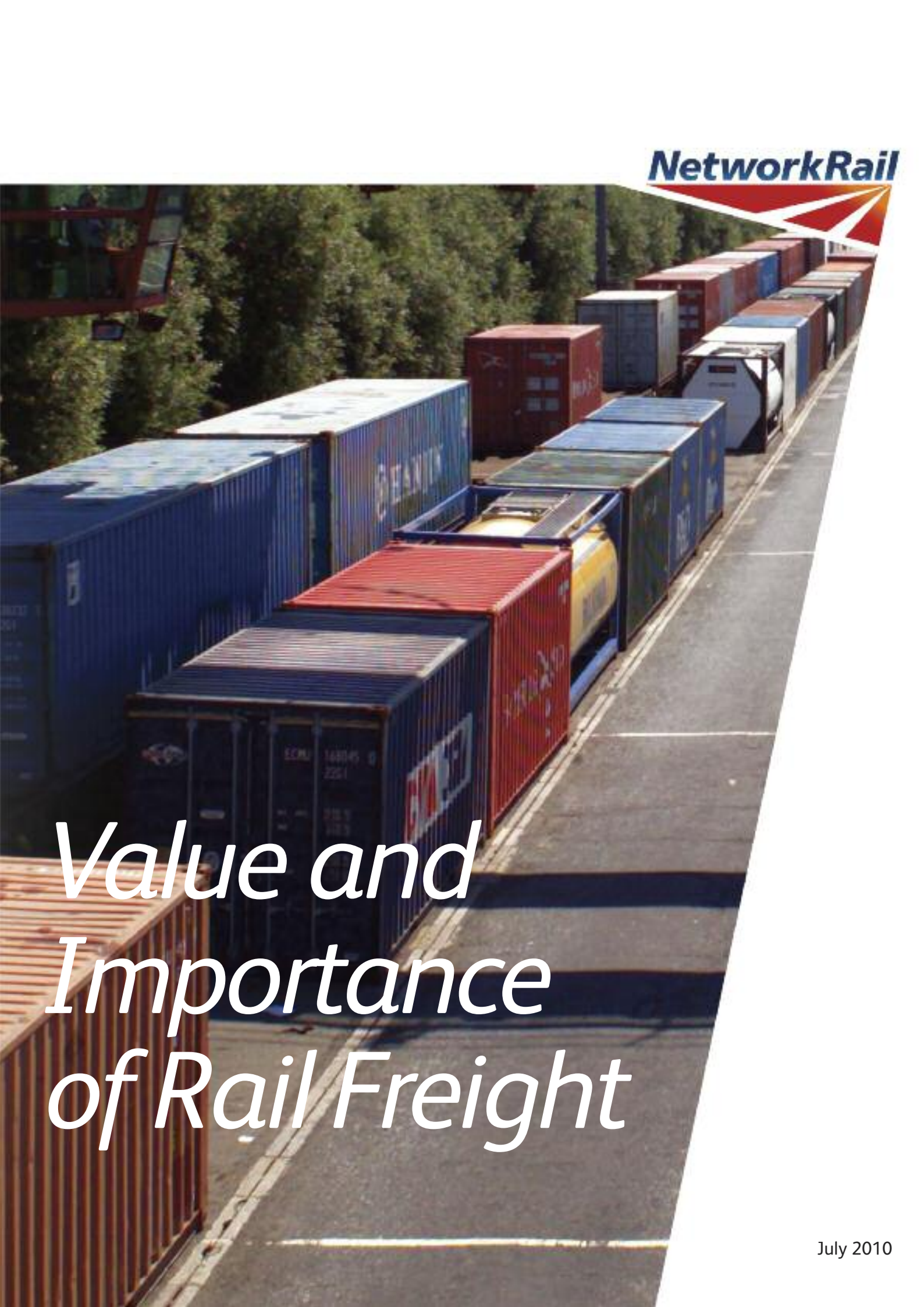

Value and Importance of Rail Freight

July 2010

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Executive Summary

An effective way of transporting goods across the country, rail freight is vital to Britain's economy. Not only does it provide a faster, greener, safer and more efficient way of transporting heavy loads than roads; it is responsible for moving over 100 million tonnes of goods hundreds of miles every year[1], delivering groceries to our supermarkets, coal to our power stations and removing waste from our cities.

[1] National Rail Trends, October 2009, ORR

Rail Freight is an indispensable part of our everyday lives, a success story, but one that has been largely untold until now.

In the bulk goods market – a traditional strength of rail – freight trains often provide the most efficient and economic option for reliable deliveries:

- for power generation, the vast majority of coal burned travels by train supplying over 25% of our electricity[2]. These trains carry the equivalent to 1.6 million lorry journeys per year[3]
- for manufacturing, some major industries such as steel operate efficiently because trains feed raw materials into their production line and then move finished products to their final destination
- strategic fuel depots are supplied with petroleum products on their way to the filling station pumps
- for construction, London alone receives 40% of its raw materials[4] by rail. Major construction schemes meet their timescales and keep costs down because of the reliability of rail
- for waste management, the equivalent of 55,000 lorry movements of domestic rubbish are removed from our major cities by trains every year[5].

In the last decade rail freight has had a renaissance. Demand has grown rapidly. Its market share in a number of bulk sectors, particularly construction materials, and petroleum has increased. Many major infrastructure projects like the construction of Terminal 5 at Heathrow and the Olympic Park in East London benefit from the transport of materials by rail. This not only cuts congestion on busy roads and reduces the likelihood of lorry accidents but more importantly it helps to reduce Britain's carbon footprint. Yet for rail freight the future opportunities are even greater.

Following a decline in primary and manufacturing industries rail freight's traditional role in transporting bulk materials has shifted, revealing its potential to move consumer goods efficiently and serve the burgeoning global trade in these markets. Rail has already made huge inroads into this new market with over 25%[6] of freight containers originating from the Far East shipped into ports like Southampton and Felixstowe being transported onwards by rail. This inter-modal traffic is expected to grow markedly from the expanding large container ports and the Channel Tunnel as well as between regional distribution centres, like Grangemouth in Scotland, and Daventry in Northamptonshire.

Rail has proved that it can compete successfully for retail business in terms of price and service and is already playing a significant role in supplying household names like Tesco and Asda. With track access prices at the lowest they have been since rail privatisation in the mid 1990s, rail performance at an all time high and with businesses clamouring for greener solutions, it is likely that more companies will follow suit and embrace the benefits of rail freight.

Modal shift of freight from road to rail is good for the country. Rail presents a faster, greener, safer and more efficient way of transporting loads across Britain and is increasingly the mode of choice in a competitive freight market. It achieves this by:

- taking lorries off the road, drastically reducing road congestion (each freight train can typically take around 60 lorry journeys off the road)[7]
- reducing carbon emissions; rail freight produces around a 76% reduction in CO_2 emissions over road freight per tonne carried, helping us to improve our carbon footprint[8]
- lorries are responsible for a disproportionate number of road casualties so reducing their numbers on our roads will save a significant number of lives and injuries every year[9]
- haulage by rail is more efficient than by road. On average a gallon of fuel will move a tonne of goods 246 miles on the railway, but only 88 miles by road[10]
- rail freight produces less than a tenth of the nitrogen oxide and fine particulates of road haulage per tonne carried[11].

[2]Analysis of Transport Statistics Great Britain 2008 data and power generation market share statistics

[3]Analysis assuming 29.1 tonnes of coal carried per lorry, and 47 million tonnes of coal moved annually

[4]Rail Freight Strategy, August 2007, TfL

[5]Based on tonnes of waste removed by rail from major cities and assuming 24 tonnes of waste per lorry (source: Shanks Waste Solutions)

[6]The Container Freight End-End Journey, December 2008, DfT

[7]See Chapter 1

[8]2009 Guideline to Defra's GHG Conversion Factors: Methodology Paper for Transport Emission Factors, October 2009, Defra

[9]Analysis of data contained in Reported Road Casualties Great Britain: 2008, September 2009, DfT

[10]See Chapter 2

[11]The Case for Rail 2007, 2007, Rail Safety and Standards Board

Network Rail expects demand to continue to grow by at least 30% over the next decade – the equivalent of 240 additional freight trains a day - and by as much as 140% over the next 30 years[12]. If this additional demand was to be met by road freight this would lead to around an extra 9 million lorry journeys on Britain's roads each year[13].

It is currently estimated that rail freight contributes £870 million to the nation's economy, yet data from the Office of National Statistics suggests that the rail freight industry is supporting an economic output of six times its direct turnover[14]. A further measure of the industry's contribution to the UK economy is its added value which is estimated to contribute £299 million in profits and wages[15]. These are impressive figures in light of the fact that rail freight only now accounts for 11% [16] of the freight surface transport market. Yet the wider benefits rail freight brings to the economy and society deserve recognition in securing its fair share of capacity and investment in the network.

For Network Rail and the freight operating companies this is an exciting time. To cater for the anticipated demand and challenge the dominance of road haulage it is important that together with Government, we continue to put in place the right plans to allow freight to be a successful part of a vibrant, growing railway. It is important that we grow and develop the railway to make this possible.

Over the coming years, the rail industry will continue to work with passengers, business and government to prioritise those freight schemes that deliver the greatest benefit to the economy. Whether this is increasing capacity for more trains or improving the efficiency of the network, by rebuilding our infrastructure, all must provide value for money.

Our vision is to increase the modal share of rail and to take freight off Britain's roads, improving our quality of life and substantially reducing carbon emissions.

Rail freight is a success story, whether this it is taking lorries off the roads and drastically reducing road congestion or transporting goods that we consume every day, the benefits are substantial. The study aims to set out the value and importance rail freight brings to UK plc and more importantly why we need to continue to invest, plan and grow the rail freight business in this country.

[12] *See Chapter 8*

[13] *Extrapolation of data in National Rail Trends, October 2009, ORR*

[14] *Analysis of data contained in National Input-Output Tables, 2007, Office of National Statistics. See Chapter 6*

[15] *Analysis of data contained in National Input-Output Tables, 2007, Office of National Statistics. See Chapter 6*

[16] *Analysis of National Rail Trends, October 2009, ORR and Transport Statistics Great Britain 2009, November 2009, ONS*

Strategic Context

The movement of freight is vital to the British economy. Whether it is raw materials for manufacturing, fuel for electricity generation or transport of consumer goods the population of Britain relies on freight transport for a high standard of living and economic prosperity.

Without an efficient freight transport network, Britain will experience higher commodity and consumer prices and suffer the consequences of reduced availability of goods and services. Yet as road congestion increases and greater attention is given to the sustainable transport modes there is an increasing awareness that road freight has problems. Recent studies identified HGV's as causing 20% of the CO_2 produced by our transport systems[17] and being involved in 9% [18] of UK road fatalities. The total tax contribution from the road freight sector was estimated to equal just 31% to 41% of its external costs upon society and the environment[19].

In contrast freight by rail combines the twin goals of efficiency and sustainability. Rail is first choice for a number of UK industries leading to the annual haulage of 100 million tonnes a year[20] and a market share of surface freight transport of 11% compared with 8% at the time of the privatisation of Britain's rail freight industry[21]. Enabling rail freight to expand and thrive is a key responsibility of the rail industry as it tackles its longer-term planning objectives.

Traditional bulk commodities remain a significant market. For example coal for electricity generation, construction materials for private and public sector projects, raw materials for making steel and petroleum products for air and road transport, are all increasingly important to the British economy. However rail has also developed strongly into new markets in recent years.

Rail is becoming a key part of the logistics chain with supermarkets and third party logistics providers looking for alternatives to road transport. Rail freight through the Channel Tunnel is attracting new customers. The advent of temperature controlled services from Southern Europe, which are achieving up to a day's quicker journey time than road haulage, is a demonstration of rail's strength. This has been reinforced by partnerships with household names such as the Stobart Group.

Deep sea container traffic by rail continues to grow from ports all around the country as well the major container ports of Southampton and Felixstowe. Rail now has a 25 % market share in container traffic from these major ports[22], a figure that will rise further as the network is enhanced to accommodate the increasingly popular 9'6" high cube container. Rail volumes are also increasing between UK distribution centres.

Whilst the end customer will always choose the transport mode that makes economic sense there is an increasing recognition that freight by rail makes environmental sense and can be marketed in that way.

Rail freight's CO_2 emissions are 76% less than road per tonne carried[23] and make the environmental gain from modal shift even stronger in the case of freight than it is for passenger movement. When added to rail's advantageous performance in harmful emissions such as nitrous oxide and particulates, the increased use of rail to meet sustainability objectives is now seen as a critical part of rail freight customers' corporate and social responsibilities.

Rail freight is improving its own environmental performance through the use of lower emission engines, improved fuel utilisation and better locomotive management. But it is the environmental benefit obtainable from modal shift that generates the greatest sustainability gain.

[17] *Low Carbon Transport: A Greener Future, July 2009, DfT*

[18] *Reported Road Casualties Great Britain: 2008, September 2009, DfT*

[19] *Environmental and Social Costs of Heavy Goods Vehicles and Options for Reforming the Fiscal System, Oxford Economic Research Associates, report prepared for English Welsh and Scottish Railway, January 1999*

[20] *National Rail Trends, October 2009, ORR*

[21] *Analysis of National Rail Trends, October 2009, ORR and Transport Statistics Great Britain 2009, November 2009, ONS*

[22] *The Container Freight End-to-End Journey, December 2008, DfT*

[23] *2009 Guideline to Defra's GHG Conversion Factors: Methodology Paper for Transport Emission Factors, October 2009, Defra*

Rail freight's advantages in this area are reinforced by government's willingness to buy the non-user benefits created by rail which avoid the impact of lorries on our roads. These include reduced congestion, fewer road accidents, cuts in polluting emissions and 76% less CO_2 all of which convey measurable benefits for the nation[24].

Whilst the environmental benefits of rail have long been recognised, the publication of the Stern Review on the economics of the climate change in 2006 further highlights rail's importance in a prosperous and healthy society.

This recognition has encouraged, Office of Rail Registration (ORR) to capture the additional benefits of rail freight and in January 2010 it published its findings. The ORR's 'Review of Access Policy' quantified two further benefits from an efficient rail freight business: those falling to the freight operator from time savings and those available directly to the end user through lower inventory and terminal handling costs. In the longer term, both areas are to the advantage of the customer as rail freight's competitive environment ensures that benefits are passed through to the market.

In Britain, rail freight has an 11% market share of surface freight transport[25] and its principal competitor is road haulage. Road freight contributes part of the cost of providing the infrastructure it uses through the payment of vehicle excise duty and tax on fuel consumed.

In contrast, whilst rail freight also has to pay tax on its fuel (albeit at a lower level than road), it also has to pay fully for the wear and tear that it causes to the rail network. Rail freight can therefore be said to pay fully for its infrastructure costs whereas road hauliers are not invoiced for the wear and tear they cause to their network. It has been estimated that road haulage meets only 31 to 41% of all its external costs[26].

Britain's rail network is mostly a mixed use railway. By this we mean that passenger and freight trains share the same tracks – they generally do not have segregated infrastructure. This mixed usage is aimed at achieving a successful balance between providing an affordable level of infrastructure and meeting the capacity requirements of all users. This helps the efficiency of the whole rail industry.

An example of mixed use is the line between the West of England and Reading where local and long distance, high speed passenger trains share the same tracks with bulk aggregate trains. Then between Reading and London these same trains

[24] *2009 Guideline to Defra's GHG Conversion Factors: Methodology Paper for Transport Emission Factors, October 2009, Defra*

[25] *Analysis of National Rail Trends, October 2009, ORR and Transport Statistics Great Britain 2009, November 2009, ONS*

[26] *Environmental and Social Costs of Heavy Goods Vehicles and Options for Reforming the Fiscal System, Oxford Economic Research Associates, report prepared for English Welsh and Scottish Railway, January 1999*

are joined over the four track section of the Great Western Mainline by intensive local and commuter train services. The rail infrastructure used by this mix of train types is exploited productively for the benefit of all – accommodating high speed passenger trains (up to 125 mph[27]) with very heavy freight trains (up to 5,000 tonnes[28]) on the same stretch of network. On a mixed use network the whole of the operation has to be planned with great attention to detail so that freight trains do not delay any passenger trains – or vice versa.

Road hauliers, however, do not have to plan their journeys with anything like this rigour. They effectively turn up at will with rarely any requirement to manage the congestion they currently cause to other users of the road network.

At privatisation rail freight operations were placed into new ownership. Over the last fifteen years these companies and new entrants into the market have invested a total of £1.5 billion (valued by the Rail Freight Group). The rail freight companies and their partners have invested in locomotives, wagons, yards, terminals, systems and facilities. Following on from the successful growth and development of the privatised sector, in recent years there has been further investment in freight infrastructure through programmes such as the Transport Innovation Fund and – critical to the continued success of rail freight – the Strategic Freight Network (SFN).

This investment, together with improved service quality and market focus has contributed to rail freight operators becoming increasingly competitive - with each other as well as with other modes - providing a genuine choice for customers. It is fair to say that the freight sector is now the most competitive part of the rail industry.

This contrasts with mainland Europe where rail freight tends to be dominated by a single national operator with a number of smaller players focusing on niche markets. Whilst rail freight's market share in much of mainland Europe is greater than in Britain no country has seen the growth rate experienced in Britain.

One result of this competition in Britain has been a reduction in transport prices where the beneficiaries have been rail freight users, their own customers and the consumer. Lower rail freight prices reduce the cost of electricity, construction, manufacturing and the shelf price of food, drink and consumer products.

Rail freight is only one user of Britain's mixed use railway and the responsibility to maximise the efficiency and utilisation of the network lies with all players in the rail industry whether they are the infrastructure provider, operator, funder or stakeholder. Passenger operations fulfil a range of government objectives whilst rail freight meets a range of economic and environmental needs.

Reducing our carbon footprint is essential if our quality of life is to be protected. More sustainable transport has a major part to play in this and promoting growth in rail presents a significant opportunity – particularly if freight can be part of that success.

This report highlights a number of the economic and environmental benefits that rail freight brings to Britain. Ensuring that these benefits are achieved is the responsibility of the whole railway industry.

[27] *Network Rail - Sectional Appendix (Western)*

[28] *Network Rail - "Freight Train Loads Books"*

Chapter 1

Rail freight's role in a prosperous Britain

Rail freight's role

1.1 Rail freight is an indispensable part of the British economy. Without it congestion on Britain's roads would increase, our shops would be missing vital groceries, our coal-fired power stations would struggle to operate, our waste would be left to decay and major construction projects would face severe logistical difficulties. Rail freight is a greener, safer alternative to road haulage and is the favoured choice for a wide range of movements.

1.2 In 2008/09 rail moved 100 million tonnes of goods over an average haul of 200 km[29]. Rail has a significant role in key long distance and bulk commodity sectors and has an 11% share of the total British surface freight market[30]. Looking to the future the role of rail freight is expected to grow even further. The recently published freight strategy produced by the industry (Freight Route Utilisation Study) forecasts that the rail freight market will grow by 30% by 2014/15 in total – and by much more in specific sectors. This is the equivalent of an additional 240 freight trains per day[31]. The Network Route Utilisation Strategy, which considered a range of long term economic scenarios, forecast that rail freight activity could increase by as much as 140% between 2006/07 and 2030/31.

1.3 Business, the public and government all agree that road congestion places a significant cost upon society. It is estimated that road congestion reduces GDP by £7 to £8 billion per annum[32].

1.4 Rail freight plays an important role in reducing the number of lorries on the nation's roads. Due to the greater capability of rail each freight train can typically replace around 60 lorries[33]. In 2007/08 an additional 6.7 million lorry journeys would have been required if the equivalent of rail's freight business were carried by road[34]. This equates to 1.4 billion lorry km avoided or an additional 13,000 lorries travelling the distance between London and Manchester every day of the year.

1.5 Lorries contribute to a disproportionate number of fatal accidents per km travelled[35]. Reducing the number of lorries on our roads would save a significant number of lives.

[29] *National Rail Trends, October 2009, ORR*

[30] *Analysis of National Rail Trends, October 2009, ORR and Transport Statistics Great Britain 2009, November 2009, ONS*

[31] *Freight Route Utilisation Study, March 2007, Network Rail*

[32] *The Eddington Transport Study, December 2006, DfT*

[33] *Calculation detailed in Section 2*

[34] *National Rail Trends, October 2009, ORR*

[35] *See Section 5.2*

1.6 Rail freight makes a significant contribution to the green agenda. Per tonne of cargo conveyed rail freight produces 76% less carbon dioxide than road freight[36].

1.7 Rail freight contributes much more than just removing lorries from Britain's roads.

Rail freight:

- is responsible for the delivery of a wide range of goods from the raw materials for construction projects to the groceries on supermarket shelves
- builds resilience into supply chains by increasing available delivery options
- keeps down the price of electricity by providing the most cost-effective way of delivering coal to power stations
- enables the continued operation of the national rail network by delivering raw materials for track repair and maintenance.

The unique role of rail freight

Corus is Britain's largest steel producer and generates high volumes of semi-finished products for inter-works movements. An example is the transport of steel slab and coil between Margam and Llanwern. The steel is loaded and moved on rail wagons at temperatures up to 400˚C – something that could not be safely contemplated via road transport. Rail therefore boosts the Corus production line by;

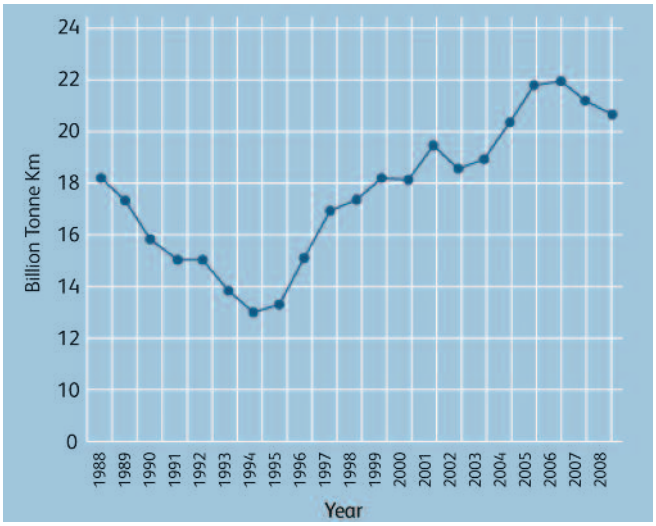
- Moving the hot steel quickly to minimise stock levels
- Delivering the steel whilst still hot which reduces the need to re-heat for further rolling, saving money and carbon emissions.

Sometimes rail provides solutions not practical by road.

Re-emergence of rail freight

1.8 Rail freight is undergoing a renaissance. Rail freight activity fell significantly in the latter half of the 20th Century. However, in recent years this trend had been reversed and rail freight activity grew significantly, increasing by 65% between 1995/96 and 2006/07[37]. Although there has been a fall as a consequence of the recession, it is forecast that the upward trend will resume once economic recovery is in place.

Figure 1.1 Rail Freight in Britain (1988-2008)



Source: ONS and ORR data, From 1991 onwards the data is in financial years. The financial year 2008/09 is denoted as 2008..

[36] *Guidline to Defra's GHG Conversion Factors: Methodology Paper for Transport Emissions Factors, October , Defra*

[37] *Analysis of data contained in Transport Statistics Great Britain 2009, ONS*

The changing role

1.9 Rail freight has traditionally been associated with the carriage of heavy, bulky materials. It still does play a key role in transporting such goods. For every 100 tonne km that coal is transported in Britain, 79% is undertaken by rail[38]. Rail plays a role in transporting 40% of all construction materials used in London[39]. However, over the last decade rail freight has participated significantly in the carriage of consumer goods. Consumer goods carried by rail freight have seen the fastest growth in any category over the past six years, growing by 46% between 2002/03 and 2008/09[40]. Over time there has been shift in the British economy away from traditional primary and manufacturing industries and towards a service and consumer goods led economy. The role of rail freight has been changing in response to this shift.

The freight market

1.10 Rail is used to transport a variety of goods, ranging from those for which rail transport is the clear favourite to markets where road and rail compete fiercely. The main categories of rail freight traffic are:

- coal to power stations to keep our lights on
- metals for manufacturing industries
- construction materials for projects to revitalise towns and cities
- oil and petroleum to keep our trains, cars, buses and planes running
- retail goods that we all consume
- other traffic – including minerals for paper making, cars and car parts and many others.

Of the goods carried, import and export trade feature strongly but many are also moved for internal consumption.

1.11 Table 1.2 shows the proportion of rail freight movements accounted for by each of the main commodity groups. Freight activity is commonly measured in tonne kilometres, this is the weight carried multiplied by the distance travelled.

Table 1.2 Rail freight by commodity type (2007/08)

Commodity	Billion tonnes km Moved	% Of Total
Coal	7.7	36%
Metals	1.8	9%
Construction materials	2.8	13%
Oil and petroleum	1.6	7%
Consumer goods and other traffic	7.2	34%
All traffic	**21.2**	**100%**

Source: ORR. Note figures exclude rail maintenance materials carried by rail freight

1.12 The number of HGVs that can be removed from our roads by a freight train varies according to the commodity. Rail can safely carry heavier loads than road and is particularly efficient when goods are being moved long distances or where large volumes are being moved for short distances. Table 1.3 below shows the approximate number of lorry journeys avoided for each commodity type. This analysis assumes that each HGV is operating at the legal maximum weight of 44 tonnes[41].

Table 1.3 Potential for a fully loaded freight train to remove lorries

Commodity	Fully Loaded Train Potential[42]	Equivalent Number of Heavy Goods Vehicles[43]
Coal	1,500 tonnes	52
Metals and ore	1,000 to 2,500 tonnes	60
Construction materials	1,500 to 3,000 tonnes	77
Oil and petroleum	2,000 tonnes	69
Consumer goods	600 to 1,100 tonnes	43
Other traffic	1,000 to 1,500 tonnes	43

[38] *Transport Statistics Great Britain 2008, November 2008, ONS*

[39] *Rail Freight Strategy, August 2007, TfL*

[40] *Analysis of data contained in National Rail Trends, October 2009, ORR*

[41] *The 44 tonne limit includes the weight of the lorry itself, this is assumed be 14.9 tonnes per HGV, and has been netted off leading to an average load of 29.1 tonnes per HGV. In a number of circumstances the legal maximum will not be achievable. For example the very nature of construction sites means that 44 tonne lorries cannot usually be accommodated. For lighter consumer goods a value of 20 tonnes is assumed*

[42] *Network Rail, Freight trains loads*

[43] *Where a range is given the mid point of the range has been used to estimate the equivalent number of HGVs*

1.13 Table 1.3 shows that each fully laden freight train removes typically between 43 and 77 HGVS which would otherwise have travelled on Britain's roads. This reduces road congestion and environmental emissions. Both of these are discussed in more detail in later sections.

Role of rail freight in delivering strategic projects

Many strategic infrastructure projects have benefited from the transport of materials by rail freight. Recent examples include Terminal Five at Heathrow, Wembley National Stadium and the development of the Olympic Park in East London.

1.14 The volume of each type of good carried by rail can be extrapolated to estimate the total value of these goods.

Table 1.4 Estimate of the value of freight carried by rail

	Assumed Average Price per tonne (£)	Tonnes[44] lifted (m)	Total Value (£m)
Coal	50	45.5	2,275
Metals (steel)	350	17.4	6,090
Construction materials (aggregates)	20	22.8	456
Oil and petroleum	290	7.6	2,204
Consumer goods and other traffic	1700	11.7	19,890
		Total	30,915

1.15 Table 1.4 shows that rail freight moves goods of an estimated worth of over £30 billion every year. Although the consumer goods traffic category accounts for only 11% of the tonnes lifted, it accounts for 64% of goods carried by value. This is due to the greater value per tonne of goods in this category. Although coal accounts for 43% of the goods carried by weight, it represents less than 7% of the goods by value. This trade off between the weight and value of goods conveyed makes the renaissance of rail freight referred in section 1.8 all the more commendable i.e. the gross tonne mileage moved has risen despite a shift from denser, bulk goods towards lighter, consumer ones. This underlines the fact that, in recent years, rail has advanced with marked success into markets where:

- goods are lighter and more valuable
- performance and service quality have to be higher
- the volume handled grows at a faster rate than the tonnage conveyed.

Delivering goods to supermarkets

Asda is increasingly using rail freight in the supply chain that delivers goods to its stores. Asda transports groceries, clothing and general merchandise by rail, taking advantage of the fact that each train can be shared with other logistics suppliers, helping to maximise the efficiency of each journey.

Asda uses rail freight to move goods between the national distribution centre at Magna Park, Leicestershire and a regional distribution centre in Grangemouth in Scotland. Goods are moved 15km by road to Daventry International Rail Freight Terminal where they are loaded onto trains. The train trunk hauls these 540km to Grangemouth rail terminal in Scotland. Finally the goods are then transported 0.6km to the Asda regional distribution centre at Grangemouth. It is estimated that using rail freight for this flow alone saves 9.7m lorry km a year equating to an annual saving of 6,400 tonnes of CO_2[45].

Supermarkets are using rail to get closer to their stores and further minimise road journeys into the north of Scotland via new rail terminal facilities at Inverness and Aberdeen.

Container business on rail

1.16 World container movement has grown quickly in recent years, illustrating the impact of 'globalisation'. Increasingly, we import mainly consumer and semi-finished goods from abroad in containers and the fastest growing trade is with the Far East. The world's biggest container ships (some now carrying 12,000 equivalent container units) bring manufactured and other goods from the Pacific Rim to Europe where their main

[44] *Based on detailed 2004/05 commodity analysis*

[45] *The Malcolm Group; An Award Winning Multi-Modal Operator, September 2009, DfT*

destinations are the UK and continental Channel and North Sea ports. Southampton, Felixstowe and the Thames Ports have seen their container business on rail surge forward year on year with the recessionary blip only slowing this success slightly. The logistics industry has collaborated to see rail take an increasing share of the inland movement. The ports have invested in new infrastructure to cater for rail freight, the shipping lines have increasingly chosen rail whilst the freight operators have won new business and added new and bigger trains to the timetable to move the boxes onwards from the ports in bulk. Through the success of these partnerships, containers have become the biggest freight commodity on rail in Britain and the RUS studies chart a course for its continued strong growth. As a result strong business cases have been developed to secure investment in the rail network for schemes which will allow more - and bigger - containers to travel by train.

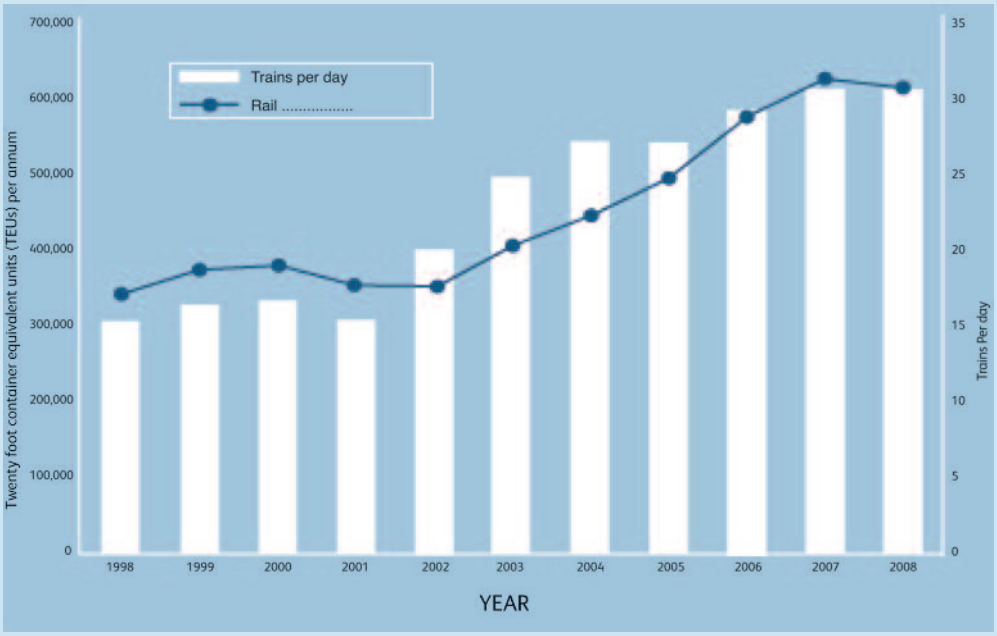
1.17 During the current recession container volume on rail has levelled off[46] over a one to two year period. Major ports estimate that their overall business is down between 10 and 15% [47] - suggesting that, whilst overall rail business has not increased by much, its market share has grown strongly. This bodes well for the return of growth to rail in the medium term.

The Port of Felixstowe

The Port of Felixstowe is the largest container port in the UK. In 2008, UK major ports handled 5.2 million individual container boxes (which equated to 8.7 million standard container units), an increase of 21% since 2000. Felixstowe now accounts for 37 % of all UK container trade[48]. Over time, demand to ship through Felixstowe has grown significantly, more than doubling between 1990 and 2008. As Felixstowe has grown so has the role of rail in the operation of the port.

Between 1999 and 2008 the number of containers passing through Felixstowe increased by 118% , yet the number transported by rail increased by 165% demonstrating the growing market share for rail in moving containers. Over the same period the number of trains serving the port daily has almost doubled. The growth in rail use at Felixstowe is shown below.

Figure 2.1 Freight train performance over time



[46] *NR track access billing figures*

[47] *Associated British Ports*

[48] *Factsheet – Maritime Statistics, December 2009, DfT*

The complementary role of road freight

1.18 There is considerable scope to increase the role that rail freight plays in the range of delivery solutions. However, to truly realise the full benefits of an integrated freight system, road and rail will need to work together. The relationship between rail and road freight needs to be one of collaboration rather than conflict.

Supporting the car export market

Rail freight contributes to the British export market delivering cars such as Minis, Land Rovers and Jaguars to ports so that they can be shipped abroad. The use of rail helps enable the secure safe delivery of these prestige goods.

Jaguar operates railheads at both its Halewood and Castle Bromwich plants enabling more than 70% of its production to travel by rail. Jaguar estimates that these railheads save 4.5 million lorry miles a year. Jaguar also credits rail with improving distribution efficiency as it allows Jaguar to avoid the disruption associated with road congestion. Twenty-two cars can be transported in each rail wagon meaning that 176 cars can be carried on a typical 8 wagon train. This same load would require 22 lorry transporters.

Cars for export to Europe are carried to Port Dagenham for transfer onto ships. Cars destined for further afield are transported by rail to Southampton from where they continue their journey to markets in Asia, America and the Middle East.

Chapter 2

Rail freight and business

Service to business

2.1 Rail freight provides many advantages for its users. It:

- competes competitively on price in many markets
- mitigates the impact of fuel price uncertainty as less fuel is used per tonne transported
- builds resilience into supply chains by increasing the number of delivery options
- reduces operating costs by removing typically between 43 and 77 HGVs per freight train[49]
- improves delivery reliability with fewer delays due to road congestion
- can help keep goods secure from theft and damage
- boasts substantial green credentials.

2.2 Many businesses are seeking ways to minimise their impact on the environment and communities. Rail freight not only offers opportunities to achieve both of these aims, it can often be the most reliable and cheapest mode.

Ensuring reliability

2.3 The ability to rely on products and materials being delivered on time is critical to businesses. Road freight is frequently delayed by unpredictable congestion. Rail provides a disciplined network in terms of the planning and management with sophisticated timetabling and signalling systems designed to optimise reliability. Events can still lead to railway delays but rail freight performance is improving year on year. Between 2005/06 and 2008/09 the percentage of freight trains arriving on time has risen by six points. More than eight out of ten freight trains complete their journey on time[50] – a figure which rises to 98% for premium delivery supermarket goods trains such as the Stobart services for Tesco[51]. Compared with this

[49] *Calculation detailed in Section 2*

[50] *Analysis of data supplied by Network Rail. Trains which arrive within 10 minutes of planned arrival time after adjusting for late starting trains are defined as being on time*

[51] *Stobart Group*

Photograph shows a train operated for Eddie Stobart carrying Tesco goods at Moy in the Scottish Highlands. On the day this photo was taken the train reached Inverness early - whilst the A9 trunk road was heavily disrupted due to snow. Photo courtesy of Graeme Elgar, Network Rail, Inverness.

26% of road freight journeys are delayed each year[52]. It is clear that rail can match and often beat road service reliability.

2.4 Following the severe winter weather of 2009/10 the Freight Transport Association undertook a straw poll of members' experience of rail during the worst spell of snowy and icy conditions for 20 years. Independent terminal operators who depended upon several transport modes across their supply chains volunteered that rail performance had remained commendably reliable – more so than other transport modes.

Concrete for London

London Concrete was formed in 1997 and has grown into a company employing 140 staff occupying a major position in the London construction industry. Nine out of 10 plants operated by London Concrete are based around railheads. Significant cost savings are made by using rail freight to transport the required raw materials. London Concrete estimates that it saves 10-20% of its delivery cost through switching to rail.

Table 2.1 Cost savings by commodity

	Cost by Rail	Cost by Road	Saving per tonne
Stone	£4.65 per tonne	£5.55 per tonne	£0.90
Sand	£6.45 per tonne	£7.13 per tonne	£0.68

Source: London Concrete Ltd

In 2007 1.8m tonnes of aggregates were delivered to London Concrete by rail. In 2009, London Concrete was awarded a freight facility grant of £1.3m to develop a further rail unloading and storage facility at Ferme Park in North London. This will allow an additional 1.3m tonnes of sand and stone to be carried by rail annually, equating to 40,000 fewer lorry journeys into London each year[53].

Competition

2.5 There are five main rail freight operating companies (FOCs) licensed to operate in the British rail freight market;

- Colas Rail
- DB Schenker
- Direct Rail Services
- First GBRf
- Freightliner.

2.6 These hauliers compete on price, flexibility and reliability. This has made prices competitive and led to improved service quality. The entire rail freight industry also competes with other transport modes, especially road. Competition between rail operators and other modes continually drives the industry forward to provide an efficient and effective service to its customers.

Keeping our mail moving

Rail freight moves more than a million postal items per day. The rail freight industry has demonstrated its flexibility and resourcefulness in serving this rail market. These actions include providing more trains at Christmas and when weather has prevented mail being moved by air. The Royal Mail has described its rail freight service being 'incredibly flexible and responsive', during peak times such as during the release of the latest Harry Potter book[54].

Growing use of rail freight

2.7 The type of goods carried by rail is changing as our economy develops from manufacturing to a more consumer led base. Rail freight has kept pace with the changing economy.

2.8 In October 2009 Eddie Stobart in partnership with DB Schenker launched a new rail freight service from Valencia in Spain to London. The service carries a variety of fresh produce such as salads,

[52] *The Eddington Transport Study, December 2006, DfT*

[53] *Based on typical loading capacity of 32 tonnes for sand and stone lorries*

[54] *http://www.gbrailfreight.com, 29/10/09*

fruit and vegetables. Stobart estimates that each train saves 30 lorry trips and, in a year, the service will reduce carbon emissions by 8,600 tonnes[55]. Further services are now planned as a result of this success.

2.9 "There has been a real change in attitude from companies we deal with in recent months. Suddenly they all want to know if they can have their goods carried in an environmentally sensitive way and, in particular, if they can have them moved by train." William Stobart, Chief Executive, Eddie Stobart.

2.10 Tesco is another example of a company that is taking advantage of the benefits that rail freight brings to its business. Tesco estimates that it now saves 2,909 tonnes of CO_2 each year compared to a 2006 baseline by transporting goods by rail[56]. Tesco has taken advantage of the public relations benefits by branding rail freight intermodal units with 'LESS CO_2' in the style of the Tesco logo. Other supermarket chains including Asda and Sainsbury's also use rail freight to transport goods to its stores. Sainsbury's estimates that it has saved 2.7 million lorry kilometres by diverting from road to rail over the last four years[57].

Figure 2.2 A Tesco branded train

Rail freight and London

St Pancras Churchyard Terminal is a £17 million state-of-the-art rail facility which opened for aggregates and cement traffic in 2005. It provides rapid discharge times, enabling on time delivery of bulk materials for concrete production into the heart of London for the construction industry. The plants it serves form the largest concentration of concrete manufacture in Britain. Other aggregate terminals are located on the eastern, western and southern fringes of the City and Westminster to serve construction needs. This means that freight trains reach almost as far into the heart of the capital as the daily commuter passenger services to London terminus stations such as Victoria, Paddington and Liverpool Street. This linkage is strengthened by the fact that many modern office blocks where the daily commuters travel to work were built with concrete made from raw materials hauled by rail to the City's doorstep.

Fuel efficiency

2.11 Rail haulage is more fuel efficient than road haulage. Less fuel is needed to haul a tonne of goods by rail than by road, saving both money and carbon emissions. On average a gallon of fuel will move a tonne of goods 246 miles on rail[58] but only 88 miles by road[59]. See Figure 2.3.

Figure 2.3 Distance a tonne of goods can travel on a gallon of diesel

[55] *Observer Newspaper, 25th October 2009*

[56] *Tesco PLC Corporate Responsibility Report 2009, April 2009, Tesco PLC*

[57] *J Sainsbury PLC Corporate Responsibility Report 2009, 2009, J Sainsbury PLC*

[58] *Analysis of data contained in National Rail Trends 2008/09, ORR*

[59] *Analysis of data contained in Road Freight Statistics 2008, DfT*

Buying the benefits of rail freight

2.12 The UK Government recognises that rail freight can have significant environmental and social benefits. In order to encourage the use of rail freight, the Government offers two key grants:

- capital support - the freight facilities grant which helps to offset the capital cost of providing rail freight facilities
- revenue support such as the Rail Environmental Benefit Procurement Scheme (REPS) which assists companies with the operating costs associated with running some types of rail freight. This will be replaced by a similar scheme referred to as the Mode Shift Revenue Support Scheme (MSRS) from April 2010.

2.13 In England both schemes are administered through the multi-modal Sustainable Distribution Fund. In September 2008 the Government announced a £67 million[60] boost to this fund that will help the freight industry reduce costs and cut emissions.

2.14 The European Commission also provides funding for cross-border rail freight services under the Marco Polo funding programme.

[60] *http://www.dft.gov.uk/pgr/freight/railfreight/rfg/pnrailfreightgrants*

Chapter 3

Rail freight and the consumer

Supporting our everyday lives

3.1 Rail freight is an indispensable part of our everyday lives. It plays a pivotal role in supplying food to our supermarkets and delivering goods to our shops. The range of goods moved by rail may surprise many consumers. Sometimes a train is clearly branded but many freight containers convey a hidden cornucopia. Consumer goods on rail include:

- Royal Mail letters and parcels
- mineral water, with some bottles transported all the way from Lake Geneva to the Midlands by rail
- seasonal goods – even Christmas trees!
- wine and Scotch whisky
- cars such as Minis and Landrovers for the domestic and export markets
- fresh fruit direct from Spain to London
- virtually a full range of goods that fill the supermarket shelves at Asda, Tesco, Sainsbury's and the Coop.

3.2 Rail freight also plays a pivotal role in removing waste from cities and moving it to recycling or final disposal sites. For example, in 2005 rail freight removed 790,000 tonnes, or 29% , of London's municipal solid waste[61].

3.3 By providing the lowest cost method of supplying coal to coal-fired power stations rail freight also keeps household fuel bills down.

"Customers want to know what the environmental impact was of the food they buy in their supermarkets" William Stobart, Chief Executive, Eddie Stobart.

Rail freight and the passenger rail network

3.4 Rail freight helps to keep passenger trains running on time. During the night and sometimes in the day freight trains deliver rail maintenance equipment and materials directly and speedily to work sites. This helps to reduce disruption during busy times so that the railway is maintained and ready to use for all trains come the morning. This is also important as a number of rail locations are inaccessible from the road, leaving a freight train as the only viable option. These trains regularly deliver 300 to 600 foot long sections of rail - impossible to achieve by road. Trains operated by rail freight companies also play an instrumental role in clearing snow, ice and leaf mulch from the network helping to deliver a reliable and punctual service for passengers.

[61] *Rail Freight Strategy, August 2007, TfL*

Chapter 4

Rail freight and the environment

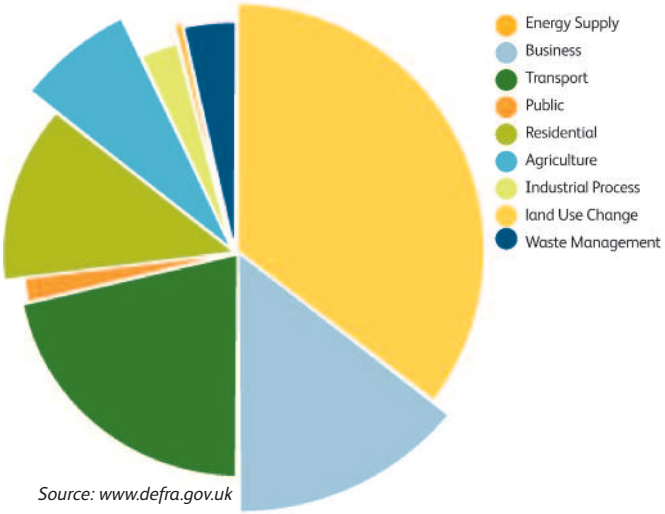
4.1 Climate change is not only a massive threat to the environment, it is also perhaps the greatest economic challenge facing the world in the 21st Century. This view was confirmed in the 2006 Stern Review on the economics of climate change which concluded that "climate change is a serious and urgent issue". The review found that on average global temperatures could rise by 2 - 3°C within the next 50 years unless action is taken. Some experts now regard Stern's figures as being much too conservative. These rises could have a catastrophic impact on people around the world including:

- a reduction in food production, which could lead to famine and disease
- an increase in extreme weather conditions leading to hurricanes and severe flooding
- rising sea levels, threatening people's homes and way of life
- water shortages in equatorial and tropical areas.

Governments around the world are united in agreement that action needs to be taken, with the British Government setting a target to reduce carbon emissions by 80% from the 1990 level by 2050.

4.2 The Stern Review found that transport accounted for 14% of global greenhouse gas emissions, three-quarters of which were attributable to road transport[62]. Examination of data for the UK shows that transport is responsible for an even larger proportion of the greenhouse gases produced in the UK, at 21% of all emissions[63]. Transport is also the second fastest growing source of climate changes gases. It is therefore clear that action needs to be taken to address the release of greenhouse gases by the transport sector.

Figure 4.1 UK Greenhouse Gas Emissions By Cause - 2007



Source: www.defra.gov.uk

[62] *Stern Review: The Economics of Climate Change, October 2006, HM Treasury*

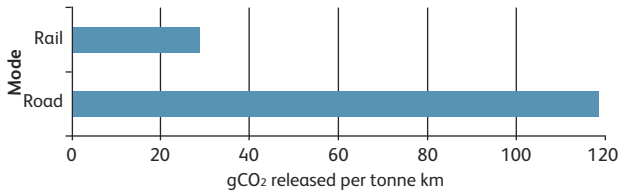
[63] *www.Defra.gov.uk, 02/10/2009*

4.3 Rail freight has a clear environmental advantage over road haulage, playing an important role in addressing climate change. Rail freight produces fewer harmful gases than road freight both in terms of greenhouse gases and other emissions that impact of people's health. Rail freight produces less than a tenth of the nitrogen oxide and fine particulates of road haulage per tonne carried when compared to road transport[64].

4.4 Per tonne of cargo conveyed rail freight produces 76% less carbon dioxide than road freight. The Department for Environment, Food and Rural Affairs (DEFRA) estimates that on average HGV road freight emits 118.6g of CO_2 per tonne km of freight carried whilst rail freight only produces 28.5g CO_2 per tonne km of freight carried[65].

4.5 Road freight generates 7% of total UK greenhouse gas emissions, with HGVs accounting for 4% of total emissions[66]. In the extreme case that all freight currently carried by rail was transferred to road, there would be an additional 1.9m tonnes of CO_2 produced each year. This is equivalent to the carbon saved by more than 230,000 solar panels[67].

Figure 4.2 Road and rail freight – grammes of CO_2 per tonne km



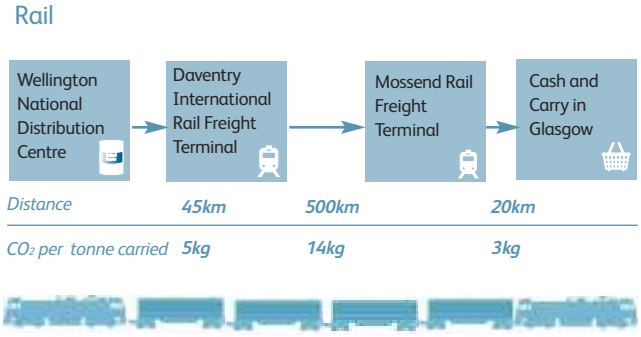
Source: 2009 Guideline to Defra's GHG Conversion Factors: Methodology Paper for Transport Emission Factors, October 2009, Defra.

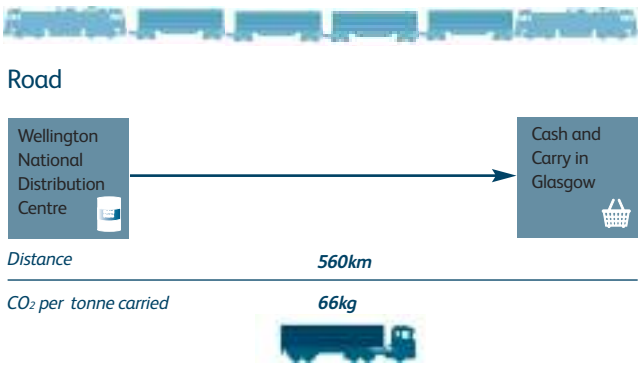
The journey of a tin of beans

4.6 Figure 4.3 shows the journey of a typical consumer item, transported by rail. A tin of beans starts off its journey being loaded onto a container at the national distribution centre of a major supermarket chain. A number of other goods such as cleaning materials, toiletries and other food stuffs will also travel with the beans. This container is then transported by road to a rail freight terminal. The container is transferred to rail for the trunk leg of its journey before completing the final miles by road.

4.7 Figure 4.3 also shows the CO_2 at each stage of the journey if the tin were carried by rail or a road alternative. Even after including the carbon cost of the road legs at either end, the rail option produces a third of the CO_2 of the road route.

Figure 4.3 The journey of a tin of beans





	Start point	End point	Distance m		CO_2 per lorries carried	
			m	km		
Rail	Wellingborough National Distribution centre	Daventry International Rail Feight terminal	28	45	5kg	loaded into a container at Wholesalers national distribution centre along with other goods. Moved by road to the rail international
	Daventry International Rail Feight terminal	Mossend Hall Freight Terminal	312	502	14kg	Container loaded ontoa train for transport to Scotland
	Mossend Hall Freight Terminal	Glasgow Cash and Carry	13	21	3kg	Wholesaler takes delivery of goods for final distribution to shops
Road	Wellingborough	Glasgow Cash and Carry	350	560	66kg	Glasgow Cash and Carry

[64] *The Case for Rail 2007, 2007, Rail Safety and Standards Board*

[65] *2009 Guideline to Defra's GHG Conversion Factors: Methodology Paper for Transport Emission Factors, October 2009, Defra*

[66] *Analysis of data contained in Low Carbon Transport: A Greener Future, July 2009, DfT*

[67] *Analysis of data from www.everyactioncounts.org.uk*

The rail freight industry has taken a number of positive actions in recent years to reduce its carbon emissions. This includes:

- renewal of most of the locomotive fleet to a modern standard
- driver training in fuel saving
- reduced engine running to cut carbon emissions.

4.8 The planned electrification of the Great Western Main Line and proposed electrification of the Midland Main Line could provide the opportunity for greater electric haulage to be used to move freight trains. This could lead to further environmental benefits in the long term allowing renewably generated electricity to be used to power trains. Trials are also being carried out to determine the feasibility of using sulphur-free diesel on the current diesel locomotive fleet[68]. In terms of environmental credentials, this progress highlights that the rail industry is determined to strengthen its lead over road haulage.

Other pollutants

4.9 Rail freight has a clear environmental advantage over road haulage, playing an important role in addressing climate change. Rail freight also produces fewer harmful gases than road freight in terms of other emissions that impact on people's health. Rail freight produces less than a tenth of the nitrogen oxide and fine particulates of road haulage per tonne carried when compared to road transport.

4.10 However, given its strong current performance in environmental terms the key challenge for Government, Network Rail and the wider industry is to provide capacity and capability so that modal shift to rail can be achieved.

[68] *The Case for Rail 2007, 2007, Rail Safety and Standards Board*

Chapter 5

Rail freight and communities

5.1 By its nature, rail is a more segregated system than road which limits its impacts upon communities. Rail freight helps communities in many ways, particularly by removing lorries from our roads, making towns and villages across the country more pleasant places to live and work. Research has shown that fewer lorries means fewer accidents, less pollution and roads which are safer, thus breaking down those perceived barriers that impede on communities.

Making Britain's roads safer

5.2 Rail freight can help communities by making roads safer. In Britain in 2008, heavy goods vehicles accounted for only 5.6% of all vehicle km but were involved in 9.4% of road fatalities[69]. This is a rate of 1.3 fatal accidents per 100 million vehicle km, compared to a rate of 0.7 fatal accidents per 100 million vehicle km for cars[70]. From 1999 to 2008 there were 117,000 accidents involving HGVs which resulted in 4,972 fatalities, 20,826 serious injuries and a total of 165,226 casualties[71]. This highlights that by taking lorries off our roads, rail freight prevents over 500 road casualties a year.

5.3 It is not just the intrinsic size and weight of HGVs that puts other road users at increased risk, a proportion of HGVs are not maintained to appropriate standards. Spot checks undertaken in 2009 found that 46.5% of foreign vehicles and 37.5% of the UK vehicles stopped had dangerous defects[72].

5.4 Rail freight is used to move a variety of potentially hazardous good such as chemicals and flammable products. The rail network allows these goods to be transported in a segregated environment mostly away from homes, other traffic and pedestrians.

Easing congestion

5.5 Rail freight reduces congestion on our roads. The ORR estimates that in 2007/08 an additional 6.7 million lorry journeys would have been required if an equivalent volume of goods were carried by road rather than rail[73]. This equates to 1.4 billion lorry km avoided.

5.6 Congestion on our roads presents a significant cost to British society. Analysis undertaken by the Department for Transport (DfT) found that congestion was the biggest external cost imposed by HGVs[74]. Rail freight currently reduces the congestion cost to society by £450m a year[75].

[69] *Reported Road Casualties Great Britain: 2008, September 2009, DfT*

[70] *Reported Road Casualties Great Britain: 2008, September 2009, DfT*

[71] *Road Freight Statistics 2008, October 2009, DfT*

[72] *Commons Transport Committee, August 2009*

[73] *National Rail Trends, October 2009, ORR*

[74] *Mode Shift Benefit Values: Technical Report, April 2009, DfT. 2015 values expressed in 2010 prices*

[75] *Analysis based on data contained in Mode Shift Benefit Values: Technical Report, April 2009, DfT. 2015 values expressed in 2010 prices*

It is unlikely that rail will replace the HGV but removal of a proportion of HGVs from our roads helps the reliability and speed of those that remain.

Rail freight and The Olympics

At the Olympic Park in East London the Olympic Delivery Authority (ODA) is commissioning a range of venues and associated infrastructure within a total budget of £9.3 billion on 2.5km^2 of land[76]. This means that millions of tonnes of materials must be delivered to the site in Stratford. By January 2010 65.7%[77] of construction materials (by weight) had been brought in by rail minimising the impact of lorries on the local community.

Two railheads have been built to enable the efficient delivery of construction materials. These have seen 3 - 4 trains going into the London Olympic site and adjacent Stratford City development most days carrying approximately 1,350 tonnes of material per train. As the construction ramps up the railheads (known as Bow East Logistics Centre and Temple Mills) have the potential to cater for 6 - 8 trains a day. ODA estimates that each train replaces approximately 75 lorries, so in total rail has the potential to remove 450 to 600 lorries a day in each direction.

Removing lorries from local roads has minimised congestion in the area and inconvenience to local residents. A simulation model was used to estimate the benefit of rail freight as an alternative to road. This estimated that rail deliveries to both terminals would avoid between 250,000 and 380,000 hours of local congestion in a single year.

Connecting communities

5.7 Increased volumes of traffic on a road can give rise to a real or perceived barrier in a community. They create concerns over road safety or a feeling that an area is unpleasant or even dangerous to live or visit. Due to their sheer size, lorries in particular can evoke concerns in a community. By limiting people's ability and desire to move about, busy road traffic can severely affect the interaction of communities.

5.8 Rail freight can play its part in reducing the severance in communities. Rail freight is carried on a mainly segregated system where increased volumes do not impact on communities to the same degree that increased traffic on roads does.

Reducing air pollution

5.9 Air pollution such as particulates and nitrogen oxide damages people's health. The effects range from mild irritation to more severe symptoms for those with pre-existing conditions. The World Health Organisation (WHO) estimates that close to 6.4 million years of healthy life are lost annually across the globe due to long-term exposure to ambient particulate matter, much of which comes from road vehicles.

5.10 Rail freight produces significantly less small particulate matter (PM10) and nitrogen oxide than road freight. Per tonne km carried, rail produces 0.004 grams of PM10, compared to more than ten times that amount produced by HGVs (0.048 grams). In terms of nitrogen oxide rail freight produces only 0.11 grams per tonne km, compared to over 1.74 grams per tonne km carried by road (though road haulage has a current advantage in terms of sulphur dioxide producing 0.005 grams per tonne km, compared to 0.016 grams per tonne km by rail. However, by January 2012 new regulations mean that rail will match – and arguably outperform – road in sulphur emissions control as well)[78]. The health effects of localised pollutants and particulate matter are related to location of their release and

[76] *Olympic Delivery Authority*

[77] *Olympic Delivery Authority*

[78] *The Case for Rail 2007, 2007, Rail Safety and Standards Board*

propagation. As rail freight operates in a segregated environment, away from pedestrians and households the impact of its emissions will be further reduced in comparison to road haulage.

5.11 Noise is another form of pollution that can severely affect the quality of life of individuals and communities. The WHO estimates that traffic noise harms the health of almost one in three people in Europe[79]. People living close to railways can also be affected by high noise levels, but this is usually confined to more narrowly defined corridors than road. The DfT estimates that each lorry mile in an urban area imposes an additional noise cost of 16 pence on society rising to 18 to 19 pence per lorry mile in London and other major conurbations[80]. At its current level rail freight reduces the noise cost imposed by lorries on society by £60 million a year.

[79] *http://www.euro.who.int/Noise, 27/10/2009, WHO*

[80] *Mode Shift Benefit Values: Technical Report, April 2009, DfT. 2015 values expressed in 2010 prices*

Chapter 6

Valuing rail freight

6.1 Chapters 2 and 3 explain how rail freight plays a key role in the British economy. Quantifying this is particularly important when investment decisions are being made. Schemes to further improve rail freight services must be evaluated using robust information regarding the benefits delivered such as enhanced productivity, increased capacity, time savings and reliability improvements. Such analysis needs to take into account the wider contribution that rail freight makes to the economy and society.

Valuing the contribution of rail freight

6.2 The economic contribution of a sector to the nation's economy can be measured at three levels:

- the direct effect is the turnover and employment of the industry itself
- the indirect effect adds the sum of inter-trading between businesses to the direct turnover. This registers a multiplier effect as goods and services are traded
- the induced effect is the indirect effect plus the expenditure driven by the household income derived from the rail freight sector.

6.3 Using company turnover and market share information it is calculated that the total output of the rail freight industry in the UK in 2007 was £870m. Data from the Office of National Statistics has been analysed to estimate the extent to which the rail freight sector supports other, additional activity in the UK economy. This results of this analysis are shown in Table 6.2.

Table 6.1 Rail freight impact on UK Economy[81]

	Direct Impact	Indirect	Induced
Output	£870m	£3.8bn	£5.9bn
Employment Supported	4.7k	29.0k	66.6k

Source: London Concrete Ltd

6.4 The above table illustrates that the rail freight sector is supporting an economic output of six times its direct turnover and is supporting employment 14 times the numbers employed directly in the industry.

6.5 Using the same information it is possible to compare the output per employee for the rail freight industry with the national average.

[81] *Analysis of data contained in National Input-Output Tables, 2007, Office of National Statistics*

Table 6.2 Resource use and total output of The UK Rail Industry (2007 prices and values)

Measure of Economic Value	Rail Freight	National Total
Total Output	£870m	£2,360,670m
Output per Employee	£185k	£89k

6.6 As can be seen from Table 6.1, rail freight generates almost double the national average output per employee. This reflects the high productivity and physical capability of the industry. A further measure of an industry's contribution to the UK economy is its added value - the sum of the wages it pays and the profits it generates. In total the UK rail freight sector contributes £299m in profits and wages to the UK economy.

Other economic impacts

6.7 As well as these direct economic benefits rail freight also contributes to the economy by reducing congestion, accidents and pollution. The DfT takes these benefits into account in assessing the case for modal shift from road to rail (and water).

6.8 Since 1991 the DfT has used a measure referred to as 'Sensitive Lorry Miles' (SLM) to value these benefits. The rate depends on the type of roads that would be used by the HGVs.

6.9 The DfT has recently reviewed its methodology in response to improved understanding of the impacts of mode shift. From April 2010 an alternative method of benefit calculation will apply, referred to as "Mode Shift Benefit Calculation [MSB]". This follows the same basic principles as the SLM but the benefit per lorry mile removed has been increased to further reflect additional research into the negative impact of HGV journeys.

6.10 The MSB work considers the social benefits of rail freight under seven broad categories. These are:

- Congestion relief
- Accident reduction
- Noise costs
- Climate change costs
- Air pollution costs
- Infrastructure costs
- Other costs.

6.11 As freight moves from road to rail, public income from taxation falls. And although rail incurs much lower societal costs than road haulage, there are still some modest costs in terms of noise and pollution. The impact of both of these is netted off from the total benefit in calculating MSBs.

Table 6.3 Mode shift values for removal of a mile of road freight (pence per lorry mile)[82]

Category	Cost per Average Lorry Mile (pence)
Congestion	52.4
Accidents	2.8
Noise	7.0
Pollution	2.5
Climate Change	3.8
Infrastructure	9.0
Other (road)	6.4
Taxation	-34.1
Rail or Water Costs	-5.7
Total	**44**

[82] *Mode Shift Benefit Values: Technical Report, April 2009, DfT. 2015 values expressed in 2010 prices*

6.12 These mode shift benefit values are based on the impact of marginal modal shift of freight traffic from road. However, if over the next 25 years rail freight grows at the higher end of published forecasts there would be step-change benefits by 2031 as shown in Table 6.4.

Table 6.4 Benefits to society of road journeys avoided due to use of rail freight[83]

Category	Societal benefits in 2007/08 from Rail Freight	Societal benefits by 2031 if Rail Freight Grows by 140% [84]
Congestion	£448m	£1,075m
Accidents	£24m	£57m
Noise	£60m	£144m
Pollution	£21m	£51m
Climate Change	£32m	£78m
Infrastructure	£77m	£185m
Other (road)	£55m	£131m
Taxation	-£292m	-£700m
Rail or Water Costs	-£49m	-£117m
Total	**£376m**	**£903m**

6.13 The benefits of freight schemes are not exclusively related to mode shift. Investment schemes that increase the reliability or capability of freight services lead to improved productivity for existing rail business and the industries which it serves. Reduced journey times reduce train running costs and decrease the amount of capital that is tied up in the form of goods in transit. Reliability is a key consideration for businesses - a late or missed delivery can halt production or construction or lead to a loss of repeat orders. The value of time savings and reliability improvements for freight trains has been the subject of debate with estimates of the impact ranging from £30 and £1400 an hour[85]. The ORR has recently completed a study into the value of rail freight time savings and reliability. This identified two key categories of freight user benefits:

- benefits that fall to freight operators such as savings in driver or rolling stock costs
- benefit that accrue to freight users such as lower inventory costs.

The study found that the value of time and reliability varied depended on the commodity being carried and the length of any delay. Freight operator benefits from time savings were estimated to fall between £110 and £122 per train hour. Freight operator costs of delay vary substantially by delay length, with a 45 minute delay costing £190 per train. However for a three hour delay this rose to £1700 per train.

Freight user values of time were estimated at £117 to £150 per train hour with the cost of delay on freight users varying significantly by commodity type. This ranged from £46 to £1600 for a 45 minute delay and from £900 to £7,900 for a three hour delay.

[83] *Analysis based on data contained in Mode Shift Benefit Values: Technical Report, April 2009, DfT. 2015 values expressed in 2010 prices*

[84] *Network Rail has been working with the industry to develop forecasts of future rail freight growth based on different scenarios of economic development. The Global Responsibility scenario predicts that rail freight volumes will grow by 140% between 2006/07 and 2031. These scenarios are outlined in more detail in Chapter 8*

[85] *"ORR - Current Freight Issues", September 2009. Presentation given by Tim Griffiths of ORR to RFG Annual Policy Meeting*

Chapter 7

Rail freight's support to the rest of rail industry

7.1 Network Rail regularly contracts out the transport of materials used to upgrade the railway to the freight train operators. This helps to defray both the capital and operating cost of servicing the rail network. Without a successful and efficient freight sector these activities would tend to use locomotives, crews and other equipment which were dedicated to the maintenance of the railway. Rail freight therefore helps to reduce the cost of providing the rail network and lowers the charges that all customers need to pay to use it.

7.2 Other ways in which the freight business has complementary links with the rest of the rail industry include;

- moving passenger coaching stock to and from heavy maintenance depots for major attention and refurbishment
- hauling new, imported passenger trains through the Channel Tunnel and from ports
- providing "standby" locomotives to keep the network moving
- hiring locomotives for some passenger train haulage
- providing locomotives for rescue service in break-down situations
- contracting maintenance services for passenger train operators at freight workshops
- providing drivers for passenger operations on a contract or spot hire basis
- providing stabling sidings for passenger rolling stock in some locations
- joint ventures where there is spare land within freight yards to develop servicing facilities for new fleets of passenger trains
- providing career opportunities for rail staff moving between companies which develops the skill base and experience of people within the industry.

If the freight business did not exist to provide these options the passenger industry could get by using other sources. However, these alternatives would probably cost more and be less effective that the service which the passenger industry currently secures from its freight suppliers.

7.3 The passenger and freight industries can also benefit from strategic collaboration. An example of this approach is the development of what is known as the 'Joint Line' taking place during Network Rail's funding Control Period 4 (2009 – 14). This project will develop a line to accommodate long term freight growth on a route parallel to the East Coast Main Line (via Sleaford, Lincoln and Gainsborough). It will provide the potential to free-up capacity on the East Coast for growth in high speed passenger services whilst adding to freight capacity – a win-win for rail

growth and development. This is not an isolated case and other examples include;

- On the Glasgow and South Western and Settle and Carlisle lines, track doubling and new signals have improved capacity and timekeeping for both passenger and freight trains
- The major development of the Reading area will create passenger and freight benefits – reducing conflicting movements across junctions and adding capacity for both types of trains
- Cross-London routes are being enhanced with both passenger and freight benefits – improving capacity and reliability.

Significant benefits can be derived from collaboration between the passenger and freight users of the network to develop changes which benefit all. Freight brings economic strength to the business case for such schemes. It also carries weight by influencing decision makers, as it speaks for the leaders of British industry when making the case for rail development, representing the key players in retailing, logistics, manufacturing, construction and power supply.

Chapter 8

Rail freight and the future

The continued growth of rail freight

8.1 Although the current recession has led to a short-term downturn in rail freight volumes, growth is expected to return to the strong upward trend that started in the mid 1990s.

8.2 The Freight RUS published by Network Rail in 2007 forecast freight demand up to 2014/15. The study predicted that rail freight would grow by between 26% and 28% in terms of tonnes lifted. However, more recently Network Rail has been working with the industry and independent advisers to develop forecasts of freight growth further into the future – a 30 year view. These forecasts have been developed by an industry steering group to help gain to ensure stakeholder support. The scenarios fed into the Network RUS with stakeholder endorsement and this has now become an established RUS.

8.3 The forecasts generated four scenarios for potential long term trends in economic development affecting Britain. These scenarios consider how the economy might develop given different approaches to areas such as;

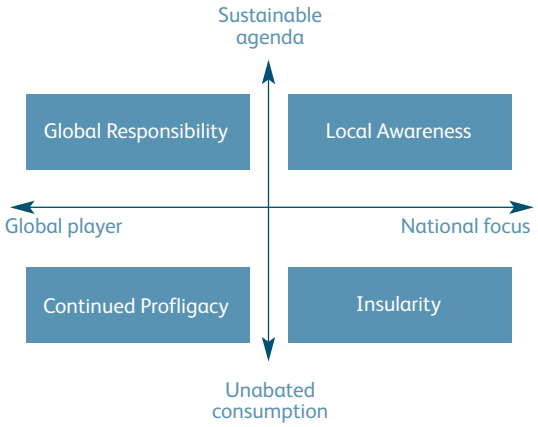
- sustainability
- globalisation
- the degree to which the economy is driven from London and the South East
- or decentralised with regional centres playing an increasing role.

Differing levels of drivers of change including economic growth, population growth, regional distribution of growth, urbanisation and the pricing of externalities (such as road charging) were also modelled and the impact on the demand for transport by different modes has been calculated accordingly.

8.4 The four scenarios for our economy, illustrated in Figure 8.1, can be summarised as follows:

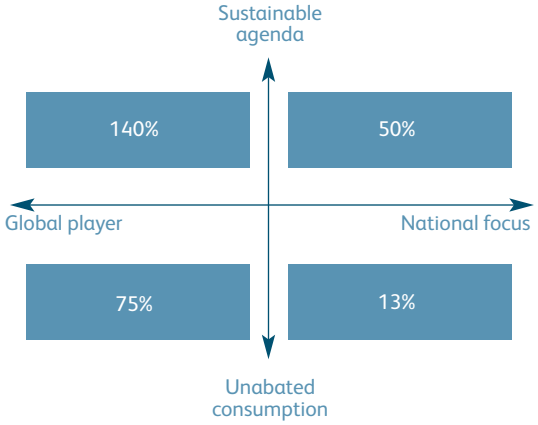
- continued profligacy (unabated consumption, global player)
- insularity (unabated consumption, decentralisation)
- global responsibility (sustainable agenda, global player)
- local awareness (sustainable agenda, decentralisation).

Figure 8.1 Network RUS Economic Scenarios



8.5 These four scenarios lead to significantly different predictions of rail freight demand and demonstrate the range of possible outcomes that could occur as shown in Figure 8.2.

Figure 8.2 Potential growth in rail freight tonne km carried between 2006/07 and 2031 under different scenarios



8.6 Even the least radical forecast shows rail freight growing, and the highest would see the tonne km carried by rail freight more than double.

8.7 By commodity, the expected pattern of growth is more varied. As the economy develops, the role of bulk goods traditionally associated with heavy industry will become less pronounced. Consumer goods, however, develop very strongly. Such goods to and from ports are expected to grow by between 60% and 310% whilst consumer goods that are carried on rail between domestic terminals are expected to increase by between 200 and 1200% . This could increase the rail consumer goods market by as much as 1200% in the highest scenario - although it is acknowledged that this figure is based on a current relatively low market share for domestic business.

Table 8.1 Range of forecast growth in rail freight tonne km carried between 2006/07 and 2031 by category

Commodity	Lowest Forecast Growth Rate	Highest Forecast Growth Rate
Coal	-70%	0%
Metals	-20%	20%
Construction Materials	6%	50%
Consumer Goods – Carried Internationally	60%	310%
Consumer Goods – Carried Domestically	200%	1200%
Total Rail Freight	**13%**	**140%**

Ensuring a successful future

8.8 This report has highlighted the numerous benefits of rail freight. The forecast growth in rail freight will provide an opportunity to realise further benefits.

8.9 The industry is already using partnerships to facilitate a successful future for rail freight. Network Rail has been working with the DfT, Welsh Assembly Government, the Freight Transport Association, Freight Operating Companies, the Rail Freight Group and the Association of Train Operating Companies to develop a comprehensive and cohesive strategy to optimise the use of our rail network.

This is referred to as the Strategic Freight Network (SFN)[86]. The SFN involves investment in infrastructure to allow the efficient operation of longer, larger and more freight trains to meet the forecast growth in demand. The SFN work is also shared with Transport Scotland - recognising that the benefits of modal shift do not stop at borders. In the long term the delivery of the SFN, augmented by the DfT Longer-Term Vision[87] requires a package of interventions that will:

- create more efficient freight operations by optimising the routing of freight trains to meet the needs of all types of rail growth
- ensure that sufficient routes are open to traffic 24 hours a day, seven days a week to meet market demands
- eliminate pinch points that limit capacity
- enable the operation of longer and heavier trains
- explore extending the coverage of European loading gauge
- further linkage to new strategic rail freight interchanges and terminals
- the electrification of freight routes to further improve environmental performance.

8.10 A package of investments is already planned for the period 2009/10 to 2013/14. This initial package is mainly focused on loading gauge enhancement, capacity and train lengthening. As these enhancements are being delivered the case for further investments in later control periods will be developed.

Vision for the future

8.11 Future funding decisions need to take into account the importance of rail freight to Britain. To realise the full potential benefits of rail freight further investment will be needed to increase capacity and to drive forward service improvements.

8.12 The growing use of rail freight in Britain shows that more and more businesses are seeing the benefits of rail freight. The recovery from recession will provide an ideal opportunity for businesses to re-examine their practices and to determine how they get the best value from their current freight operations.

8.13 This should enable the continuation of the role rail freight plays in the British economy, reducing carbon emissions, minimising road congestion and improving quality of life for many.

The Strategic Freight Network and British Industry

The schemes which comprise the SFN were not simply chosen by the rail industry. They were selected by a stakeholder group which included representatives of the freight users – British industry.

The schemes chosen will help British industry improve its efficiency and competitiveness:

- gauge enhancements and train lengthening – to improve the economic payloads of trains.
- capacity enhancements – to provide more opportunities to bypass road congestion, switch transport mode, reduce inventory and cut journey times for goods.

The sectors of British industry which will benefit from SFN include:

- port
- shipping lines
- manufacturing
- logistics providers
- retailers
- quarrying
- construction

SFN schemes have been identified by major players in British industry to improve the British economy's productivity.

[86] *SFN – see http://www.networkrail.co.uk/browse%20documents/StrategicBusinessPlan/Update/Strategic%20Freight%20Network%20paper.pdf)*

[87] *http://www.dft.gov.uk/pgr/rail/strategyfinance/strategy/freightnetwork/strategicfreightnetwork.pdf*

Working in collaboration

8.14 In recent years a number of high profile collaborative enhancement schemes have already been completed. These investments have enabled the continued growth and development of rail freight. The schemes already delivered include:

- the award-winning Brigg Line enhancement scheme, serving the Port of Immingham on Humberside, which enables the operation of an additional 16 freight trains per day
- the Birmingham intermodal freight terminal gauge enhancement
- the Port of Felixstowe south rail terminal extension which extended train capacity by 10% per annum
- Hull Docks branch doubling to improve reliability and increase train numbers
- reinstatement of Olive Mount Chord to improve the efficiency of train services for the Port of Liverpool
- Birmingham (Sutton Park Line) gauge enhancement to provide greater reliability of freight train movement through the conurbation
- Wrawby Junction line (Humberside) speed improvements
- Cross-London gauge and capacity enhancement.

8.15 Other schemes being delivered or developed currently include:

- Southampton to West Midlands gauge clearance scheme to enable more efficient use of existing rail capacity including provision of a diversionary route
- further cross-London gauge and capacity improvements
- capacity enhancements between Ipswich and Nuneaton enabling more trains to serve east coast ports without travelling via London

- capacity and gauge improvements between Liverpool and the West Coast Main Line
- Peterborough to Nuneaton gauge clearance benefiting east coast ports
- Nuneaton North Chord – a new link to separate freight and express passenger trains on the West Coast Main Line
- upgrading of the Peterborough to Doncaster via Lincoln (Joint) line to allow increased freight services on a route parallel to the East Coast Main Line
- Shaftholme Junction grade separation – separating the flow of freight and passenger trains on the East Coast Main Line at a critical junction in Yorkshire and shortening the route to destination for freight trains
- a £40 million fund to finance further gauge enhancement works – including a key cross-country route between the West Midlands and Yorkshire
- a £40 million fund to finance works that would enable the operation of longer trains – from ports and quarries
- A £5 million fund to develop the plans for future freight schemes which might deliver further benefits during 2014 – 1019.

8.16 Organisations that have worked together to achieve these successful schemes include:

- Advantage West Midlands (AWM)
- Associated British Ports (ABP)
- DfT
- East of England Development Agency (EEDA)
- East Midlands Development Agency (EMDA)
- East Midlands Regional Assembly (EMRA)
- European Union
- Hutchison Ports UK (HPUK)
- Mersey Docks and Harbour Co
- Merseytravel
- Northern Way
- South East England Development Agency (SEEDA)
- Transport Scotland
- Yorkshire Forward.

Network Rail is delighted to acknowledge the contribution made by of all these organisations to freight development schemes and looks forward to working with these and other parties to secure future successes for freight on the British rail network.

RAIL FREIGHT OPERATORS' ASSOCIATION

Network Rail is pleased to acknowledge that this document has been compiled with the full support and input of the Rail Freight Operations' Association.

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