

TRANSPORT

RAIL FREIGHT GETTING ON THE RIGHT TRACK.

Institution of
**MECHANICAL
ENGINEERS**



Improving the world through engineering

Over the last 50 years, most of the UK's freight has been transported by road, however, with increasing congestion on our roads and an 80% cut in CO₂ emissions below 1990 levels by 2050, is this the time to be considering the value of rail to move goods around our nation?

This report examines the advantages and challenges to this question and highlights the need for a holistic rail strategy to meet the needs of the railway passenger and freight sectors on our network.

This report has been produced in the context of the Institution's strategic themes of Energy, Environment, Education and Transport and its vision of 'Improving the world through engineering'.

ENERGY

ENVIRONMENT

EDUCATION

TRANSPORT

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OUR CONGESTED ARTERIES

It is one of the few subjects that businesses, Government and the public all agree on, congestion on our roads is getting worse and is of no benefit to anyone. However, although a personal inconvenience for many drivers and a thorny issue for Government to tackle, economically, the issue of congestion can be most acutely measured by the estimated £10 billion lost business each year due to our road network not being able to cope with the high levels of usage. This becomes even more pronounced at a time of economic downturn when corporate profits are tighter and losses due to congestion cannot just be ignored.

Over the years, Government has tried to curb the UK drivers' enthusiasm for using the roads. And, in some ways, it has been successful, by either chance or clever marketing, in encouraging modal change back to public transport.

However, a sizeable percentage of the vehicles on our roads are commercial heavy-goods vehicles or vans which move goods from one place to another. This activity is necessary for the UK to maintain a world-class economy. However, is road the only viable method of transportation for imported or manufactured goods in the UK? Is this also the most environmentally sound method of movement of freight?

THE ENVIRONMENTAL CHALLENGE

The Government has set a binding target to achieve an 80% overall reduction, below 1990 levels, in carbon dioxide (CO₂) emissions by 2050. In 1990, the UK transport sector emitted 140.8 million tonnes of CO₂. By 2006 this had increased to 157.2 million tonnes of CO₂. This equates to approximately 24% of the UK's national CO₂ emissions.

The carbon challenge for the transport sector is that it now needs to achieve a CO₂ saving of 129 million tonnes by 2050. If it fails to do so, the rest of the UK economy will be under pressure to subsidise the transport sectors poor emissions record.

With continuing congestion and little room for further expansion of the UK road network, the transport sector must examine ways to reduce road vehicle mileage. In addition, it must begin to examine methods to reduce its portion of CO₂ emissions to help the UK reach its 80% reduction which in strategic investment, funding, planning and construction in the transport sector, is only a stone's throw away.

FACTS ABOUT FREIGHT

Within the UK freight sector, road freight now contributes 92% of domestic freight-related emissions, and, as things currently stand, technological fixes are not expected to deliver the required reductions in CO₂ emissions for this sector to meet its 2050 obligations.

With current projections estimating an 8% shift in the market share of freight movements from road to rail by 2030, this will still deliver only about 1% of the whole transport sector's required emissions reductions against 1990 levels. Added to this, a 1% shift in freight from road to rail will deliver savings of approximately 0.2 million tonnes of CO₂ yet require an increase in rail freight capacity of nearly 10%. So the capacity challenge for the rail freight industry is massive.

Here we get to the crux of the issue for the rail-freight industry. The projected growth in the industry is not sufficient enough to deliver substantial CO₂ savings required for the sector. The opportunity for rail freight to deliver significant CO₂ savings is there, however the facilities to enable this are not. In essence, to see substantial CO₂ reductions from the transport sector, the projected growth rates for rail freight need to be much higher. To achieve this, investment in rail, and some road, infrastructure needs to be substantial and ambitious.

GETTING OUR FREIGHT TRANSPORT ON THE RIGHT TRACKS

Rail freight has, for a long time, been the poor relation to the passenger network on rail, and, within the wider freight industry has played second fiddle to the road-freight sector for nearly 50 years. With road congestion increasing and the clear environmental benefits seen in using rail, the Institution of Mechanical Engineers believes it is time that the UK re-examines the value of using rail as a key distributor of freight around our nation.

Over the last few decades, investment in rail freight, when compared to passenger transportation, has been poor at best. This fact has been recognised by the Department for Transport (DfT) and steps are being taken to rectify this. These include funding allocations through the Statement of Funds Available (SoFA), and other mechanisms such as the rail environmental benefits procurement scheme. Unfortunately, these steps are insufficient to achieve the benefits to the UK environment, and economy, that rail freight is capable of delivering.

It should also be noted that at this time rail freight usage is actually on the increase. The industry has seen more than a 60% growth since 1994/95 and projections suggest that by 2030 rail freight will increase its proportion of the entire market share against road haulage by 8%. Much of this growth is likely to be associated with the carriage of deep-sea containers.

From an environmental perspective, this is positive. From a logistical and practical infrastructure perspective this growth should raise a few eyebrows, particularly when the UK railways have seen a decline in track length since the turn of the century.

Added to this, the growth in demand from two separate arenas within the railway sector creates a bigger challenge for the decision-makers. They need to meet passenger mobility aspirations and, at the same time, create capacity for and implementation of sizeable rail-freight expansion.

In essence, the growth in personal and freight transport requirements is putting the UK transport infrastructure under strain, it is putting the environment under strain and, it is putting the economy under strain. We must plan our way out.

COLLABORATION RATHER THAN CONFLICT

Considering the points mentioned, these statistics could create a combative approach between the railway industry and the road freight sector. Road freight is substantially larger than rail freight in terms of volumes moved, yet, the road freight industry may do well to start speaking with rail-freight providers and investigate routes through which they can develop synergies and adapt to the requirements of a greening economy.

Rather than a direct shift in road freight towards rail, perhaps the target should be a reduction in road-haulage miles. Rail does, after all, nearly always rely on road freight for the final parts of many of its goods journeys.

By reducing road distance, rail provides a mechanism through which large numbers of HGVs can be removed from the UK's congested long-distance arteries. The economic arguments for doing this are strong with the elimination of congestion being worth as much as £7–8 billion to the UK gross domestic product (GDP). With this in mind, steps to motivate the collaboration between road-freight and rail-freight companies, thereby reducing road haulage miles, should be encouraged. This would assist in reducing congestion on the UK's long-distance road arteries and help deliver significant CO₂ savings.

BROWN'S GREEN SOLUTION

It is time for the Government to step up and meet this challenge, through the provision of a rail infrastructure capable of meeting the UK's needs now, and into the future. Meeting this challenge will be an integral part of achieving sustainable transport goals within the UK and rail freight has the potential to play a major part in this.

As an option for reducing carbon emissions, and congestion, rail freight provides the most tangible solution for the sustainable movement of goods around the UK. CO₂ emissions from rail freight are nearly ten times lower than those from HGVs, which in turn, are substantially less carbon-intensive than lightweight vehicles (vans).

The benefits of rail freight have been recognised, however not enough is being done to capitalise on these.

Projected growth in the rail-freight industry indicates that there will be a 60% increase in volume being carried, and an increase in tonne kilometres of 114%, by 2030. This growth cannot be met by the current infrastructure available, and at the same time as achieving growth in passenger transport on rail. Quite simply, we are outgrowing our multi-functional network.

This means that those individuals planning rail infrastructure expansion, based upon the projected growth rates, need to rethink the scope of their plans and develop new, more ambitious ones. These new plans will recognise the opportunity that rail, and in particular rail freight, brings to reduce carbon emissions and promote the UK economy through the reduction of congestion on the roads.

Finally, since the development of this report, the UK, and world, economy, has decidedly taken a turn for the worse. The Government has developed a wide range of initiatives to try to stimulate the economy and time will tell if these have been successful. However, one element still under review, and now being seriously considered in the USA, is the development of key infrastructural programmes as major regional or sector stimuli. Transportation has the opportunity to assist and needs bold decisive direction which could have short and long term benefits to the economy and our environment.

The Institution of Mechanical Engineers therefore recommends the following:

- 1.** The Government should undertake a holistic review of the UK rail network and implement an even bolder investment programme which accommodates both passenger and freight requirements. In addition, a majority of UK sea ports should be linked with major towns and cities via rail to establish a freight 'hub and spoke' network. Finally, investment should be focussed on increasing capacity of the network through improved signalling and traffic management, as well as the recently announced high-speed rail programme.
- 2.** For industry to be incentivised to use low-carbon distribution options to help reduce the transport sectors emissions in line with 2050 targets.
- 3.** Development of an industry and consumer 'Low-Carbon Transit Impact' labelling system to help consumers make educated environmental judgements when deciding on products – very much like the current 'Air Freight' labelling being introduced by some supermarkets. This is a continuation of the Institution's 'Green Ticketing' proposal introduced in the 2008 Low-Carbon Mobility report, where all passenger ticketing for road, rail and air transportation would show the expected CO₂ emissions value.
- 4.** For the road and rail sectors to work together to develop more environmentally suitable solutions for industry, using rail for long distance movement, HGVs for regional distribution and LGVs for local distribution. Indirectly this proposition would benefit the domestic road haulage industry as it would be best placed to service regional rail hubs.

Over 8% of the UK road network is already subject to very congested conditions.



SETTING THE SCENE

THE REALITY OF OUR 2050 CO₂ TARGETS

By 2050, the UK hopes to have achieved the ambitious target of cutting our CO₂ levels by 80% below that of 1990 levels. To achieve this substantial target, all parts of the economy need to contribute by making cuts in their total emission output, including the UK transport sector. However, the transport sector, which in 2006 contributed 24% of the UK national CO₂ total, is lagging behind the rest of the economy with regards to delivering substantial environmental improvements.

In 1990, the UK transport sector emitted 140.8 million tonnes of CO₂. By 2006 this had increased to 157.2 million tonnes, an increase of 16.4 million tonnes since 1990, meaning that the transport sector now requires a saving of 129 million tonnes of CO₂ by 2050 to achieve its 80% reduction². Within the transport sector, freight accounted for about 33.7 million tonnes of CO₂ (as at 2004) which is about one fifth of all transport emissions³. Of this, road freight accounted for 92% of these emissions.

There are few signs of a decline in transport-related emissions in the near future. This potentially places greater pressure on the wider national economy to subsidise the transport sector's reductions failure by producing greater than 80% CO₂ savings.

From a national perspective, this begs the question of whether the wider economy can afford to shore up the transport sector through emissions reductions. It also highlights the requirement for a radical change in thinking within the UK Government to deliver these savings.

GETTING ON THE RIGHT TRACK

In 2006 there was recognition by the House of Commons environmental audit committee that there would be "clear advantages, in terms of carbon emissions, of shifting freight from road to water and rail"⁹. It was also accepted that the environmental benefits available through a shift from road to rail freight should be taken into account when planning future transport infrastructure expansion within the UK.

Using an output-based method for calculating CO₂ emissions³ it is estimated that rail freight under diesel traction produces 14.7g of CO₂ per tonne kilometres (see box p8). The same calculations estimate that electric freight traction produces an estimated 13.9g per tonne kilometre; this lack of differentiation is most likely due to the UK's heavy reliance upon fossil fuels for its electricity generation mix. This will improve as the UK energy mix becomes more sustainable. Meanwhile, HGVs are estimated to produce approximately 138g of CO₂ per tonne kilometres. In addition, light-goods vehicles (vans) can produce up to 360g of CO₂ per tonne kilometres.

The figures shown in **Figure 1**, illustrate that, out of the terrestrial transport options available for the haulage of solid freight in large volumes, rail freight provides the least carbon intensive mode available per tonne kilometre.

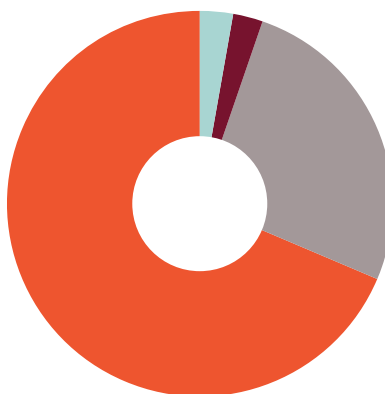


Figure 1: Carbon Dioxide emissions per tonne km by freight mode (gm/tonne-km).

- Diesel Rail Freight (14.7)
- Electric Rail Freight (13.9)
- HGV Freight (138)
- Vans (360)

Rail freight clearly has the potential to reduce carbon emissions and contribute to the transport sector's emissions reduction targets. Indeed, in a perfect world, if all domestic freight carried in 2004 had been by rail, this would have equated to a total of approximately 3.6 million tonnes of CO₂, providing a 90% carbon saving against actual 2004 levels. This would contribute towards a reduction against 1990 levels of nearly 24% of the transport sector's total CO₂ emissions.

THE MODELS USED IN THE WORK

A number of methods for calculating CO₂ have resulted in a range of figures including 49, 17, 30, 33, 35, 38 and 18 gramme CO₂/tonne km for rail freight. Part of this confusion may have arisen through the consideration of carbon versus CO₂ in a variety of context (carbon can be converted to CO₂ by multiplying by 3.67). Care should therefore be taken when considering freight-related CO₂ intensities³. McKinnon et al use CO₂ as their measure. This report also focusses upon CO₂.

UK ON THE MOVE

The requirement for the transport sector to make substantial cuts in its emissions is of growing importance. However, as strong an imperative as this is, it needs to be recognised that the challenge for the transport sector, as a whole, is far greater than purely achieving a better environmental track record.

The UK's roads are becoming increasingly congested, with 8% of the UK road network already subject to very congested conditions¹⁴. Without action, this has the potential to increase to 30% by 2025 with an estimated cost to business and freight of £10 billion per year¹⁴.

The economic arguments for keeping the UK moving are clearly set out in the Eddington report¹⁴, while the environmental impacts of a growing transport infrastructure, if current trends continue, are also acknowledged.

The transport sector therefore faces a number of challenges that, at the moment, seem insurmountable and conflicting. The need for personal mobility is set only to grow further. At the same time, the UK has become a consumer economy, highly reliant upon the movement of goods throughout the nation.

Therefore, it is important we find a solution which satisfies all the demands which we place on our transport network.

THE RE-EMERGENCE OF RAIL FREIGHT

Since the 1950s there has been a steady growth in the transportation of goods by road with rail freight having its percentage of market share steadily reduce to under 10%.

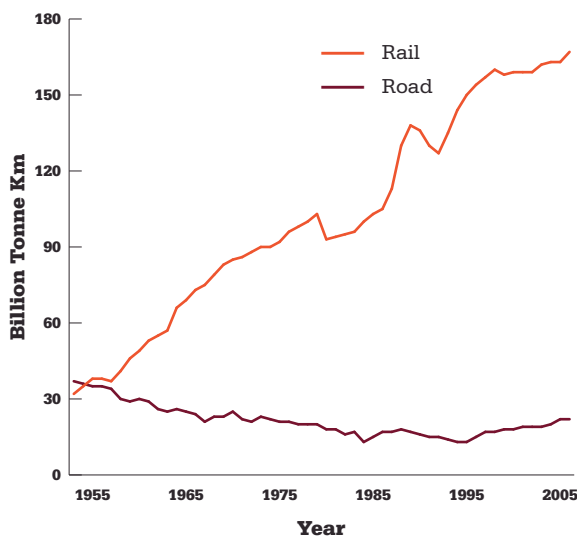


Figure 2: Domestic freight transport by mode 1953–2006

When considering **Figure 2**, it is worth noting that the road sector appears to have capitalised upon the growing need for the movement of goods, rather than directly taking market share away from the rail freight industry at anywhere near the rate at which it has grown. Based upon past history, the road industry has therefore, capitalised upon a societal need more effectively than rail freight has been able to.

This growth has resulted in a large-scale environmental issue for the UK, with road freight (vans (LGVs) and heavy goods vehicles (HGVs)) now contributing 92% of domestic freight transport-related CO₂ emissions³.

This environmental concern provides a dilemma for policymakers, industry bodies, academic thinkers and all stakeholders alike. How can the UK meet its binding CO₂ emissions reduction targets while heavy goods vehicles and vans can, at best, only be expected to see an improvement in carbon efficiency of only 30–40% through technological improvements by 2020¹.

National transport statistics⁴, on the surface, indicate that road freight appears to be growing at a greater rate than rail freight, and that rail freight appears to be declining (**Figure 2**). However, looking more carefully, it is worth noting that the decline in rail freight tonne kilometres runs only through to the mid-1990's. Since then, the rail-freight sector has seen significant growth.

This growth, shown in **Figure 3**, illustrates that, as a percentage of the previous year's tonne kilometres hauled, rail freight has consistently seen a growth rate greater than road freight from a base year of 1996. It highlights both the potential for rail freight in the UK, and at the same time the greatest challenge that rail freight has over the coming years in sustaining this level of growth – capacity.

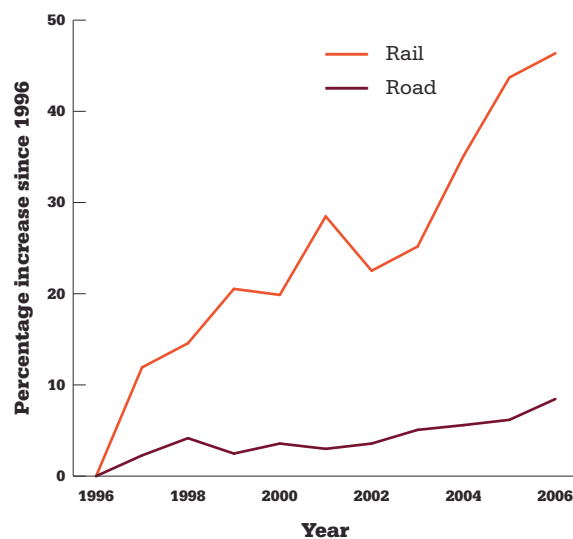


Figure 3: Cumulative percentage increase in respective tonne kilometres rail versus road

THE CAPACITY CHALLENGE

It is projected that the rail-freight market share will continue to grow over the next two decades, reducing road-haulage tonne kilometres by about 8%,¹³ and saving approximately 1.6 million tonnes of CO₂ per year by 2030. This market share rise equates to an increase in freight tonnage movement by rail from 123.5 million tonnes in 2006 to a projected 197.8 million tonnes in 2030. This is a greater than 60% increase in volume being carried, and a projected increase in tonne kilometres of 114%¹³.

However, this growth will require an increase in rail freight capacity of 13.04 billion tonne kilometres. This is something the current rail network does not have the capacity to deal with. In addition, the 8% increase in rail-freight market share has the potential to deliver only about 1% of the whole transport sector's required emissions reductions against 1990 levels² (Figure 4). This puts the challenge for the transport sector into perspective and belies the true contribution that rail freight has the potential to make.

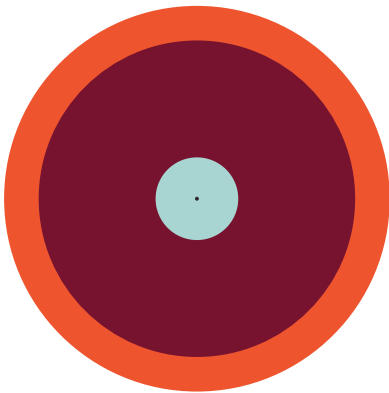


Figure 4: UK Transport sector CO₂ emissions in 2006

- Total (157.2 million tonnes)
- UK Transport sector CO₂ – National benchmark savings required by 2050 (129 million tonnes)
- Freight sector CO₂ emissions in 2004 (33.7 million tonnes)
- Projected CO₂ savings based on current predicted 8% shift from rail to freight (1.6 million tonnes)

The Rail Freight Group¹¹ is forecasting rail freight to double over the next 25 years, with a major element of this being associated with the movement of deep-sea container traffic, which is likely to quadruple over the same period. The indications for the growth of rail freight are therefore good.

However, this projected growth poses a substantial capacity challenge for the rail freight industry, particularly with regard to balancing this demand alongside growing passenger numbers.

With these numbers in mind, it is worth noting that a 1% shift in freight from road to rail is often touted to require an increase of 10% in rail capacity, due to the scale of the road network against the rail network⁹.

Taken literally, these figures indicate a requirement for an 80% increase in rail freight capacity by 2030. Therefore, the greatest challenge for the industry will not be winning this market share; instead it will be meeting the demand upon infrastructure that this growth brings.

In recent years, concerted action has been taken by the Government, economic stakeholders in the rail industry and lobby groups to ensure that the UK rail network does not become the most aged rail network in the world. Despite this, there is still a definite need to build a case for continued and increasing levels of investment into the UK rail infrastructure for the foreseeable future. This issue is now particularly pertinent in light of the clear environmental benefits that could be gained through the promotion of the rail sector as an important and environmentally friendly freight distributor.

However, despite recognition that capacity is a major hurdle to the growth of the rail industry, the UK rail infrastructure has, over recent years, continued to decline in length. This trend has been particularly obvious since the take-over of Railtrack by Network Rail in 2002, as illustrated by Figure 5.

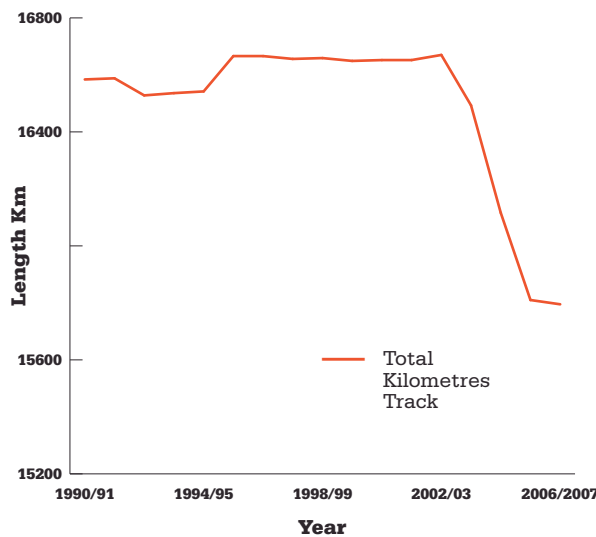


Figure 5: UK length of rail tracks 1990–2007

FOOTNOTE

Based upon 2004 Dft Figures for road freight⁴ and CFIT carbon intensities (McKinnon et al³). This also assumes worst case scenario of all additional freight being carried by diesel traction.

THE NEED FOR INVESTMENT IN RAIL FREIGHT

This growth in demand, from two separate arenas within the rail sector, makes the challenge of meeting peoples mobility aspirations and, at the same time, meeting industry's logistical demands, ever more challenging for those charged with delivering improved rail passenger and freight services within the UK.

Traditionally passengers have provided greater profits than freight. Therefore, freight has tended to take a secondary role, much to its detriment. It is therefore time to raise the profile of rail-freight within the UK, helping people to see the opportunities that the rail freight sector can offer.

Rail freight has seen consistent growth for the last ten years and if this growth continues apace, without recognition by key stakeholders, this growth will challenge the entire rail sector.

The Institution therefore, believes that it is time to reconsider rail freight's position on the political tables and look into its potential to deliver sustainable benefits for the UK in greater depth.

From the Institution's perspective, we are keen to emphasize that investment should embrace new technologies and promote the better use of the UK rail network to deliver environmental benefits, including the rail-freight sector which can offer a viable alternative to road transport, rather than being just a poor relation or a carrier of fuels and ores. Providing a rail infrastructure capable of meeting the UK's needs now, and into the future, will be an integral part of achieving sustainable transport goals within the UK.

The transport sector is already lagging behind in terms of delivering carbon savings and it is clear that current investment in the transport sector has failed to curb this growth in carbon emissions, with many advocating that the current investment strategy has actually fuelled the growth of carbon-intensive modes of transport.

In this context, the rail industry provides a favourable route for carbon-conscious expenditure. The target is set for 2050, the expenditure needs to start now.

As outlined in this report, projected growth within the rail-freight sector will not be enough to deliver substantial carbon savings on the national scale. However, as an option for the reduction of carbon emissions, the rail-freight sector is leagues ahead of all the other options available. The target should therefore be to deliver far greater levels of growth in the rail-freight sector than are currently projected.

Funding on rail freight provides an ideal platform to deliver triple bottom-line benefits to the UK, through reduced carbon loadings associated with freight transport and improving economic performance derived through lower levels of congestion and more-efficient movement of freight throughout the UK.

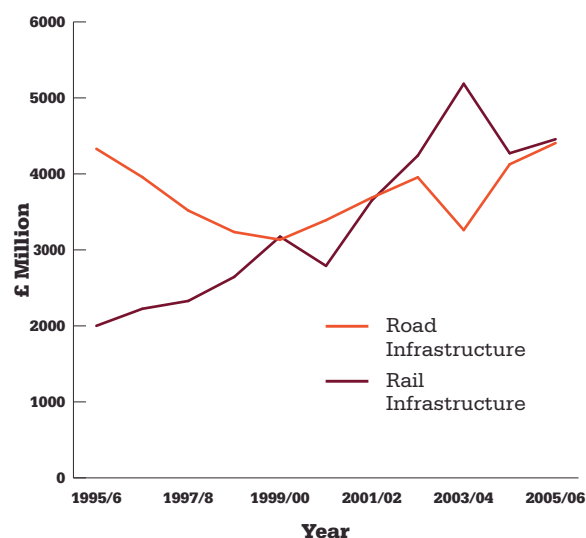


Figure 6: UK investment in transport infrastructure 1995–2005

Since 1995, investment in the UK rail network has been steadily increasing (**Figure 6**). However, much of this investment is focused on passenger rail, rather than freight. This is recognised by the DfT, which states that investment in rail freight has been 'highly constrained'²¹ and that the High-Level Output Specification (HLOS) will be focusing on passenger services.

At the same time, the DfT states that the Government is keen to ensure that the HLOS is consistent with the 'reasonable requirements of freight operators' giving recognition that freight by rail has the potential to deliver both environmental benefits and a reduction in road congestion.

In this regard, it is clear that there is a gap in expectation against delivery. Rail freight has the potential to deliver substantial carbon benefits to the UK; however, based on current growth estimates, these benefits will be curtailed by a lack of specific investment in rail freight.

Specifically, the rail-freight sector's projected growth is already severely constrained by railway capacity and other concerns such as inappropriate gauging for new market sectors.

Without substantial investment and support to rail freight operators, this shift will not happen, and, with current projected growth rates for rail freight in mind, the hoped for carbon savings will not materialise.

Investment in rail freight needs to be sustained and well thought out to deliver a substantially greater growth in the sector than is currently forecast.

The demand for investment in rail-freight infrastructure is there and the economic and environmental motives are clear, so let us invest wisely and deliver sustainable benefits for future generations.

TARGETED INVESTMENT IN RAIL FREIGHT

Any investment in the rail-freight sector would be long-term and deliver benefits for generations to come.

The recent Eddington report¹⁴ highlighted sustained investment in the UK transport infrastructure within three strategic areas:

- City catchments;
- Inter-urban corridors; and
- International gateways.

He also makes a direct call for investment in the UK's rail infrastructure, a position the Institution supports.

The economic case for targeted new rail-freight infrastructure development and current infrastructure improvements is strong. In particular, deep-sea and container ports are already facing heavy levels of congestion¹⁴ and gauging problems mean that the rail-freight industry is unable to capitalise fully upon key market opportunities.

The Government has recognised the importance of rail freight, but, as yet has provided very little solid or targeted financial backing to rail-freight initiatives:

There have been legislative moves to make the attainment of planning permission for freight terminals more streamlined:

1. Investment to boost capacity through the development of a strategic freight network via the provision of £200 million under the statement of funds available (SoFA)⁵
2. Development of further high-speed rail links has the potential to free up capacity through a shift in passenger volumes
3. The idea of a 24/7 railway has been proposed, along with all the technical and operational difficulties this would bring
4. There has also been the set-up of the Rail Environmental Benefits Procurement Scheme for which the Government has pledged £4 million¹⁰.

On the face of it, these all seem a little inadequate, particularly when considered against the challenge the transport sector faces to reduce carbon emissions, and the possibility that, if the transport sector fails to reduce its emissions; the UK will fail to meet its targeted emissions reductions.

Looking at this challenge, if the Government truly wishes to reduce carbon emissions from the transport sector, it must:

- 1.** Take a holistic view of the passenger and freight railway networks and invest accordingly to meet expectations from both these important sectors.
- 2.** Continue investment for the enhancement of passenger lines, including the development of a new north-south high-speed passenger line. This would release some capacity, allowing freight to gain extra routes.
- 3.** Undertake a full examination of the entire rail network and prioritise some under-utilised routes for freight. Additional investment should be made to link priority freight lines to allow rapid movement of freight around cities, thereby reducing congestion and costs.
- 4.** Additional investment should be taken to ensure freight lines are capable of taking container freight from all major UK ports (spokes).
- 5.** Development of freight centres (hubs) servicing all major UK cities and towns, including extensive development of access roads to the hubs for regional/local road distribution.

If aspirations for a greener economy are to be realised, the Government needs to make strategic long-term decisions and implement far-reaching policy. Doing this will not always be popular with the voting public, nor will it be easy to implement. However, unpopular decisions for the right reasons will ultimately deliver benefits to everyone.

Rail networks should be designed with long-term sustainability in mind and there is currently a lack of joined-up policy beyond 2015. This means that designing the nation's infrastructure is not being done with future generations in mind. Future generations will not thank the decision makers of today for their lack of foresight.

While governments and their policies change, this does not mean that politicians should be afraid to look beyond their term in office. In the case of rail freight, this is what is needed.

The Institution acknowledges that the investment required for these projects would be substantial – as would the number of construction and manufacturing companies required to bring this new network to fruition. However, this solution could provide a viable economic stimulus sought by the Government and also help counter some other transport 'hot potatoes' eg. Heathrow runway 3.

Finally, the 'hub and spoke' freight network would assist in reducing congestion on the UK road network. If even only a quarter of the congestion were to be eliminated, the UK would save £2 billion a year in lost business.

“ ”

**DEEP-SEA CONTAINER TRAFFIC
IS EXPECTED TO QUADRUPLE
OVER THE NEXT 25 YEARS. IS
THIS THE NEXT BIG MARKET FOR
THE RAIL FREIGHT INDUSTRY?**





OPPORTUNITIES FOR
RAIL FREIGHT

Government targets for rail freight have historically, focused on four key market sectors⁷:

- 1. Traditional bulk markets;
- 2. Niche traditional markets such as cars, manufactured goods and express parcels;
- 3. Deep sea containers; and
- 4. General freight, in unitised loads, such as swap bodies, containers or trailers.

Of these market sectors, coal accounts for 33% of freight movements, metals 19%, the construction industry 16% and petroleum 4%. Considering this, people could mistake the route forward for rail freight as being simple.

Traditional bulk markets account for 72% of the volume of rail freight¹³, these products have proven markets and the rail freight sector has proved that it can handle them effectively and efficiently.

However, a shift in the UK from manufacturing of bulk, unprocessed raw materials into end products, towards the sourcing of already finished products, now means that the rail freight industry, and in some ways the UK Government, need to rethink their approach.

As the UK economy 'greens', so will the goods it requires. This is extremely pertinent with regard to traditionally rail-freighted goods such as coal, minerals, aggregates and wastes.

Figure 7, backs up this assertion by showing year-on-year tonne kilometres moved by rail for metals, construction materials and oil & petroleum, illustrating that there has not been any substantial growth in the movement of these commodities by rail over the last ten years, with the exception of coal.

While **Figure 7**, shows the substantial increase in coal/coke tonne kilometres moved by rail since 1998, it also belies the reality that, while tonne kilometres of coal/coke movements have increased, the overall total volumes moved have not⁴.

This leaves rail freight in a quandary; its traditional markets are not growing at any significant rate, yet the projections are for substantial growth within the rail-freight sector. Therefore, this begs the question: where will this growth come from, and can rail freight capitalise upon it? In answer, it is the growth in deep-sea container traffic to the UK.

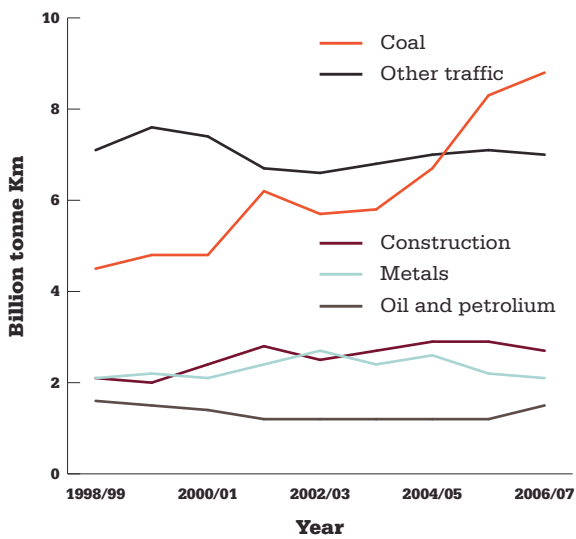


Figure 7:
Rail Freight tonne km by core commodity

THE CONTAINER MARKET

As an island, the UK relies heavily on sea freight to deliver the goods required to feed the UK's consumer economy. This means that ports are expanding and the opportunities for rail freight to haul deep-sea containers are increasing as well. This is shown in **Figure 8**, which illustrates the growth in deep-sea containers arriving at UK ports since 2000, highlighting the opportunity available for rail freight to capitalise upon this increase, so long as it has the capability/capacity to do so.

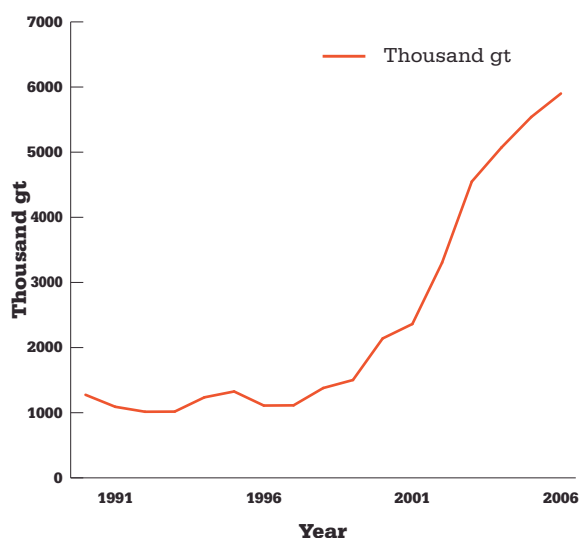


Figure 8:
Growth in container traffic to the UK 1990–2006

DEVELOPING NEW HABITS FOR NEW MARKETS

While the rail-freight industry has a solid track record in heavy goods, the industry needs to continue to diversify its business streams into non-traditional sectors. In addition, the rail-freight sector needs to manage a large number of product categories within a single freight load.

Rail freight has traditionally dealt with high-volume, high-density products. Consumer markets need a freight service provider capable of dealing with high-volume, low-density products.

Considering retail logistics as an example, products are, on the whole, moved by HGVs because of the delivery point flexibility these offer. Any one product will be handled or moved on a number of occasions. Every time the product stops moving, it costs money to store. Every time that the product is handled, it costs money to handle. Every time the product is moved, it costs money to move. So, the challenge for the rail-freight industry is whether it can handle the product more efficiently, store it for shorter times and, ultimately, charge less to move the product?

As retailers increasingly optimise their distribution centres according to the locations of their stores and the quality of transport networks near by, if rail freight provides a viable, cost-effective service, it will be given serious consideration.

Rail freight can play its part in an effective integrated logistics system so long as it makes good cost-sense and, increasingly for socially and environmentally conscious companies, it makes good carbon-sense.

Unfortunately, the uncertainty and risks that transition of non-traditionally rail-freighted goods onto rail brings, provide a significant barrier to any moves towards rail freight for traditionally road-freighted goods. Helping businesses investigate these risks and providing a route through which they are able to make long-term decisions under lower-risk scenarios, would help them decide whether rail freight has the potential to fit into their current, or future, business models.

The rail-freight sector, and the UK Government, have a role to play in helping businesses make this decision. Before this though, it is worth considering that, for some products, the rail-freight industry does provide a viable alternative, while for others there is a long way to go before rail freight becomes a substitute for the HGV.

Essentially, business requires a volume of a good to be taken from point A to point B, departing on schedule, keeping the goods safe, secure and unbroken during transit, and arriving at their destination on schedule, so that they can meet their customers' demands. It is an integral part of most business logistics and any shortfalls have the potential to create great expense and damage reputations, particularly for those brands reliant upon the provision of high-quality goods within short notice periods. These brands are often also the ones which see the greatest added value benefits through improving their carbon track record.

While rail freight has had some success in acquiring contracts transporting the so-called 'fast moving consumer goods' for retail brands, the cynics among us may say that this has provided these brands with greater PR mileage than they have provided the rail-freight industry with tonne kilometres.

There has not been a substantial shift in volumes of faster-moving consumer goods to rail freight, and unless incentives, and aligning of policy, are provided, this is unlikely to happen in any volume within the near future.

For those businesses branding their products with carbon labels or marketing themselves upon carbon credentials, rail freight does have the potential to provide a lower carbon option, however rail freight's potential to provide substantial value beyond the financial needs to be established with these businesses. This in turn will be reliant upon businesses establishing an ethos in which value beyond the balance sheet is recognised and rewarded.

It is the view of the Institution that Government, with the railway sector, needs to encourage and educate businesses on the low-carbon benefits of railway transportation of their products over long distances with quick and easy distribution points (hubs) for localised retail/manufacturer delivery.

Furthermore, Government and the sector should investigate the development of an industry and consumer 'Low Carbon Transit Impact' labelling system – very much like the current 'Air Freight' labelling being introduced by supermarkets. This would demonstrate to consumers a company's commitment to reducing its CO₂ output from manufacture to store delivery. Again, it would not be overly taxing to estimate carbon expenditure from key ports to towns and cities throughout the UK.

This recommendation is a continuation of the IMechE 'Green Ticketing' proposal introduced in the 2008 Low-Carbon Mobility report where all passenger ticketing for road, rail and air transportation would show the expected CO₂ emissions value.

MARKET 'SHARE' OR MARKET SHARE

At present, many of the arguments promoting rail-freight focus upon the unsustainable factors associated with road freight. These arguments often fail to recognise that rail freight facilities still require road infrastructure and the use of road haulage in many situations.

Railways carry a substantially lower total volume of goods than the roads, however a single freight train journey carries a substantially greater volume than a single HGV, so, an adversarial approach between rail and road clearly does not fit with the marketplace thinking.

While the carbon benefits of rail are clear, road freight can expect to deliver only technological improvements that reduce emissions by 30–40%¹.

Sooner, or later, the transport sector will be expected to deliver environmental improvements on a grand scale. The options to achieve these are limited and will, ultimately, be achieved only through reduced vehicle miles on the roads.

This poses the question of whether the rail and road freight industries might promote themselves better through an exploration of the synergies that an integrated road-rail-road or port-rail-road logistics solution may deliver, particularly for longer-distance journeys.

Long-haul routes show the greatest propensity towards rail and, perhaps, the greatest opportunities for synergy between road haulers and rail-freight companies.

The rail-freight sector needs to be smart. HGVs have the capability and flexibility to reduce empty journey miles. In other words they can, to a greater extent than rail, maintain trailers on the road with goods in those trailers. Meanwhile, rail freight, being constrained to fixed tracks, does not always have this flexibility. On the other side of the coin, rail freight can carry large volumes, long distances, very efficiently in a single journey, with a low carbon loading upon those products.

In essence, the rail-freight industry should capitalise upon the opportunities available to localise road freight, freeing up the already congested long-distance road arteries. Delivering both economic and environmental benefits to the UK through a shift in thinking towards reducing road-freight mileage, rather than seeing rail as a direct alternative to road freight.

The rail-freight industry will harness the opportunities available through the trend towards outsourced distribution only if supply chains start to consider rail freight within a whole-supply chain picture, in which transport by rail is just a part of the service, with freight handling, storage and movement all being managed by a single entity.

With the creation of a well-structured freight hub network throughout the UK, HGVs would be required to move freight on a regional basis. LGVs, which have very high emissions, would be constrained to local distribution where HGV presence is prohibitive or undesirable.

This collaborative proposal has the additional benefit of supporting the UK road-haulage network that has, in recent years, been under increasing competition from European haulage companies, which are often cheaper than their UK counterparts. Regional distribution from rail-freight hubs would not be of practical use to haulage companies outside the UK unless they establish a UK presence. This would therefore either strengthen the UK haulage industry or bring external investment in to compete in the UK regional haulage market, thus providing jobs and revenue to the UK.

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