

Decarbonising Transport – Setting the Challenge

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1 Introduction

1.1 About the Rail Delivery Group

The Rail Delivery Group (RDG) brings together the companies that run Britain's railways, including Network Rail and HS2, with the aim of delivering a successful railway that ensures value for money and benefits customers, taxpayers and the wider economy. We also give a voice to freight and passenger operators, as well as delivering important national ticketing, information and reservation services for passengers and staff on behalf of member companies. RDG welcomes the opportunity to submit evidence in response to the publication of *Decarbonising Transport – Setting the Challenge* on behalf of Owning Groups and Freight Operating Companies (FOCs). This submission should be considered as the start of a much-needed conversation on how to achieve the full decarbonisation of rail by 2050, in line with the UK Government's net zero target.

The RDG response covers six areas that will need particular focus in order to decarbonise rail:

- **Set contractual carbon targets:** include carbon and wider environmental targets within future management contracts and give a new National Rail Body responsibility for carbon monitoring and environmental regulation of the rail industry.
- **Reform fares and ticketing:** establish a new, up to date system which incentivises many more passengers to use the network and facilitates seamless travel between other, low carbon forms of public transport.
- **Level the transport tax playing field:** ensure transport taxation and charging regimes reflect the environmental impact of each transport mode in a consistent way.
- **Invest in zero carbon infrastructure:** develop a joined-up approach to investment and infrastructure decisions that creates certainty and enables the railway to decarbonise in a cost and time effective way, including through a rolling programme of electrification.
- **Support rail freight growth:** establish a framework that incentivises growth in the rail freight sector to avail of its environmental benefits and support further investment into traction solutions.
- **Create sustainable stations:** develop zero carbon, integrated transport hubs to promote the use of active travel and low-carbon modes for the customer's onward journey.

Underpinning all of the above remains the importance of running a customer-focussed, punctual and reliable railway. Getting these "basics" right will remain essential if the railway is to remain an attractive mode of transport and support modal shift.

1.2 Understanding the challenge

RDG is supportive of the Government's commitment to achieve net-zero carbon emissions across UK industry by 2050. While as a sector transport has become more energy efficient, since 2016, transport has been the single-largest contributor to UK Greenhouse Gas (GHG) emissions. Even though 2050 is a generation away, infrastructure and policy decisions made now will directly affect the railway's ability to meet this target in a cost-effective way. Industry should not therefore place all its focus on 2050 but instead adopt a step-by-step approach to smoothen the transition to 2050, which will deliver real carbon reductions to the UK over the next 30 years.

The railway remains an environmentally friendly way to transport people and goods. The low friction between the steel wheels of a train and the steel rails of a track mean that the railway is inherently energy efficient compared to other transport modes.

UK rail accounts for around 2% of total transport emissions and about 0.6% of the UK total. Rail carbon emissions per passenger km have been cut by nearly 30% since 2005 - with rail's strong environmental performance helping to reduce UK carbon emissions by up to 7.7 million tonnes every year. With 8,000 new, greener carriages being introduced - this number will keep increasing.

The most recent 2018-19 rail emission statistics from the Office of Rail and Road show positive trends for both passenger and freight. Rail has increased its electricity consumption (as a result of more electric

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services and increased use of bi-mode trains), but reduced its diesel consumption. As electricity is increasingly being generated from renewable energy sources, rail's absolute carbon emission performance reduced significantly compared to 2017-18 by over 10% for passenger and by over 6% for freight.

The majority of rail's carbon footprint comes from the use of diesel traction – though to achieve full decarbonisation industry must consider all its operations, rather than focus solely on rolling stock.

Despite rail's comparative environmental advantage, the industry is not resting on its laurels. Whether it be research and development into big ticket items such as alternative traction sources for rolling stock, or exploring how to generate electricity from renewable sources, the railway is actively identifying innovative solutions to reduce its carbon footprint. There is a wealth of private sector experience and expertise across RDG's membership and it is important that these experts are closely involved in the stakeholder engagement and policy development phases of *Setting the Challenge* as the pathway to decarbonisation is paved.

With the right framework and incentives in place, rail can also credibly commit to meeting the Government's economy-wide net-zero carbon target by 2050, if not before.

1.3 COVID-19 Impact

During this time of national crisis, the rail industry has been working collaboratively to make sure that key workers can get to their workplaces safely, and that essential goods are transported across the country.

The impact of COVID-19 on the rail industry has been unprecedented with passenger footfall reducing by over 90%¹ and a decline in rail freight volumes of almost 50%. The long-term change to passenger numbers is uncertain, which is why RDG is conducting studies to understand how the nation's travel will be affected by the pandemic. However, there is no doubt that the way people work and consume leisure will change for the long-term and rail must be flexible to this. In addition, as economic activity begins to recommence, and more people return to work, the rail industry will face the challenge of restoring passenger confidence in using public transport rather than using their private car. It is vital the rail industry and the Department work together to encourage passengers to travel by train. As outlined in *Setting the Challenge*, cars still account for 55% of GHG emissions in the transport sector and an overreliance on automobiles would result in increased carbon output and congestion on the road network.

If anything, the pandemic has heightened the need for rail and fares reform. There remains uncertainty over what follows Emergency Measures Agreements (EMAs) which have temporarily transferred cost and revenue risk to the Government from operators to ensure the continuation of train services for key workers in return for a small management fee, while FOCs are facing significant commercial challenges to ensure the long-term future of their businesses.

As part of the economic recovery, the Government is at a crossroads on its future transport policy. RDG believes this is an opportunity for the Government to reinforce its commitment to decarbonising the UK economy by 2050. This can be done through the promotion of a green restart, which will see modes that can make a significant contribution to the net-zero target over the course of the next generation supported. For too long environmental and transport policy have been separated and now is the time to synthesise them to maximise their impact.

It is important that this is not just about rail, but about every customer's end-to-end journey. There are now more people walking and cycling², and it is imperative the environmental and public health benefits of this are maintained through the better integration of active travel facilities with the rail network.

Throughout the rest of this document we have identified a series of recommendations which we believe would support the decarbonisation of the transport sector by 2050.

2 Paving the pathway to a net-zero carbon 2050

In February 2018, the then Rail Minister, Jo Johnson, issued a challenge to the rail industry to remove all diesel-only trains by 2040 and to develop a decarbonisation strategy. In response, the industry set up the

¹ <https://www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic>

² *ibid*

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Rail Industry Decarbonisation Task Force which concluded that it was broadly feasible to remove diesel-only trains or to decarbonise using a combination of electrification, bi-mode, hydrogen and fuel cell technologies. But technical challenges remain, particularly for freight. The Task Force made five strategic recommendations:

- **Targets** – the rail industry, including Government, should support the target of net zero carbon by 2050.
- **Policy** – the whole industry has responsibility to contribute to net zero carbon in a cost-effective manner. To facilitate this, the Government should set out clear, consistent and enabling policies.
- **Industry structure** – from the Williams Review we should have an industry structure which effectively enables, incentivises, monitors and regulates the route to net zero carbon.
- **Delivery plan** – each key constituent of the industry e.g. Network Rail, Train Operating Companies (TOCs), FOCs, Rolling Stock Leasing Companies (ROSCOs), etc, should publish a long-term plan to achieve interim and long-term targets towards rail decarbonisation in support of net zero carbon by 2050. These will be reviewed, monitored and regulated by a central body.
- **Research and Development** – the industry should set out clear 5-year periodic research plans to reduce technical and implementation uncertainties.

Network Rail is building on the Task Force's recommendations through its Traction Decarbonisation Network Strategy (TDNS). This is overseen by a programme board chaired by Network Rail with representatives from the wider industry including from RDG. Later this summer the study will recommend which traction technologies – electrification, battery or hydrogen fuel cell – should be used on which parts of the network supported by high level economic analysis. This will be followed later in the year by a more detailed programme business case.

RDG are supportive of the Decarbonisation Task Force report published in July 2019 as well as TDNS. Decarbonisation of the railway is not so much a technological issue, as most of the science already exists or is being developed and trialled and will be ready far in advance of 2050. The largest challenge that the railway faces is how to implement the recommendations of the Task Force and TDNS in the most efficient and effective way.

To achieve the full decarbonisation of the railway, **clear and consistent long-term environmental policy** is essential so that industry can develop and implement a strategy to reduce carbon emissions in line with Governmental targets. There must be aligned incentives that establish clear accountability and induce behavioural change in the transport sector so that the risks and rewards of working towards carbon net-zero are shared collectively. There is no doubt that to achieve the decarbonisation of the railway there will need to be significant investment across both the public and private sector, to enable the necessary investments to be completed by 2050, it is imperative that this process starts now.

Modal shift towards low or no-carbon modes can also deliver immediate carbon benefits and must be actively encouraged. The railway can help to influence customer behaviour by providing services and tickets that meet the needs of the modern-day consumer. Also, a customer's journey must be viewed holistically with consideration to every stage of their trip; this can be supported by improved integration between the railway and different modes, including through additional policy support and investment in active travel.

2.1 Set contractual carbon targets

When the Williams Rail Review was announced in September 2018, its driving forces were punctuality, customer service, accountability and maintaining value for money for the taxpayer and customer alike. With the green agenda now firmly at the top of the Government's priorities it is important that any structural or market reform, which sets the railway up for the next generation, features strong incentives to decarbonise.

This should include environmental targets and commitments within future management contracts.

These should include carbon targets and commitments but extend to other environmental impacts such as air quality, waste and water. Such targets should be outcome-based without a tightly specified process in order for the most cost-effective and innovative solutions to be adopted. Within an increasingly devolved transport landscape nations and regions are already developing their own environmental strategies and targets. For example, Transport Scotland have already outlined their ambition for Scotland to be net-zero by 2045, if not sooner. Where possible, **targets should be consistent at a GB-wide level** to make that transition to net-zero as efficient and seamless as possible.

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Should the Williams team recommend the implementation of a **National Rail Body, it should take responsibility for carbon monitoring and environmental regulation of the rail industry**. This would involve collecting emissions data to better understand operator emissions in order to identify and prioritise abatement opportunities. Until now, the quality of environmental data has varied significantly. If targets are to be included within management contracts, and to inform interim targets between now and 2050 it is essential that there is an industry agreed definition and process for collecting emissions data.

In the past, the limited lifespan of franchise contracts, which typically run for five to seven years, has stymied operators' ability to make long-term investments into sustainable and decarbonisation initiatives. This is because the time taken to receive a return on major investments often exceeds the length of the franchise. With the 2050 target now enshrined into UK law this inefficiency must be addressed urgently by the creation of a **Residual Value Mechanism (RVM) for sustainability and environmental initiatives** which enables operators to pass through the cost, and benefits, of their investments as contracts change hands. The existing RVM has several constraints which make it unsuitable for green initiatives. Firstly, to qualify for the RVM to be applied, the useful economic life of any residual value asset must not exceed 15 years – whereas sustainability and decarbonisation investments can have much longer lifespans. Also, the business case test can be too focussed on the financial benefits, rather than the wider economic benefits that environmental investments can provide.

2.2 Reform fares and ticketing

The current fares structure is complicated and restrictive with existing regulations which make it difficult to offer more flexible fares that meet the needs of the modern-day customer as well as enabling the railway to make best use of the capacity it has to support modal shift and hence reduce carbon emissions. An increasing number of people are self-employed or working flexibly, and it is anticipated that the impact of COVID-19 will accelerate this change in the labour market. The fares system should therefore accommodate this transition. The complexity of the existing fares system which has over 55,000 separate fares can deter customers from using the railway. No matter how frequently people choose to travel, **we need fares reform to establish a system which encourages customers to choose rail when they do**. RDG are currently pushing ahead to develop Flexible 'Flexi' season tickets to support part time workers and more working from home. Commuters will become more price sensitive due to the impact of COVID-19 and the reduced cost of this product will encourage more people to travel by rail and leave their car at home.

This is not a one size fits all approach, and different strategies will be required for different markets and areas. To remain competitive the fares system should reflect the availability of substitutes across different flows and facilitate **greater integration with other modes**. The railway already promotes this through the sale of PlusBus tickets which enable passengers to take the bus to or from stations in most urban areas for a small additional fee, thereby reducing the need to drive or take a taxi. Within a more flexible system this could be expanded upon by the provision of tickets which allow passengers to hire a bike to begin or complete their journey.

There are inefficiencies within the existing structure as a result of regulatory and historically mandated fares that make it difficult for rail to compete with different modes on particular flows. For example the heavily regulated off-peak return fare which is set at an artificially low level and is offset by increasing fares at peak times makes it difficult for the railway to compete with aviation on long-distance routes, despite rail having significant carbon benefits. For instance, a plane journey from London-Edinburgh emits 144kg of carbon per passenger³, whereas the equivalent journey by rail emits 29kg, but the railway has less than 40% market share⁴ on this flow.

Private Operators are experienced in yield management via price signalling but are unable to leverage this fully due to the current regulatory structure. A reformed fares structure would enable operators to be more creative with the fares they offer to make best use of available capacity and smooth demand. For example, historically, trains on main commuter routes will tend to be heavily used in the morning and evening peaks but with significant spare capacity at other times. Making better use of available capacity through fares and ticketing reform would enable many more people to travel by rail with minimal additional

³ <https://energysavingtrust.org.uk/blog/planes-trains-and-automobiles-%E2%80%93-carbon-emissions-compared-between-london-and-edinburgh>

⁴ <https://www.globalrailwayreview.com/article/97974/Iner-railway-environment-communities-customers/>

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carbon emissions. Analysis conducted by KPMG for RDG indicates that fares reform could encourage an extra 300 million people to travel on currently empty seats on long-distance and regional trains over a 10-year period, this change would prevent up to 1.2 million tonnes of CO₂ emissions. Annually this would equate to 61,000 cars of Britain's roads, helping to tackle decongestion⁵.

In addition, the increased take-up of **smart ticketing will reduce the need for paper tickets** as customers aim for more sustainable options such as mobile ticketing or smart cards - though this will require wider acceptance across different routes and journeys. This can be leveraged by fares reform to optimise the additional customer benefits of smart ticketing, particularly personalising the experience and ensuring the best fares for their individual needs are charged. This in turn makes rail a more attractive proposition over less carbon-efficient transport. RDG is working closely with members and customers to expedite this process by co-ordinating initiatives such as Smart Week.

2.3 Level the transport tax playing field

Taxation and charging should be set at a level which internalises more of the environmental impacts of transport usage to support the transition to a net-zero economy.

Despite its environmental credentials, UK rail largely competes for custom with more carbon intensive modes such as the private car, domestic aviation and for freight, HGVs. To avail of its carbon benefits, the Government and industry must work together to encourage more transport users to make their journey using the railway. This should include a review of the existing taxation and charging regimes used in the transport sector. Road fuel duty has remained unchanged for nine consecutive budgets since 2011, and kerosene used to fuel planes remains exempt from tax. It is well-established that road and aviation users cover less of their external environmental costs⁶ (i.e. when infrastructure costs are excluded) and society is subsequently paying for the legacy of their consumption. Cross-elasticity demand analysis⁷ indicates that long-distance leisure customers are most price sensitive and if the environmental impact of their journey was reflected within the cost of their journey rail patronage would increase.

There is an argument that the rail industry is being penalised when replacing diesel trains with cleaner electric trains with yearly increases in Government levies which make up a significant amount of the overall electricity cost. The total electricity rate for 2019-20 is expected to be just over 10p/kWh, with levies now making up around 40% of the total cost compared to 12% 10 years ago. The increase in levies charges has more than doubled over the last four years.

⁵ https://www.bigplanbigchanges.co.uk/files/docs/Fares_reform_proposals_A4_WEB_DPS.pdf

⁶ <https://ec.europa.eu/transport/sites/transport/files/2018-year-multimodality-external-costs-note.pdf>

⁷ <https://greenerjourneys.com/wp-content/uploads/2018/06/THE-UNINTENDED-CONSEQUENCES-OF-FREEZING-FUEL-DUTY-JUNE-2018.pdf>

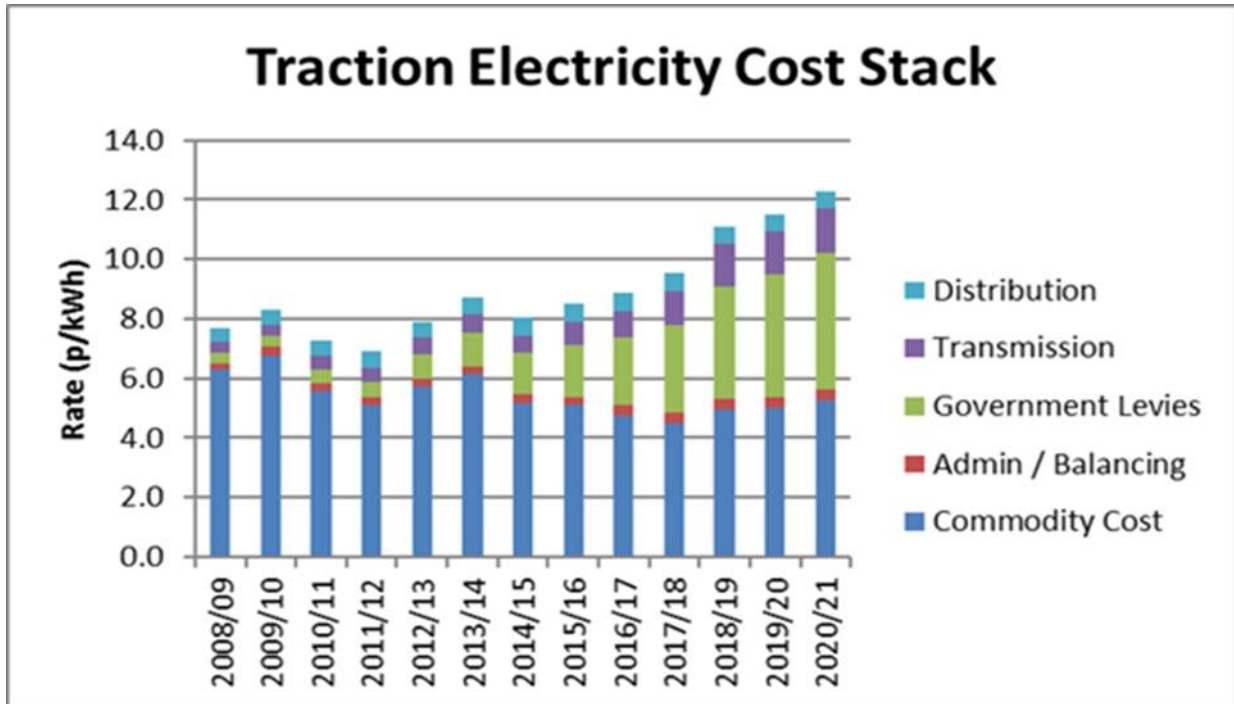


Figure 1

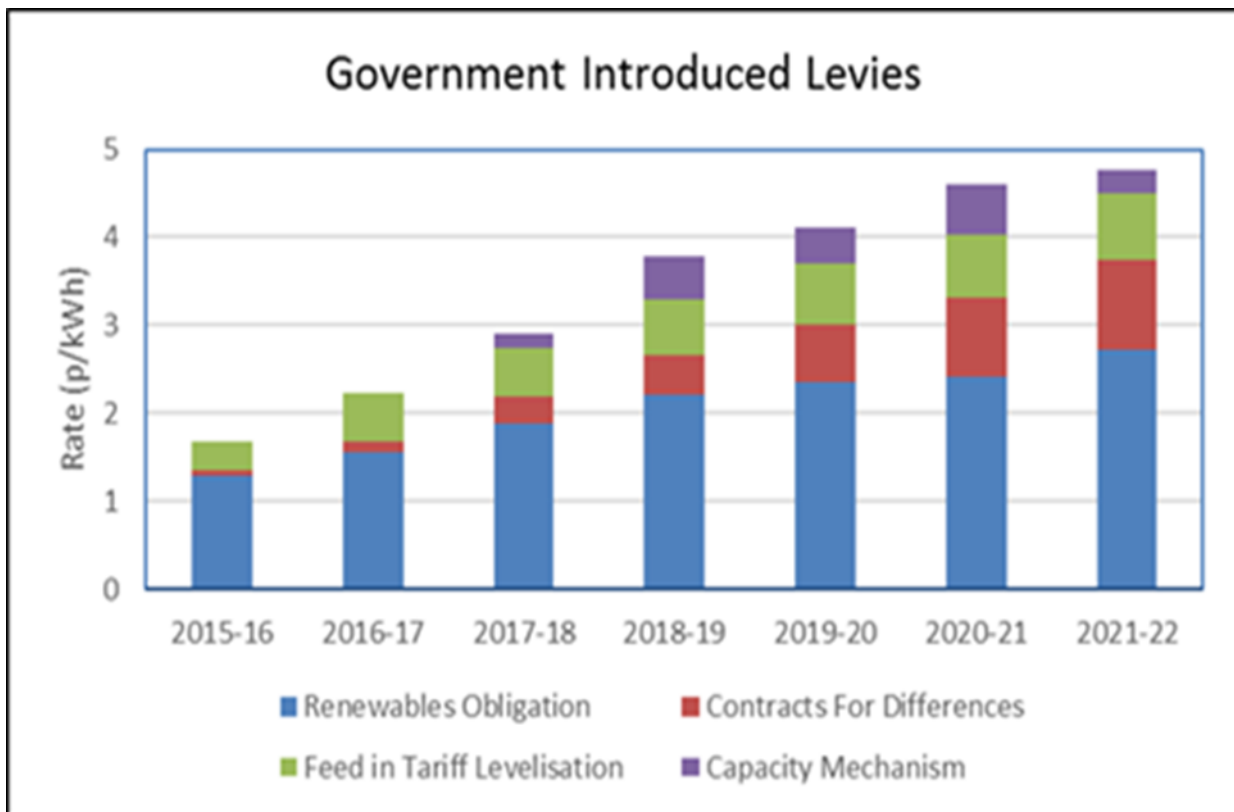


Figure 2

There is an increasing number of low-carbon initiatives (e.g. OLEV) to support decarbonisation. However, rail falls out of scope for many of these initiatives and Government should consider **how the scope of low-carbon initiatives, incentives and research and development programmes can be expanded to support greater rail involvement**. One reason for this is that the timescales for these schemes are often too narrow with a focus on quick wins rather than the largest carbon reductions.

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2.4 Invest in zero carbon infrastructure

There needs to be a **joined-up, whole system approach** to the decision-making and prioritisation process for infrastructure decisions to support the decarbonisation of the rail industry. There is a strong track record of collaboration in the private sector to support the roll-out of low carbon traction technology and Government should use this expertise to inform the pathway to decarbonisation. This is particularly important where decisions directly impact the procurement of rolling stock in an industry which often invests in assets with lifespans which will exceed beyond the Government’s 2050 target.

That said, operators are also highly skilled at improving energy efficiency within their existing fleet through the development of systems which improve braking techniques thus reducing wasted traction energy. This collaborative approach should involve the ROSCOs and rolling stock manufacturers as they make significant investments into research and development to design the next generation of rolling stock with enhanced environmental credentials. Increased operator involvement would also ensure that infrastructure enhancements take place in a way which minimises the impact to passenger and freight services.

The Rail Technical Strategy (RTS), which is currently being refreshed with an expectation of publication in September 2020, will provide a focus for rail industry research, development and innovation activity. The RTS will set out medium term (2025) and longer term (2040) technical visions for the railway and intermediate steps required to deliver these. One of the primary RTS themes will be “low emissions” including consideration of: cheaper and less disruptive electrification; zero carbon self-powered vehicles; low carbon freight and increased energy efficiency.

Operators are heavily engaged and supportive of the direction of travel of Network Rail’s TDNS. On the majority of routes across the network, **electrification will be the most viable solution**: it is a tried and tested approach that works and also provides wider environmental benefits through reduced noise and air pollution and additional customer benefits through reduced journey times, better performance and reliability. There will, of course, be a role for battery and hydrogen traction on more lightly used shorter-distance routes where the business case for electrification cannot be made. Electrification is often regarded as the expensive solution. However, it remains the only feasible low carbon option for higher speed, long-distance and freight services. The most cost- and time-effective way to deliver electrification projects is through a **rolling programme of electrification** and the UK can learn from successful international schemes such as those in Germany and Switzerland. RDG support the TDNS approach to a strategic programme business case to assess the cost and benefits of various electrification schemes.

The publication of the TDNS national recommendations provides the Government with an opportunity to reinforce its commitment to decarbonisation by announcing a series of infill electrification schemes. Investments in infrastructure would also induce welcome activity in the construction sector to kickstart the UK economy as it looks to rebuild from COVID-19.

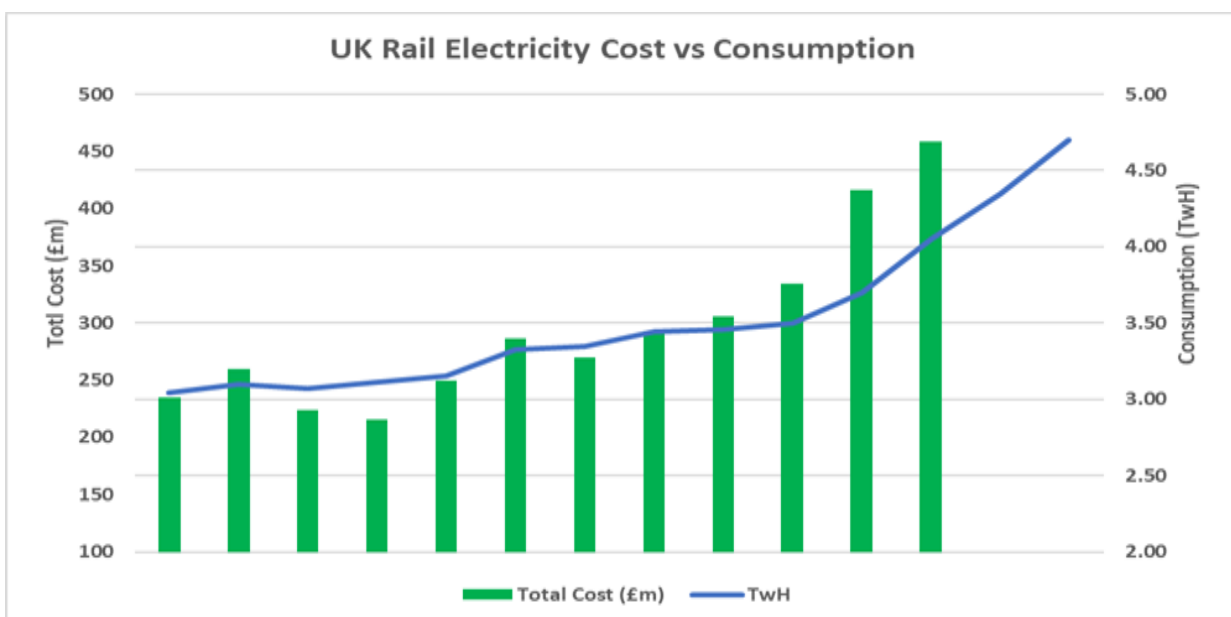


Figure 3

The rail industry also has a responsibility to make sure that the energy it uses for traction electricity comes from renewable sources and it is not just outsourcing the problem. There will also be an energy security challenge to make sure that there is a consistent and sufficient supply of power within the National Grid to meet rail's increased demand.

UK Rail is the highest energy consumer across the UK, with the industry consuming just over 4 Terawatt-hour (TWh) in 2019/2020. For scale 1 TWh is 1 billion kWh, which would power 250,000 homes for a year. Figure 3 shows how UK Rail's energy consumption and costs has grown over the last 10 years and will continue to grow as cleaner Electric and Bio-mode trains enter service replacing older diesel trains.

RDG convene TOCs through the Electric Current for Traction (EC4T) Scheme Council, which was founded to improve how operators procure electricity for traction in order to reduce industry costs against a volatile market and to improve industry forecasts of energy and cost. The Council has recently decided to focus on the potential procurement of energy through Virtual Power Purchase Agreements (VPPAs). A VPPA enables a company to purchase power at an agreed rate from a renewable source (e.g. wind or solar) over a predetermined number of years. This will result in a significant reduction in CO₂ emissions and provide longer term financial savings and cost assurance to operators. To bring this forward, EC4T has agreed to develop a Renewable Electricity strategy for traction consumption which will provide a roadmap towards 100% renewable sources by an agreed target year. For this initiative to be a success Departmental engagement and support will be sought, especially as VPPAs typically have lifespans of between 10-15 years which exceeds the length of franchise contracts. Government can support the VPPA initiative by ensuring that there is a contractual process to enable the transfer of the agreements as management contracts change hands.

2.5 Support rail freight growth

With every freight train producing 76% less carbon per tonne⁸ than the equivalent transport by road, rail freight already plays a leading role in a low-carbon logistics sector today. As economic activity begins to return, rail freight can support a green restart of the UK economy by delivering significant and immediate carbon reductions via growth and modal shift. This is in line with existing Government transport policy to encourage modal shift towards rail which is supported by the Mode Shift Revenue Support (MSRS) scheme and the Freight Facilities Grant (FFG) in Scotland and Wales. Customers in the logistics sector are often highly price-sensitive and rail freight is a high fixed cost industry so initiatives like **MSRS and FFG play an important role in attracting new traffic to rail**. Any opportunity to expand the schemes would help to further reduce emissions and accelerate the decarbonisation of the freight sector. A growing rail freight sector would also help to decongest some of the UK's busiest roads as each rail freight journey can carry the equivalent of up to 76 HGVs.

The rail freight sector is working hard to identify ways to reduce its carbon output further including by adopting stop-start technologies which improve energy efficiency. Due to the temporary reduction in passenger services, FOCs have been able to make operational gains by **running longer trains using more direct paths** and this has resulted in further carbon reductions and decongestion. Due consideration should, therefore, be given to how these services can be retained through their integration into the timetable.

While these do offer incremental benefits the full decarbonisation of rail freight does present a challenge with the significant power demands of freight locomotives making alternative traction sources such as battery and hydrogen largely unviable for rail freight. With the output of TDNS expected later this year, FOCs have written to the Rail Minister listing a number of infill electrification schemes which, if delivered, would enable a significant proportion of rail freight journeys to transfer from diesel to electric traction, thus resulting in lower carbon emissions. As the current fleet approaches the end of its asset lifespan, FOCs will soon face major decisions relating to the procurement of new rolling stock. This will require FOCs to invest considerable amounts of capital in Research and Development to design, develop and ultimately procure a locomotive which retains *go anywhere* capability. To make such investments and manage risk, while in a period of commercial recovery resulting from the impact of COVID-19, FOCs would welcome greater certainty on future access arrangements and infrastructure decisions.

⁸ https://www.raildeliverygroup.com/files/Publications/2018-06_rail_freight_working_for_britain.pdf

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2.6 Create sustainable stations

Environmental policy at stations should be bold and the ambition should be to **significantly reduce carbon emissions at UK stations in advance of the Government’s 2050 target**. This is because most of the technology required to create sustainable stations already exists, and the focus should instead be to increase the uptake of these initiatives and establish clear accountability. Where possible, commitments to create sustainable stations should be mandated within management contracts and this should also include the construction and enhancement phase to ensure sustainable materials are used. New station proposals should be assessed on their carbon output. To support this there should be **a policy requiring all new builds to be zero-carbon** with ultra-low environmental impact.

It can be unclear who the custodian of a station is and therefore who is responsible for improving sustainability and reducing emissions at stations. Is it the tenant (i.e. the TOC), is it the landlord (i.e. Network Rail) or is it a combination of both? To enable any real change, the answer to this question must first be clarified. If, indeed, it is the TOC, there must be a mechanism to pass through the cost of the investment as management contracts are transferred.

Stations also have an important role as transport interchanges. Moving forward it is important that station infrastructure and timetabling is integrated with other travel modes, particularly those with low or zero carbon emissions such as walking, cycling or bus to minimise the customer’s carbon footprint through their end-to-end journey. This transition would reflect the national reduction in car ownership and the growing demand for mobility as a service (MaaS), which could be enabled by fares reform.

When customers disembark a train, they should receive clear and accessible information about how they can continue their journey without the use of a private car, by providing maps illustrating walking distances to other locations, and signposting customers to bus/tram stops. Where possible, public transport timetabling should be joined-up to make sure that customers do not have to wait substantial periods of time for services to arrive.

The RDG Station Strategy Group has responded to a recent consultation from OLEV on the introduction of Electric Vehicle (EV) charging points at stations. There are now well over 100 stations⁹ on the UK rail network that have EV charging facilities, and this is a figure which is growing rapidly to support commuters making the switch away from fuel-powered cars to EVs. To support the wider roll-out of charging points at stations, targets should be specified within future management contracts. This would also help to clarify the size and type of station that industry should focus the wider roll-out on.

With more and more people walking and cycling as a result of the pandemic, RDG welcomes the Department for Transport’s announcement to invest £2 billion in new infrastructure which will make it safer and more appealing to travel by foot or bike instead of by car resulting in significant carbon benefits. It is recognised that active travel modes are often constrained by time and distance, so it is important that rail services and infrastructure enable further integration. The rail industry wants to work with the Government, local authorities, customers and transport providers to ensure that stations support the seamless transfer of low-carbon transport modes. To support this, cycle storage facilities are increasingly common at stations to enable more people to cycle from their home and leave their bike at the station to make the next leg of their journey by train. TOCs also provide guidance on when and how passengers can take their bike onboard as part of their journey, though this does need to be managed carefully due to its impact on capacity especially during peak hours. There are examples of new rolling stock whose carriages have been built to include designated bike storage compartments to further this integration on routes which are popular with cyclists, operators¹⁰ are also working to repurpose carriages specifically to store bikes.

3. Case Studies

3.1 Blackfriars station

The rebuild of Blackfriars station, which was designed as part of the Thameslink Programme, demonstrates the important role that operators can play in the delivery of sustainable stations. GTR used the geography of the station to great effect, utilising the River Thames to transport 22000 tonnes materials to and from the site as the station was developed, resulting in lower congestion and carbon emissions.

⁹ <https://www.zap-map.com/live/>

¹⁰ <https://www.bbc.co.uk/news/uk-scotland-highlands-islands-50168117>

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The station was built to accommodate over 4,000 solar panels which provides over 50% of the station's energy and reduced the stations carbon emissions by over 500 tonnes each year. Rainwater collected at the station is harvested and used in the station's public toilets and Blackfriars was also built to maximise natural light reducing the need for electric lighting.

More recently, GTR have maintained their commitment to sustainability at stations by rolling out the installation of water fountains across their station portfolio, upgrading platform lighting to LEDs which are 80% more efficient, and building 50 EV charging points.

3.2 Supporting cycling

The UK's largest cycle hub, CyclePoint, opened in 2016 at Cambridge railway station. Able to accommodate almost 3,000 bikes, CyclePoint provides the safe and secure storage of bicycles in addition to offering maintenance and hire facilities and a cycle shop. Abellio and Network Rail worked closely with the developers and contractors to design and build the site to ensure that it met rail customers' needs. As the facility is free it actively encourages users to travel to the station for their onward commute by bike, rather than using the car or bus, and is complemented by well-developed cycle infrastructure throughout the city.

3.3 Rolling stock examples

- Class 700s used by GTR are recycling 15.8GWh of energy through regenerative braking which is being returned into the network to power additional services. This makes the operation significantly more energy efficient and thereby reduces rail's energy requirements. This denotes a decreased energy demand of over 50% on their previous rolling stock and is due to new onboard systems and regenerative braking which reduces wasted energy owing to friction.
- Chiltern are working with Angel trains and Magtec to convert Class 165 trains (which are normally diesel powered) into a low-emission hybrid drive unit. The trains are currently awaiting range extending engines and traction batteries before going out for testing and then ultimately their introduction into services.
- In 2017, energy efficient lighting was installed on the Pendolino fleet to support the West Coast franchise's commitment to making annual reductions on its carbon emissions by 2.5%. The new lighting was not only more energy efficient, but also boasted longer lifespans resulting in lower waste and lower maintenance costs.

4. Summary

As industry looks to the future, there is both an opportunity and a cross-industry appetite to do things differently. The process of national economic recovery must be used to reinforce the Government's commitment to decarbonise UK industry by 2050 through policies and investments that symbolise a green restart.

To expedite environmental improvements on the railway there must be a market structure which creates aligned incentives and induces behavioural change. It is imperative that decarbonisation plays a central role in the upcoming period of reform. Post-EMA contracts should include strong incentives and targets to decarbonise the railway thereby creating clear accountability and enabling private sector innovation and ingenuity to flourish. This should be complimented by much-needed fares reform which recreates a more flexible system that meets the requirements of the modern-day customer. A reformed fares structure would make the railway a more attractive proposition and therefore enable the railway to compete on a level playing field with other modes.

That said, cross-modal collaboration will be equally vital to achieving decarbonisation. While rail has considerable carbon advantages especially over long-distances and mass transit, industry is committed to working towards a more integrated transport system. This can include better integration with other public transport modes including through ticketing and timetables, and also improved infrastructure which builds upon the recent uptake in active travel such as walking and cycling.

With the output of TDNS due to be published in July, RDG urge the Department for Transport to respond positively and promptly to its recommendations by announcing a series of infill electrification schemes, via

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a rolling programme, on strategically important passenger and freight routes. These schemes would reduce the number of rail services using diesel traction, reducing carbon emissions substantially. Operators will continue to work closely with manufacturers and ROSCOs to design and implement new rolling stock using a variety of traction methods, including hydrogen and battery power, to support the transition to a carbon net-zero economy.

Beyond the big-ticket items, operators are committed to reducing their carbon footprint by proactively identifying and adopting new solutions and processes within their operations to deliver incremental environmental improvements. This includes new driver techniques which improve the energy efficiency of trains, promoting the roll-out of smart ticketing across the network and designing sustainable stations which are developed and ran using as little carbon as possible.

RDG and its members welcome the opportunity to provide evidence and input into *Setting the Challenge* and look forward to working closely with the Department as it develops the Transport Decarbonisation Plan.