX Indicative build dates
10. Department for Transport – Franchised Operators View
The following charts provide an overview of rolling stock that is currently on each of the franchises let by the Department with an indication of the make-up of their fleets and the years in which they were built.

The information contained within this section is indicative and has been prepared using Franchise Agreements and other material as available to the Secretary of State at the date of this document. As such neither the Secretary of State nor his officials, appointed agents or advisers makes any representation or warranty (express or implied) as to the accuracy or completeness of the information. It does not include Open Access Operators. Sub-leasing arrangements have been simplified in some instances. The Department’s Rolling Stock Team welcome any ideas for future publications, comments or corrections and can be contacted at:

RollingStockPerspective@dft.gov.uk
### Chiltern

<table>
<thead>
<tr>
<th>Class</th>
<th>Quantity</th>
<th>Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 68</td>
<td>6 Locomotives</td>
<td>2014</td>
</tr>
<tr>
<td>Mk. III (inc. DVT)</td>
<td>32 Vehicles</td>
<td>1975–1988</td>
</tr>
<tr>
<td>Class 165</td>
<td>89 Vehicles</td>
<td>1991–1993</td>
</tr>
<tr>
<td>Class 168</td>
<td>85 Vehicles</td>
<td>1998–2006</td>
</tr>
<tr>
<td>Class 172/1</td>
<td>8 Vehicles</td>
<td>2011</td>
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### Cross Country

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<thead>
<tr>
<th>Class</th>
<th>Quantity</th>
<th>Built</th>
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<tbody>
<tr>
<td>Class 43</td>
<td>10 Locomotives</td>
<td>1976–1982</td>
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<tr>
<td>Mk. III</td>
<td>40 Vehicles</td>
<td>1975–1981</td>
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<tr>
<td>Class 170</td>
<td>74 Vehicles</td>
<td>1998–2002</td>
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<tr>
<td>Class 220</td>
<td>136 Vehicles</td>
<td>2000–2001</td>
</tr>
<tr>
<td>Class 221</td>
<td>116 Vehicles</td>
<td>2001–2002</td>
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</table>
### East Anglia

#### Diesel Fleet

<table>
<thead>
<tr>
<th>Class</th>
<th>Quantity</th>
<th>Built</th>
</tr>
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<tbody>
<tr>
<td>Class 153</td>
<td>5 Vehicles</td>
<td>1987–1988</td>
</tr>
<tr>
<td>Class 156</td>
<td>18 Vehicles</td>
<td>1988</td>
</tr>
<tr>
<td>Class 170</td>
<td>32 Vehicles</td>
<td>1999–2002</td>
</tr>
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#### Electric Fleet

<table>
<thead>
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<th>Class</th>
<th>Quantity</th>
<th>Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 90</td>
<td>15 Locomotives</td>
<td>1987–1990</td>
</tr>
<tr>
<td>Mk. III (inc. DVT)</td>
<td>133 Vehicles</td>
<td>1975–1988</td>
</tr>
<tr>
<td>Class 317</td>
<td>232 Vehicles</td>
<td>1980–1987</td>
</tr>
<tr>
<td>Class 321</td>
<td>420 Vehicles</td>
<td>1988–1990</td>
</tr>
<tr>
<td>Class 360</td>
<td>84 Vehicles</td>
<td>2002–2003</td>
</tr>
<tr>
<td>Class 379</td>
<td>120 Vehicles</td>
<td>2010–2011</td>
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### East Midlands

#### Diesel Fleet

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<th>Class</th>
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<th>Built</th>
</tr>
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<tr>
<td>Class 43</td>
<td>28 Locomotives</td>
<td>1976–1982</td>
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<tr>
<td>Class 153</td>
<td>21 Vehicles</td>
<td>1987–1988</td>
</tr>
<tr>
<td>Class 156</td>
<td>30 Vehicles</td>
<td>1987–1989</td>
</tr>
<tr>
<td>Class 158</td>
<td>52 Vehicles</td>
<td>1990–1992</td>
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<tr>
<td>Class 222</td>
<td>143 Vehicles</td>
<td>2003–2005</td>
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### Essex Thameside

<table>
<thead>
<tr>
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<th>Quantity</th>
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<tbody>
<tr>
<td>Class 357</td>
<td>296 Vehicles</td>
<td>1999–2002</td>
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<td>Class 387</td>
<td>24 Vehicles</td>
<td>2014–2016</td>
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### Great Western

<table>
<thead>
<tr>
<th>Class</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Class 43</td>
<td>117 Locomotives</td>
<td>1975–1982</td>
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<tr>
<td>Class 57</td>
<td>4 Locomotives</td>
<td>1964–1965*</td>
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<tr>
<td>Mk. III Sleeper</td>
<td>20 Vehicles</td>
<td>1982–1984</td>
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<tr>
<td>Class 143</td>
<td>16 Vehicles</td>
<td>1985–1986</td>
</tr>
<tr>
<td>Class 150</td>
<td>50 Vehicles</td>
<td>1984–1987</td>
</tr>
<tr>
<td>Class 153</td>
<td>14 Vehicles</td>
<td>1987–1988</td>
</tr>
<tr>
<td>Class 158</td>
<td>43 Vehicles</td>
<td>1990–1991</td>
</tr>
<tr>
<td>Class 165</td>
<td>88 Vehicles</td>
<td>1992–1993</td>
</tr>
<tr>
<td>Class 166</td>
<td>63 Vehicles</td>
<td>1993</td>
</tr>
<tr>
<td>Class 387</td>
<td>180 Vehicles</td>
<td>2016–2017</td>
</tr>
</tbody>
</table>

* Built as class 47 locomotives, rebuilt as Class 57 in 2004.
**InterCity East Coast**

**Diesel Fleet**

**Electric Fleet**

**InterCity West Coast**

**Diesel Fleet**
- Class 221: 100 Vehicles (2001–2002)

**Electric Fleet**
### Northern Diesel Fleet

<table>
<thead>
<tr>
<th>Class</th>
<th>Quantity</th>
<th>Built</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 142</td>
<td>158 Vehicles</td>
<td>1985–1987</td>
</tr>
<tr>
<td>Class 144</td>
<td>56 Vehicles</td>
<td>1986–1988</td>
</tr>
<tr>
<td>Class 150</td>
<td>152 Vehicles</td>
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<tr>
<td>Class 153</td>
<td>18 Vehicles</td>
<td>1987–1988</td>
</tr>
<tr>
<td>Class 155</td>
<td>14 Vehicles</td>
<td>1988</td>
</tr>
<tr>
<td>Class 156</td>
<td>84 Vehicles</td>
<td>1988–1989</td>
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<td>Class 158</td>
<td>102 Vehicles</td>
<td>1990–1992</td>
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<td>Class 170</td>
<td>12 Vehicles</td>
<td>2004–2005</td>
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### Northern Electric Fleet

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<thead>
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<th>Quantity</th>
<th>Built</th>
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<td>Class 321</td>
<td>12 Vehicles</td>
<td>1991</td>
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<tr>
<td>Class 322</td>
<td>20 Vehicles</td>
<td>1990</td>
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<td>Class 323</td>
<td>51 Vehicles</td>
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<td>Class 333</td>
<td>64 Vehicles</td>
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### South Eastern DC/DV Electric Fleet

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<td>Class 376</td>
<td>180 Vehicles</td>
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<tr>
<td>Class 395</td>
<td>174 Vehicles</td>
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<td>Class 466</td>
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<td>Class 377*</td>
<td>100 Vehicles</td>
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* Sub-hire from TSGN franchisee
South Western

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<th>Diesel Fleet</th>
<th>Class</th>
<th>Quantity</th>
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<tbody>
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<th>Built</th>
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<tbody>
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<td>Class 444</td>
<td></td>
<td>225 Vehicles</td>
<td>2003–2005</td>
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<td>Class 450</td>
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<td>2002–2006</td>
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<tr>
<td>Class 455</td>
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<td>364 Vehicles</td>
<td>1980–1985</td>
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<td>Class 456</td>
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<td>48 Vehicles</td>
<td>1990–1991</td>
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<td>Class 458/5</td>
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<td>Class 483</td>
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<td>1938</td>
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<td>Class 707</td>
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<td>150 Vehicles</td>
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<td>Class 442</td>
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<td>90 Vehicles</td>
<td>1988</td>
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Thameslink, Southern & Great Northern

<table>
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<th>Diesel Fleet</th>
<th>Class</th>
<th>Quantity</th>
<th>Built</th>
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<tbody>
<tr>
<td>Class 171</td>
<td></td>
<td>56 Vehicles*</td>
<td>2003–2005</td>
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<table>
<thead>
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<th>Electric Fleet</th>
<th>Class</th>
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<tbody>
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<td>Class 313</td>
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<td>1976–1979</td>
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<td>Class 365</td>
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<td>120 Vehicles</td>
<td>1994–1995</td>
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<td>Class 377</td>
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<td>862 Vehicles*</td>
<td>2001–2014</td>
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<td>Class 387</td>
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<td>224 Vehicles</td>
<td>2014–2016</td>
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<tr>
<td>Class 455</td>
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<td>184 Vehicles</td>
<td>1982–1984</td>
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<td>Class 700</td>
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<td>1140 Vehicles</td>
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* 15 Class 170 vehicles on sublease to the Scotrail franchise operator

* Excludes 100 vehicles on sublease South Eastern franchise operator
TransPennine Express

Diesel Fleet

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Electric Fleet

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<thead>
<tr>
<th>Class</th>
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<tbody>
<tr>
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<td>40 Vehicles</td>
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Wales & Borders

Diesel Fleet

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<td>1985–1987</td>
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<tr>
<td>Class 143</td>
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<td>1985–1987</td>
</tr>
<tr>
<td>Class 150</td>
<td>72 Vehicles</td>
<td>1986–1988</td>
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<tr>
<td>Class 153</td>
<td>8 Vehicles</td>
<td>1987–1988</td>
</tr>
<tr>
<td>Class 158</td>
<td>48 Vehicles</td>
<td>1989–1992</td>
</tr>
<tr>
<td>Class 175</td>
<td>70 Vehicles</td>
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West Midlands

### Diesel Fleet

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<td>1987–1988</td>
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<tr>
<td>Class 170</td>
<td>85 Vehicles</td>
<td>2000</td>
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<tr>
<td>Class 172</td>
<td>85 Vehicles</td>
<td>2010–2011</td>
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<td>Class 230</td>
<td>6 Vehicles</td>
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### Electric Fleet

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<tbody>
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<tr>
<td>Class 323</td>
<td>78 Vehicles</td>
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<tr>
<td>Class 350</td>
<td>308 Vehicles</td>
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</table>

* Introduced into mainline service.
11. Key Rolling Stock Publications
There are a number of key publications for rolling stock which we have listed here for reference.

**Rolling Stock Strategy Steering Group**

**Long Term Passenger Rolling Stock Strategy for the Rail Industry**
Sixth Edition, March 2018

**Industrial Strategy White Paper**

**Rail Sector Skills Delivery Plan**

**Unlocking Rail Investment – building confidence, reducing costs**

An independent review chaired by Professor Peter Hansford FREng
June 2017

£
The national rail network is essential to many people's daily lives, and to the success of the UK economy. 1.7 billion passengers travelled by rail in this country last year, commuting to work and study, visiting friends and family, and accessing public services and leisure opportunities. The railway also carries essential products and commodities, supporting our manufacturing, construction and energy sectors, and ensuring that shop shelves remain stocked all year round.

Demand for rail has doubled since the mid-1990s and is projected to increase by another 15% by 2024. This presents both challenges and opportunities for the railway. Increasing passenger numbers mean we have some of the most intensively used lines in Europe, putting significant pressure on the infrastructure and leading to overcrowding on the busiest trains. But this growth also gives us the opportunity to modernise the railway fabric, invest in new trains and improve the operation of the network.

The Government's Strategic Vision for Rail, is to offer world-class services supported by outstanding customer care and value for money. To achieve this, we need to innovate. For example, by changing the way the railway is structured, getting track and train to work closely together, and realising the full potential of emerging technologies. By developing the supply chain, we can put the rail industry in a strong position to export its products and skills as Britain looks to a future outside the European Union.

Using data more intelligently, and increasing collaboration between the rail industry and other sectors, will be key to delivering these improvements. It will create opportunities to 1.


July 2017

Connecting People – a strategic vision for rail

Moving British Abroad

November 2017

The Inclusive Transport Strategy: achieving equal access for disabled people

Moving British Abroad

November 2018

The Inclusive Transport Strategy: achieving equal access for disabled people

Moving British Abroad

July 2018
Rail Network Enhancements Pipeline:
A New Approach for Rail Enhancements

March 2018

Moving Britain Ahead