# A Fare Return: Ensuring the UK's railways deliver true value for money

# Contents

# Glossary

**Externalities**: In economics, an externality (or transaction spillover) is a cost or benefit, not transmitted through prices, which is incurred by a party who did not agree to the action causing the cost or benefit.

**Social value:** Social Value is created when resources, inputs, processes or policies are combined to generate improvements in the lives of individuals or society as a whole. It is an area where is it often difficult to measure the value created.

**Outcomes**: An outcome is the change that results from an activity e.g. improved transport. Outcomes can be both positive and negative.

**Outcome indicators**: An indicator is a 'way of measuring' that an outcome, or change has taken place e.g. the seats to passenger ratio is an indicator of passenger comfort.

**Modal shift**: The transfer of travellers from the carbon-intensive 'road mode' to the cleaner 'rail mode'.

**Net present value (NPV):** The value in today's money that is expected in the future, minus the investment required to generate the activity.

**Discount rate:** The rate used to discount future costs and benefits to a present value

**Passenger mile:** Each mile or kilometre of line travelled by a passenger is known as a 'passenger mile' or 'passenger kilometre'. The total number of passenger kilometres is the total number of kilometres travelled by all passengers on the railways each year.

**Gtkms**: Giga tonnes kilometre. This is a measure of energy demand, tomes refers to tonnes of oil equivilant. (1 Gtkm = $10^9$ tkm)

**Gpkms**: Giga passenger kilometre. This is a measure of passenger transport activity.

**Gkms**: Giga kilometres. This is a measure of distance.

# Executive Summary

It seems that Britain's railways have been in a state of crisis for decades. It is possible to trace this malaise to reforms in the 1980s, which resulted in a shift in emphasis from a social model to a business-oriented approach. This paper argues that that this shift has proved to be a big mistake. The emphasis on turning a profit has undermined the quality of the service, and the process of privatisation has been badly mishandled.

Focusing heavily on profitability has for too long diverted attention away from important strategic questions that should be answered. What are our railways really for? And how can they deliver the best value across the 'triple bottom line' of social, environmental and economic outcomes?

The Labour Government of Gordon Brown commissioned Sir Roy McNulty to examine how to get better value for money from the UK's railways. The current Government has thrown its weight behind the McNulty review, with the Secretary of State for Transport querying why the UK has "the most expensive railways in Europe".

A large part of the McNulty review has involved examining rail services elsewhere in Europe, to see what lessons can be learned. This report, commissioned by the RMT union, is in a similar vein. It seeks to quantify the value for money offered by the UK's rail system and compares this with the experience of four other European countries of a similar size, demography and economic status – France, Germany, Italy and Spain.

While McNulty's remit is to compare the cost of the UK's railways with those in other countries, this report goes further. It looks at the relationship between costs and outcomes, emphasising the importance of an expanded concept of value for money that reflects the full spectrum of what passengers are looking for from the railways.

Compared to the publicly owned railways that we have examined in other countries, the UK's privatised rail system lags behind on a range of outcomes. By constructing an index that evaluates these outcomes in relation to levels of public subsidy, we have found that the UK is the poorest performer by some distance. Our figures show that UK rail services are:

- Less affordable
- Less comfortable

- Slower
- More inefficient
- Less environmentally friendly.

Across a range of indicators, the frequency of trains is the only area in which the UK performs better than its comparators.

Our under-performing railways carry a considerable cost both for passengers and for the public purse. Our calculations show that a more affordable, more comfortable and faster railway would generate a staggering £324 billion in social value (£9.2 billion a year) between now and 2050. This is the equivalent of £7 of value per average journey in that period.

The other countries that we have examined – and in particular France, which tops our index – demonstrate the potential benefits of integrated management and public ownership, coupled with long-term sustained investment. Between 1995 and 2003 total public support for the rail sector was above 0.5% of GDP in France, Germany and Italy. In the same period the figure for the UK was only 0.22%. Although the UK is now approaching French levels of investment, the under-investment of the past has taken its toll. If fares in the UK were similar to those in France, passengers here would save £162 billion over the next 35 years, or £4.6 billion annually.

We have also looked at the issue of social exclusion in relation to UK rail services. Compared to other areas of concern, social exclusion tends to get little attention when it comes to matters of transport policy – and rail transport policy in particular. What we know, however, is that an emphasis on prioritising the road network in transport spending, coupled with the rise of out-of-town retail centres and other facilities that are often poorly served by public transport, has exacerbated issues of social inequality.

The poorest people in the UK have low car ownership compared with their counterparts in other countries, and they are consequently bigger users of public transport. Bus and rail fares have skyrocketed since privatisation and deregulation, yet up to 50 per cent of people in the UK do not have access to some kind of basic service (such as schools, hospitals and food stores) by public transport. Spending has tended to favour the most lucrative routes and those where passengers are prepared to pay most, rather than where the service needs of lower earners are greatest. Overall the poor find themselves paying over the odds for services that meet their needs only partially at best.

Contrary to perceptions, although middle and high earners use rail services the most, trains make up a relatively high proportion of the travel modes of lower earners. Train fares in the UK are the most expensive in Europe, and any increases disproportionately hit low- and middle-income passengers.

We are in the midst of the deepest spending cuts in living memory, and everyone is concerned with getting value for money from public services. It was in pursuit of value for money that privatisation was first introduced. Value for money was defined at the time in very narrow terms, based on an imperative to move people around at the lowest cost. Even on these terms, before wider considerations of social value and passenger satisfaction are taken into account, privatisation has not been successful.

Subsidies have increased by 300 per cent, when privatisation was meant to save public money. Passenger numbers have increased too but most commentators agree that this would have happened anyway because of broader economic trends. Then there is the additional burden of leakage costs (profits that are paid out in dividends to shareholders) and interface costs (the transaction costs that result from having multiple service providers in competition with each other).

Our calculations show that leakage and interface costs amounted to more than £883 million in 2009 alone, and more than £6.6 billion between 1997 and 2009. Between 2000 and 2007 these avoidable costs represented almost a fifth of the entire public subsidy paid to the rail industry. These costs are based on the profits of the industry, so it is difficult to estimate what they might be in the future. However, if we take the average of the past five years (£744 million) and project it forward for the next ten years, we arrive at a discounted value of £6.7 billion.

Of course it is not possible to 'prove' that the biggest problems of the UK's railways are causally related to their ownership model. But it is easy to identify some of the reasons why privatisation has not delivered what it promised. The theory behind privatisation was that private sector discipline would improve the incentive structure, driving up quality and driving down price. This simply has not happened.

Upon privatisation, British Rail went from an integrated entity to a loose grouping of more than 100 companies. Each was working to its own set of incentives, many of which were in conflict with each other. High interface costs and a lack of coherence in strategy and management were almost inevitable.

It is difficult to argue that any significant level of risk has been transferred to the private sector. In practice the Government has sometimes had to play the role of operator of last resort, replacing franchises on South Eastern and on East Coast (twice) since privatisation. Profits have been privatised, but risks remain socialised.

The rail industry has the potential to make a significant contribution to combating climate change. Many believe that in order to meet binding emissions reduction targets, the UK will have to make a 60 per cent cut in transport-related emissions. By 2030, it is anticipated that 96 per cent of transport emissions will come from private forms of transport and trucks if current trends continue unchecked.

In this report we have modelled the 'modal shift' that would be required from road to rail in order to cut transport emissions by 60 per cent. Because of the carbon intensity of freight transport, the greatest shift from road to rail needs to happen in freight (as much as 53 per cent by 2050). But car travel is a significant carbon emitter too: even if we assume that half of the cars on the road are electrified by 2050, we still need to achieve a 12 per cent shift from passenger cars to rail.

The UK is predicted to have higher emissions per capita from transport than all of our sample countries except Spain. It is our contention that this is partly because these countries have for decades invested more heavily in their rail systems and managed them more strategically under public ownership.

If we are to achieve binding climate change reduction targets by 2050, then transport – one of the most energy intensive sectors, needs to make a significant contribution. Because of the lack of alternatives to diesel engines, replacing trucks with rail freight should be an immediate priority.

The scale of this challenge is daunting. Private car travel has been increasing its share of transport use for decades, and this trend is set to continue. But the challenge is worth meeting head on because the benefits could be so significant. We estimate that the social, economic and environmental benefits of achieving a modal shift from road to rail – in terms of reduced congestion, accidents and emissions – could potentially reach £154.8 billion by 2050.

When we combine this estimate with our previous figures showing improved outcomes for passengers, we can calculate that the total social value of the strategic shift that we propose in this report is in the region of £479 billion. The following table gives a breakdown of the values. Over a 35-year period it translates into £479 billion, or an annual average of over £13 billion a year.

| The potential social, economic and environmental value of better railways, 2015 -2050 (£ billion) | | |
|---|---|---|
| **Outcome** | **Total value over 35 years** | **Annual average**[1] |
| Affordability | 162 | 4.6 |
| Comfort | 104 | 2.97 |
| Road congestion | 73 | 2.08 |
| Speed | 58 | 1.65 |
| Climate change | 54 | 1.54 |
| Road accidents | 27 | 0.77 |
| **Total** | **479** | **13** |

The untapped potential of a modal shift from roads to rail highlights another way in which the privatised model presents a problem. It is clear that such a radical shift will not be achieved if left solely to the market. Publicly owned forms of transport have an important advantage in this regard, as they are far less reliant on lots of individual travellers making the 'right' decisions. Decisions that are taken centrally about what is in the public interest can take effect far more quickly.

Beginning with a commitment to a 'great car economy', the UK has had an unofficial policy of promoting private transport over public for decades. Since 1980 the car has become cheaper year on year relative to rail and bus travel and we have ended up with the longest commutes, the most congested transport links and the most inaccessible services in Europe.

The challenges posed by climate change make matters even worse. The UK is unique among the countries we have looked at in that it has lost control of its railways, making it less well placed to drive the kind of behavioural change in transport use that is needed to cut emissions significantly. With the Government keen to reduce the burden of public services on taxpayers, we are seeing more of the cost of rail subsidies being transferred to passengers. If this further incentivises road travel over rail, then the impact could be very damaging in climate terms.

The interim McNulty report is right to highlight that the cost of the UK's railways has increased significantly since privatisation and that a lack of leadership and a clash of duplicating and competing interests in the industry have contributed to this. Our research shows, however, that publicly owned, integrated railways *can* provide better service and better value for money for taxpayers and passengers. It is now vital for the Government to act decisively to make an objective and transparent assessment of the best way to organise Britain's railways so as to maximise social, environmental and economic value.

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[1] This figure would of course vary significantly over this period, as the annual values vary and are reduced by the discount rates applied.

# Introduction

Launched by the previous government in late 2009, the McNulty review is the latest in a series of reviews that have sought to make improvements to Britain's railways. McNulty's is the first to explicitly assess the 'value for money' provided by the rail industry for passengers and government, prompted by high levels of public dissatisfaction with escalating fares.

When they visit other European countries, travellers from the UK are often left wondering why trains are more reliable and comfortable, less overcrowded and, of course, cheaper. This report was commissioned by the RMT to compare the value for money of the UK's railways with what is on offer in a selection of other European countries of a similar size and socio-economic make-up. We begin by presenting our definition of value for money, which frames the findings of the research.

It was in pursuit of value for money that the railways were first privatised in the 1990s, reportedly for the paltry sum of £5 billion (Jack, 2001). This was guided by a belief that the State was inherently inefficient, and that improvements would only come about through the introduction of competition and private sector discipline.

Since then, however, few things have gone according to plan. Fifteen years later, a public subsidy increase of more than 300 per cent has been accompanied by only negligible improvements in performance in some areas, and a worsening travel experience for many passengers.

Now, in the context of the deepest public spending cuts in living memory, value for money is back on the agenda. Many sectors, including transport, will be forced to retrench significantly. A key concern, and one this report explores, is how value for money should be defined and evaluated in these tough times.

At the time of rail privatisation value for money was defined in narrow private-sector terms, based on delivering increased outputs for fewer inputs. This definition may work well if you are manufacturing tables: the more tables you make at a lower cost, the greater your profit margin. But what this definition does not account for is any measure of quality of service, or the impact of the rail industry on other stakeholders.

If, for example, lowering costs forces people to work for salaries that deny them a living wage, then the 'efficiency gain' that has been made needs to be questioned. If rainforests are cut down in the process of making tables, then this will have a knock-on effect both on the communities that rely on the forests for their livelihoods and more broadly on the climate too. A simple input-output model of efficiency does not capture ‘dependencies’ such as these.

When it comes to public services such as health and education, we see similar issues at work. A focus on outputs brought us shorter hospital waiting lists but no linked improvements in health outcomes. Waiting times were used as a proxy for wider health outcomes, but this did not help to make a better job of allocating limited resources to the things that matter most to people.

Recent years have seen a move away from a constant emphasis on targets and outputs, so we use the waiting list example merely to illustrate a point. What we have not seen, however, is it being replaced by a genuine focus on outcomes. Indeed budget cuts have forced an old conversation about percentage spending on competing areas of policy back onto the agenda.

In the rail industry value for money is usually understood to mean moving people from A to B at the lowest financial cost to the State and passengers. It was intended that privatisation would (among other things) support that aim. Today however, after decades of experience with privatisation across a range of sectors, that definition of has come to be widened as far as public services are concerned.

The UK Treasury offers one of the best definitions of how value for money should be defined, describing it as the “optimum combination of whole-of-life costs and quality (or fitness for purpose) of the good or service to meet the user’s requirement”[2]. Specifically, the Treasury definition states that it is *not* “the choice of goods and services based on the lowest cost bid”.

The Treasury also recognises that in a good appraisal of value for money “the wider effects on other areas of the economy should also be considered”. In other words, best value (rather than simply lowest cost) is what is important. No longer should services be judged simply by throughput and unit costs but instead the relationship between costs and outcomes should be considered.

Inspired by this idea, this paper aims to evaluate the ‘social value’ of the UK’s railways, now and in the future. By social value, we mean the value as defined by stakeholders affected by an intervention.[3] In the case of rail this means more than just input costs for government, or fares charged to passengers. It means asking what the rail system is really for, what role it should play in society and how its benefits can be distributed as widely as possible?

It is important to note that the UK is almost unique in its attempts to view the value of the rail sector in purely commercial terms, using profit as the key indicator of success. What we should be doing is thinking about the wider contribution of our rail

[2] HM Treasury (2003) *The Green Book* http://www.hm-treasury.gov.uk/data_greenbook_index.htm

[3] See Nicholls et al (2009) *A Guide to Social Return on Investment,* UK Cabinet Office

system to the achievement of social and environmental goals, as other countries do. By fully recognising the societal contribution that rail transport can make, some of our European neighbours have tended to treat the sector in a far more strategic and long-term way. We also need, like other countries, to be guided by all the things that passengers say they want: not just cheaper fares, but also more comfort and less over-crowding.

It is within this context that we have assessed the current status of the railways in the UK. We set out to compare performance in the UK across a range of indicators with the rail systems in four other European countries. We assessed the kind of 'modal shift' in transport use there would need to be, and the structural changes that would need to be made, to achieve pressing climate change targets. And finally we reflected on the potential social and economic consequences of achieving improvements in standards along European lines.

The four countries we chose to make our comparisons are France, Germany, Italy and Spain. These are good comparator countries in terms of population size and socio-economic factors such as levels of disposable income.

## Report structure

Our report is divided into four sections. In the first we compare the UK's performance with that of other European countries. We construct a performance index that compares rail outcomes in a wide range of areas to the inputs needed to achieve these, ranking the countries examined (i.e. inputs to outcomes, or 'bang for buck', if you like).

Next, in section two, we explore the issue of social exclusion and transport. This is followed in section three by a discussion of why privatisation has failed to transform the UK's railways as was originally envisaged. We highlight the problem of financial 'leakage' from the system.

In section four we look to the future, placing the UK's rail infrastructure in the context of the role that transport needs to play in meeting environmental targets. To do this we estimate the 'modal shift' from road to rail that is needed to meet pressing climate change targets. We conclude by evaluating the total cost of an underperforming rail system, setting out the implications of our findings for the future of the railways.

# Part 1: Value for money: comparing the UK's railways with others in Europe

A number of benchmarking studies have been undertaken to evaluate the performance of the UK's rail system. Generally these have been quite narrow in focus. For example, the recently published Passenger Focus study, which examined train fares and ticketing procedures, compared operators and regions within the UK and also benchmarked the UK against other European countries. As mentioned earlier, the McNulty review is benchmarking costs but not outcomes.

There has yet to be a broad comparison of performance outcomes in the UK's rail network across a range of indicators, and a comparison of these outcomes with inputs. Our first section begins by constructing an index to allow us to assess performance according to a much broader and more rounded picture of what constitutes value for money.

Reflecting on the Passenger Focus report mentioned above, we see that the UK does not perform well, with fares that are generally considerably higher in the UK than elsewhere. This is illustrated in Table 1.

Table 1. Average fare costs in the UK compared with other European countries (£/km)[4]

| | Day return (DR) | Restricted DR | Season ticket | Long distance | LD advance (1st City) | LD advance (2nd city) |
|---|---|---|---|---|---|---|
| UK | 0.26 | 0.17 | 0.14 | 0.49 | 0.15 | 0.19 |
| Germany | 0.17 | 0.17 | 0.08 | 0.28 | 0.13 | 0.10 |
| Switzerland | 0.15 | 0.14 | 0.04 | 0.39 | 0.18 | 0.14 |
| Netherlands | 0.13 | 0.12 | 0.08 | 0.34 | 0.20 | 0.18 |
| Sweden | 0.13 | 0.13 | 0.06 | 0.21 | 0.10 | 0.08 |
| Italy | 0.12 | 0.11 | 0.04 | 0.22 | 0.10 | 0.07 |
| Spain | 0.09 | 0.09 | 0.07 | 0.24 | 0.16 | 0.09 |
| France | 0.08 | 0.08 | 0.08 | 0.15 | 0.06 | 0.05 |

[4] Adapted from Passenger Focus data but recalculated in terms of pounds sterling per passenger kilometre.

If these higher fares were leading to superior outcomes in the UK rail sector, then they might be considered a price worth paying. But as we shall see, this does not appear to be the case.

It is important to note that for the purpose of our evaluation, it is the outcomes themselves that are of most importance. What people want – and what is needed both economically and environmentally – is a well functioning, affordable rail system. The efficiency with which this can be delivered – the 'return on investment' – is also important, of course. We are interested in achieving the best outcomes in the UK's rail system, and we are concerned with doing this in the most cost-effective way.

## 1.1 Inputs to the national rail systems

The input indicators[5] we used were as follows:

- Infrastructure investment[6]
- Rolling stock investment[7]
- Total public subsidies[8]
- Infrastructure subsidies[9]
- Passenger operator subsidies[10]
- Employee productivity[11].

In each case, a variety of sources were used. As well as official data from sources such as Eurostat and the World Bank, and bodies such as the International Transport Forum (ITF), we drew upon a range of academic studies.

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[5] For some outcomes, such as affordability, identifying a suitable indicator is also straightforward. For others, however, the task is complex and more than one indicator may be required. See Table 5 for details of how we approached this.

[6] Eurostat and ITF

[7] World Bank Rail Database

[8] Nash (2002) and AMTRAK (2008)

[9] ibid

[10] ibid

[11] World Bank Rail Database

| Table 2. Infrastructure investment, 1995-2008 | |
|---|---|
| Country | % of GDP |
| France | 0.23 |
| Germany | 0.27 |
| Italy | 0.42 |
| Spain | 0.19 |
| United Kingdom | 0.35 |
| Source: ITF | |

For example, Table 2 gives estimates of total infrastructure investment between 1995 and 2008, expressed as a percentage of GDP over the same period. As we can see, the UK is the second highest in the group, with much of this investment having occurred in later years – i.e. post-Hatfield.

In other areas, such as rolling stock investment, the UK's performance is much worse at 0.1% of GDP – compared to 0.9% in France, for example.
Total public subsidies supporting the UK rail network have risen sharply, as shown in Figure 1.

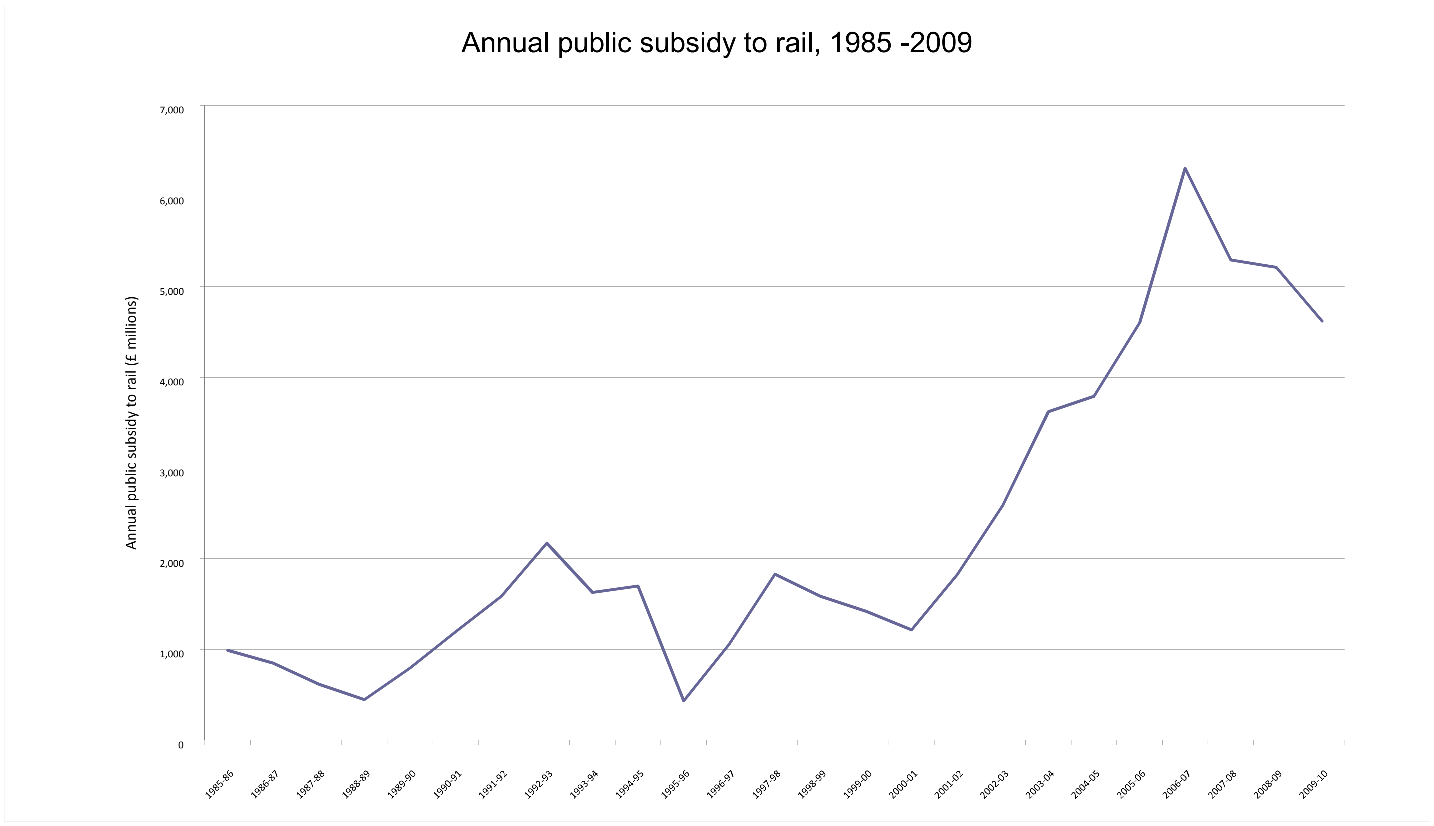


**Figure 1: Annual public subsidies to rail**
*Source: ORR*

Although public subsidies to the rail network have now reached levels comparable with those in France, this follows a long period of substantial underinvestment. For example, between 1995 and 2003 total public support for the rail sector was above

0.5% of GDP in France, Germany and Italy. The figure in the UK, however, was only 0.22%. When considering the outcomes we see today in different rail systems, it is important to factor in the impact of sustained support and investment. We should not lose sight of this when the rail budget is under threat.

In each of the six areas that we looked at (infrastructure investment, rolling stock investment, three aspects of subsidies and employee productivity), we endeavoured to give countries comparable measures. For investment or costs, this was relative to GDP, so that the scale of total subsidies (for example) is given in relation to the size of the economy in question. The UK's economy is considerably larger than Spain's, but smaller than Germany's, so just looking at headline subsidy figures would not provide a useful basis for comparison.

| Table 3. Total public rail subsidies as a % of GDP, 1996-2010 | |
|---|---|
| Germany | 0.497 |
| France | 0.330 |
| UK | 0.326 |
| Spain | 0.205* |

Source: AMTRAK (2008) and author's own calculations
* The figure for Spain is likely to be an underestimate, as it does not take account of the recent increase in spending on high-speed rail.

Table 3 shows that, for the four countries under consideration[12], total rail subsidies between 1996 and 2010 were highest in Germany (0.497% of GDP) and lowest in Spain (0.205%). Levels of subsidy were higher in France than in the UK, but the difference is marginal. To take account of the fact that calculating subsidies is a very complex task with no definitive source that can be used to compare different countries, we have not relied on just this one source, but have also used academic studies (particularly Nash, 2002).

For all of the input areas described above, we have thus generated a comparable set of figures for all the countries examined (using more than one source where appropriate and possible, as in the case of subsidies). These figures have been standardised into an index form for each of the areas described, with figures ranging between zero for the lowest score (e.g. the country with the lowest level of subsidy) and 100 for the highest.

We then took a simple average of these index scores within each category, to produce a Total Input Index.

[12] Italy was not included in this particular measure, but was used in other measures from the same source. This patchiness is very common with data in this area, demonstrating the need to use a range of sources to get as accurate a measure as possible.

For each category we have used the following formula[13] to calculate the index score, which is bounded between zero (no inputs) and to 100 (maximum inputs):
$Si = ( Xi – Min Xi) / ( Max Xi – Min Xi) \quad i = 1,…,n$

This is where Si is the specific index value produced by factor X; Xi is the value assumed by the observation (e.g. infrastructure investment as a percentage of GDP); and Min Xi and Max Xi are respectively the minimum and maximum value assumed by the variable X over all the sample observations.

Using this method, the Total Input Index for our sample countries is as shown in Table 4.

| Table 4. Total Input Index | |
|---|---|
| Italy | 72.58 |
| France | 57.07 |
| Germany | 38.87 |
| UK | 31.33 |
| Spain | 13.71 |

As we can see, Italy is the country in our group that has seen the most inputs into its rail sector over the period (broadly 1995-2008). The next highest is France, followed by Germany and the UK.

The country with the lowest inputs – by some distance – is Spain. But it is important to bear in mind that this does not factor in Spain's recent sharp increase in investment in high-speed rail (HSR).

## 1.2 Outcomes from the national rail systems

The same methodology was then applied to outcomes in the following outcome indicators:

- Fares (£ per km)[14]
- Frequency of trains[15]
- Electrification of network[16]
- High-speed rail coverage[17]
- Passenger numbers compared to numbers of available seats [18]
- Freight market share to size of the economy[19]

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[13] The formula used is the standard approach to calculating an index, as used by organisations such as the United Nations to construct the Human Development Index (HDI). The method compares performance relative to the best performing in the group (which receives a score of 100) and the worst performing (which receives a score of zero). Each country then has a number that illuminates where it sits in relation to the top and bottom of the scale.
[14] Passenger Focus (2009)
[15] ibid
[16] Eurostat
[17] Eurostat and ITF databases
[18] Eurostat and World Bank Rail Database
[19] ibid

- Efficiency of wagon use (i.e. the extent to which available wagons are in use)[20]
- Efficiency of coach use (i.e. the extent to which available coaches are in use)[21].

These indicators capture outcomes in the following areas:

- Affordability
- Convenience
- Speed
- Comfort
- Economic efficiency
- Environmental performance.

Table 5 shows how these outcomes relate to our suite of indicators:

| Table 5. Outcomes and indicators | |
|---|---|
| Affordability | Fares |
| Convenience | Frequency of trains |
| Speed | High Speed coverage |
| Comfort | Passenger numbers to available seats |
| Economic efficiency | Efficiency of wagon use<br>Efficiency of coach use |
| Environmental performance | Electrification<br>Freight market share to size of the economy |

An important area that is missing from this analysis is punctuality. This is unfortunate, but we have been unable to obtain good, comparable data on train punctuality across our sample countries. It is possible to get figures on punctuality for the UK, where there has been a significant improvement in very recent years (following a sharp deterioration post-privatisation). Anecdotally, we do know that punctuality is also high in countries such as France and Germany. However, without concrete data it is not possible to make meaningful comparisons.

While the picture on inputs was mixed from the UK perspective (relatively large investments had been made in some areas but not others), for the outcomes our findings are much more clear-cut.

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[20] World Bank Rail Database
[21] ibid

| Table 6. Ranking of outcome categories | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rank | Fares | Frequency | Electrification | High Speed Rail | Passengers to seats | Coach productivity | Freight productivity | Freight market share |
| 1 | France | UK | Germany | Germany | Italy | France | France | Germany |
| 2 | Spain | Spain | Italy | Italy | France | Germany | UK | France |
| 3 | Italy | France | Spain | Spain | Germany | Italy | Spain | UK |
| 4 | Germany | Italy | France | France | UK | Spain | Germany | Italy |
| 5 | UK | Germany | UK | UK | Spain | UK | Italy | Spain |

As we can see, the UK is ranked last in four categories and second to last in another. The only category that the UK tops is for frequency of trains. It is ranked second for freight productivity, which means the efficiency with which wagons are utilised in the freight sector.

| **Table 7. Total Outcomes Index** | |
|---|---|
| France | 82.54 |
| Italy | 63.76 |
| Spain | 51.94 |
| Germany | 46.14 |
| UK | 24.36 |

Not only is the UK ranked last in four out of seven categories, but we also find that where it underperforms its performance is worse than the other countries by a large margin.

This is reflected in its score in the Total Outcomes Index, which is shown in Table 7. As with the Inputs Index, this is an average of country index scores in each of the categories described above. The Total Outcomes Index is therefore a good reflection of overall performance, or 'bang for buck'. It shows just how far outcomes in the UK rail system lag behind those in comparable European countries, with the UK achieving less than half the score of the country ranked second worst.

Given the relatively large number of indicators used, our findings are unlikely to be unduly affected or skewed by performance in a particular area than would a more narrow analysis. The fact that the UK actually does quite well in two areas gives an indication of how poorly it must be performing in others to have ended up so far adrift at the bottom of the table.

| Table 8. Value for Money Index | |
|---|---|
| Spain | 3.79 |
| France | 1.45 |
| Germany | 1.19 |
| Italy | 0.88 |

| | |
|---|---|
| UK | 0.78 |

Our final table quantifies value for money, looking at all our outcomes and comparing these to inputs. It provides a measure of how efficiently inputs such as investment and productive labour are translated into outcomes for passengers and for business. As we have seen already, the UK did not have the lowest inputs from our sample group, scoring considerably more than Spain and only slightly less than Germany. Spain is at the top of the Value for Money table, however, because it has achieved very respectable outcomes considering the relatively low inputs involved.

Although Spain is the top performer of the five countries considered in terms of 'bang for buck', it is France that achieves the best overall outcomes. It is thus the French railway system that we consider to be performing best, across a range of indicators, among the countries under consideration.

Not only does the UK come bottom of the Total Outcomes Index but it also spends a relatively large amount of money to achieve this woeful result. This means that it also comes bottom of the 'value for money' league. Next we try to assess what the societal costs of this underperformance have been.

## 1.3 The costs of underperformance

In this section we place a monetary value on what it would be worth to passengers if we were to achieve outcomes comparable to those in France in areas in which the UK is currently underperforming. For the time being we are only looking at passengers as a stakeholder group. Outcomes for the State, wider society and the environment will be dealt with separately in later sections. The outcomes for passengers that we have looked at are[22]:

- Affordability (as measured by fares)
- Comfort (as measured by the ratio of passengers to seats)
- Speed (as measured by average speed).

Fares in France are four times cheaper than those in the UK. In order to arrive at a figure we have applied this fare reduction to each passenger kilometre[23] over a 35-year period (2015-2050), which gives us a discounted value to passengers of £162 billion.[24] We have chosen this time period to be consistent with the environmental outcomes that we consider later.

A comfortable train journey may seem a trivial thing but it can be highly valued by passengers. There is a particular dislike for overcrowding and for shortages of seats (Wardman, 2001). No other form of transport carries such a high risk of having to

[22] The UK already tops the group in frequency of trains, so this has not been included.
[23] Data on passenger kilometres for each country are publicly available.
[24] A standard discount rate of 6 per cent was used in all of the calculations in this section (Graham 2004)

stand for long periods at peak times, and for passengers with long commutes this can involve important working time.

As with our previous outcome, we modelled the benefits to the UK of achieving the same passenger/seats ratio as France. In order to arrive at a proxy value we estimated the differences in economy and first class fares between the UK and France. A benefit of first class is that there is always a surplus of seats, so passengers are guaranteed one. The difference in fare between first and economy classes represents what people would be prepared to pay for increased comfort, all things being equal.

According to the Association of Train Operating Companies (ATOC), the difference in fares per passenger kilometre is £0.11.[25] We multiplied this by the number of passenger kilometres, projecting on the same basis as our other calculations. We then multiplied by the difference in passenger/seat ratio between the UK and France (58 per cent). This arrived at a cost of £104 billion.

Finally, there is the issue of speed. Measures of speed are difficult to compare directly with other countries. For this outcome we reviewed the available benefit/ cost analysis that has been carried out on two proposed high-speed rail (HSR) lines in the UK (Atkins 2003). Although the Atkins study includes a range of outcomes, the majority of the benefit comes from reduced journey times for users (78 per cent of the total) and the wider economic benefits associated with these (de Rus and Nash, 2007). The remaining 22 per cent is made up of reduced road congestion and accidents, plus environmental benefits.

In our calculations we have removed the congestion and accident benefits, as these have been counted in our forecasts elsewhere (see section 4). Even though we deal with environmental benefits later, we do not (as we will explain) include air travel, whereas this is mainly what the Atkins study includes. We are confident, therefore, that we are not double counting (see section 4). The NPV as calculated by Atkins for both HSR options is £60 billion. When we strip out congestion and accidents, it is £58 billion, which is the figure that we have used.

The total estimated benefit of achieving outcomes similar to those of France in our rail system is thus over £324 billion. In the next section, we focus specifically on the issue of social exclusion and transport, which tends to get little space in policy debates.

[25] Submission by ATOC to the McNulty review. Converted by the authors from miles based on the rate of 1km: 0.621m

# 2. Unequal access: social exclusion on our railways

Transport policy and debate tend to be more concerned with mobility than accessibility, often failing to take account of whether people have access to the services they need or not. The distribution of costs and benefits tends not to be analysed either (Lucas, 2003).

From a social value perspective this neglected area is a very important one, as it gets to the heart of the question about what our railways are for. The most recent comprehensive study in the UK is from the Social Exclusion Unit (2003) who found identified lack of transport as a significant poor employment and educational opportunities and delayed or missed medical appointments (Lucas 2009). A report published in the same year by the Matisse project, established by the European Commission, concluded that poor transport is “one of a number of contributory factors [to social exclusion] and can be a very important one” (The Matisse Consortium, 2003). Unfortunately the Matisse Consortium found “a striking lack of reliable data on the link between transport (infrastructure, cost and accessibility of services, travel patterns etc) and social exclusion phenomena”.

As a result, we know much less than we should about the role that better transport facilities might play in promoting equality. This makes it very difficult to properly quantify the social inclusion implications of widening rail access. This does not mean, however, that we should neglect the task. On the contrary, far greater research is required into the relationship between transport (and rail in particular) and these issues, if we are to be able to assess the true social value of our railways.

## 2.1 The growth of out-of-town shopping

In order to understand the relationship between social exclusion and transport in the UK, it is important to place them in the context of wider demographic and social trends, and changes in the industrial make-up of our country. The UK, in common with the United States, has seen much greater growth in out-of-town services than other countries in Europe, reflecting in part the smaller sectoral shift from manufacturing to services in other countries (see Figure 2).

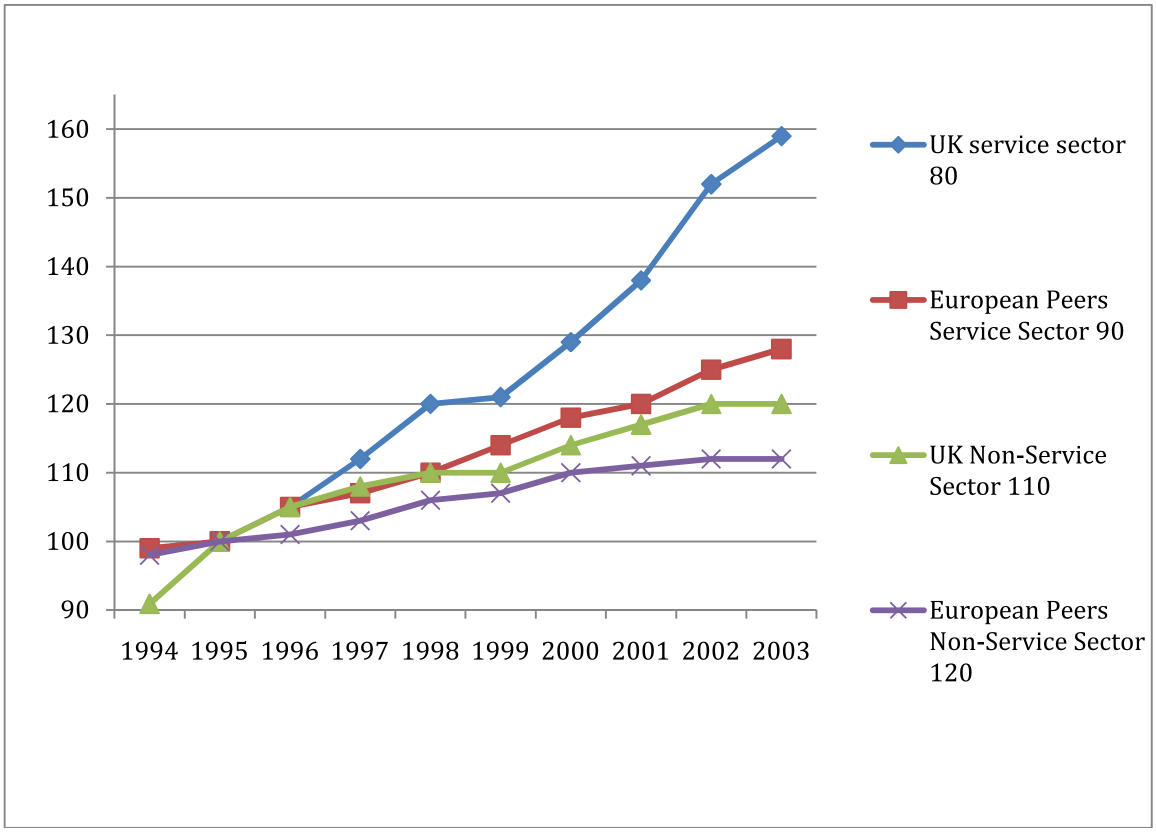


**Figure 2: Growth of the service sector and the non-service sector**
*Source: Commission for Integrated Transport*

Large supermarkets often prefer to open out-of-town stores, which means that many people can end up travelling farther to fulfil their basic needs. The average length of a journey has increased by 42 per cent since the early 1970s, for example, but the average number of journeys per person has only increased by 8 per cent (EFTA, 2003). This trend can be witnessed in all developed countries, but it is most pronounced in the UK and the US.

The expansion of out-of-town stores and retail parks has led to an increased dependence on the car and a reduction in non-car transport options. As town centres have hollowed out, this has left some communities with no access to basic services such as shops and banks. This is a trend that has worsened over the past decade (Lawlor and Nicholls, 2008; Shaheen and Haywood, 2010).

These factors have also affected housing estates at the edge of large cities, which were originally designed around proximity to local services. The last two decades have seen these neighbourhoods becoming physically and socially isolated, as local stores have closed and transport options have become restricted. Figure 3 gives a flavour of the current level of access that people have to services by public transport. What it shows is that public-transport access is denied to half the population for very basic services such as schools and hospitals.

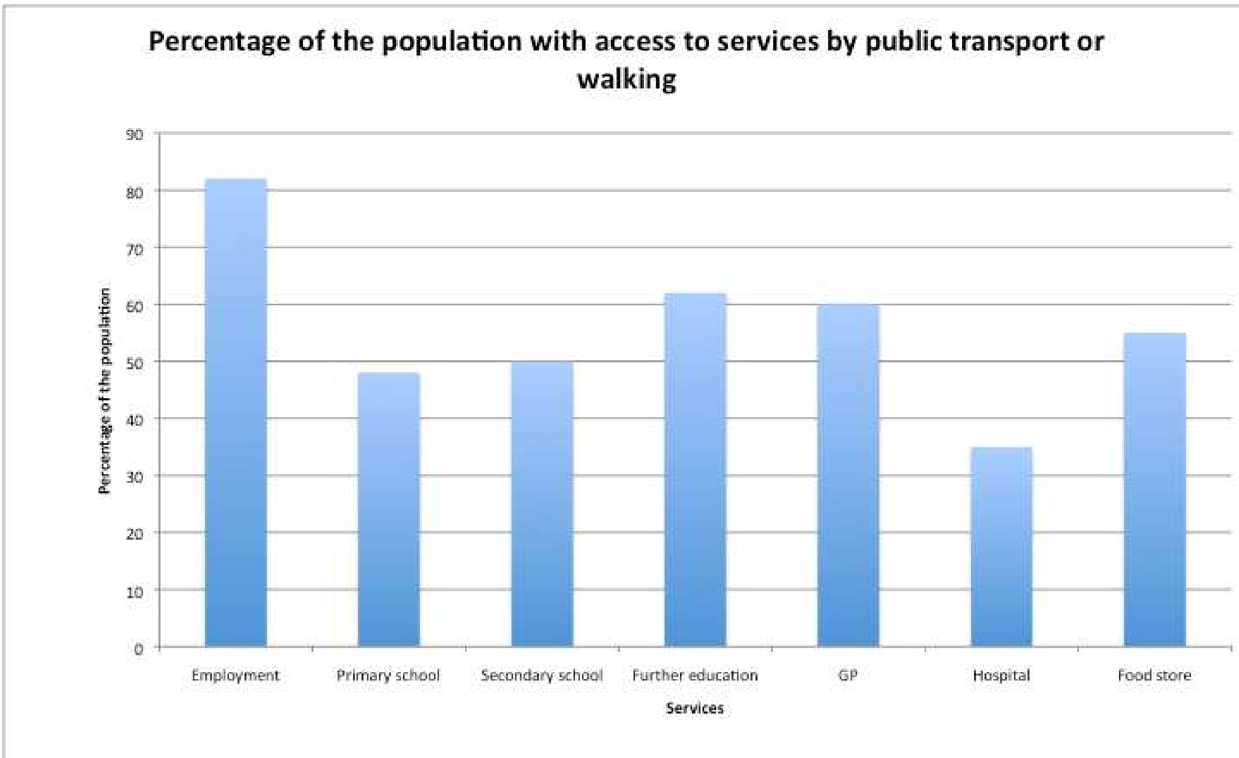


**Figure 3: Access to services by walking or public transport**
*Source: Social Exclusion Unit*

## 2.2 Is public transport affordable?

These trends have been accompanied by an increase in the cost of other transport options relative to the car, a trend that is mirrored across the G7 but to different degrees. In the US, for example, public transport costs three times more than travelling by car (Kennedy, 2003). In the UK bus fares have increased by 80 per cent while motoring costs have stayed the same (Lucas, 2003).

In one of the few international comparisons of social exclusion in relation to public transport, Lucas (ibid) finds that in countries where the provision of public transport is largely reliant on the commercial sector, “the coverage, frequency and quality of services have tended to decline”. Lucas argues that deregulation has led to the emergence of private sector monopolies that run services to meet minimum standards, while routes that are less commercially attractive have been reduced.

Grieco and Raje (2004) also find that deregulation and fragmentation of public transport services have led to those services failing low-income communities. In an analysis of bus services they find that alongside increased fares have come a reduction in the number of routes provided and demands for higher subsidies from local authorities (Grieco and Raje, 2004).

For bus travel, deregulation in 1985 does not appear to have improved access for people on low incomes. This was the conclusion reached by the Social Exclusion Unit (SEU) in its 2002 study on this subject. In addition the SEU found that local authorities had little control over the provision of mainstream public transport services and that operators were increasingly focusing their attention on core commercial routes, leaving local authorities to support more expensive peripheral routes (SEU, 2002).

Interestingly, Litman (2003) observes that while all cities have seen a decline in public transport use relative to journeys by car, the number of public transport trips taken is higher in cities with publicly funded transport systems.

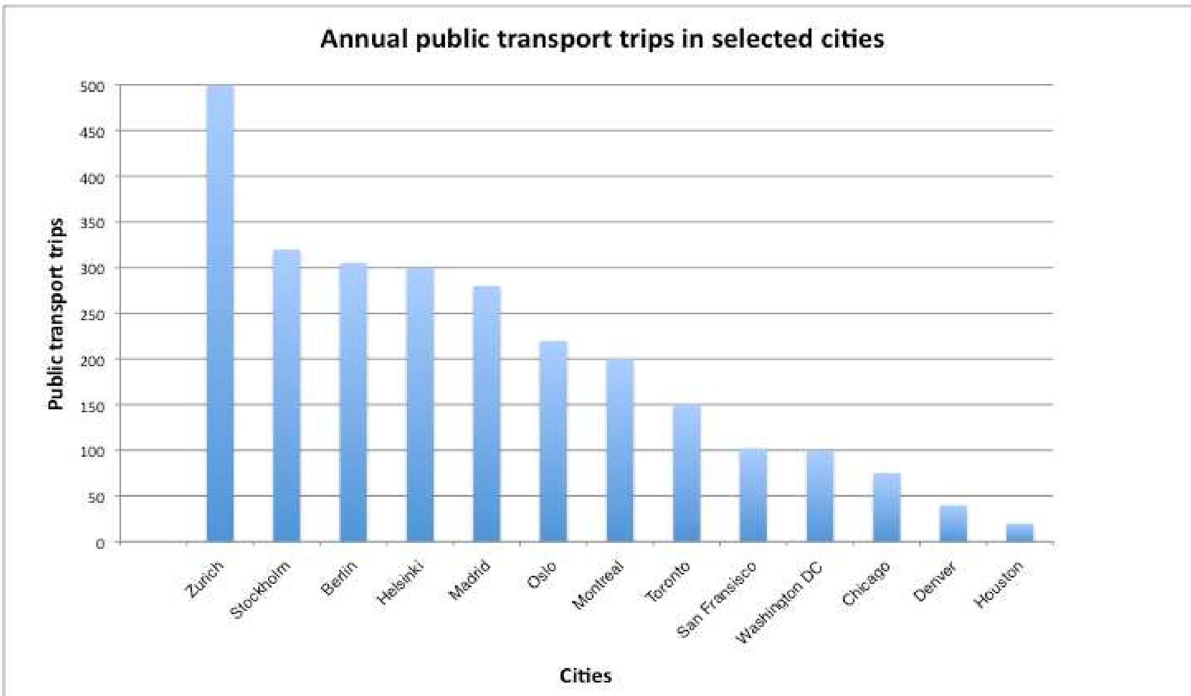


**Figure 4: Annual public transport trips per capita in selected cities**
*Source: McCormick Rankin 2002 (in Litman, 2003)*

## 2.3 Transport modes of people on lower incomes

So what modes of transport do those on lower incomes in the UK use, and how does this compare to other European countries? Firstly, people on low incomes make the greatest use of public transport (Lucas, 2003). They also walk twice as much as any other group. The most common mode of transport by far among this group is the bus, and this applies across all European countries.

As we can see from Figure 5, the bottom 10 per cent of earners in the UK have fewer cars than in other countries.

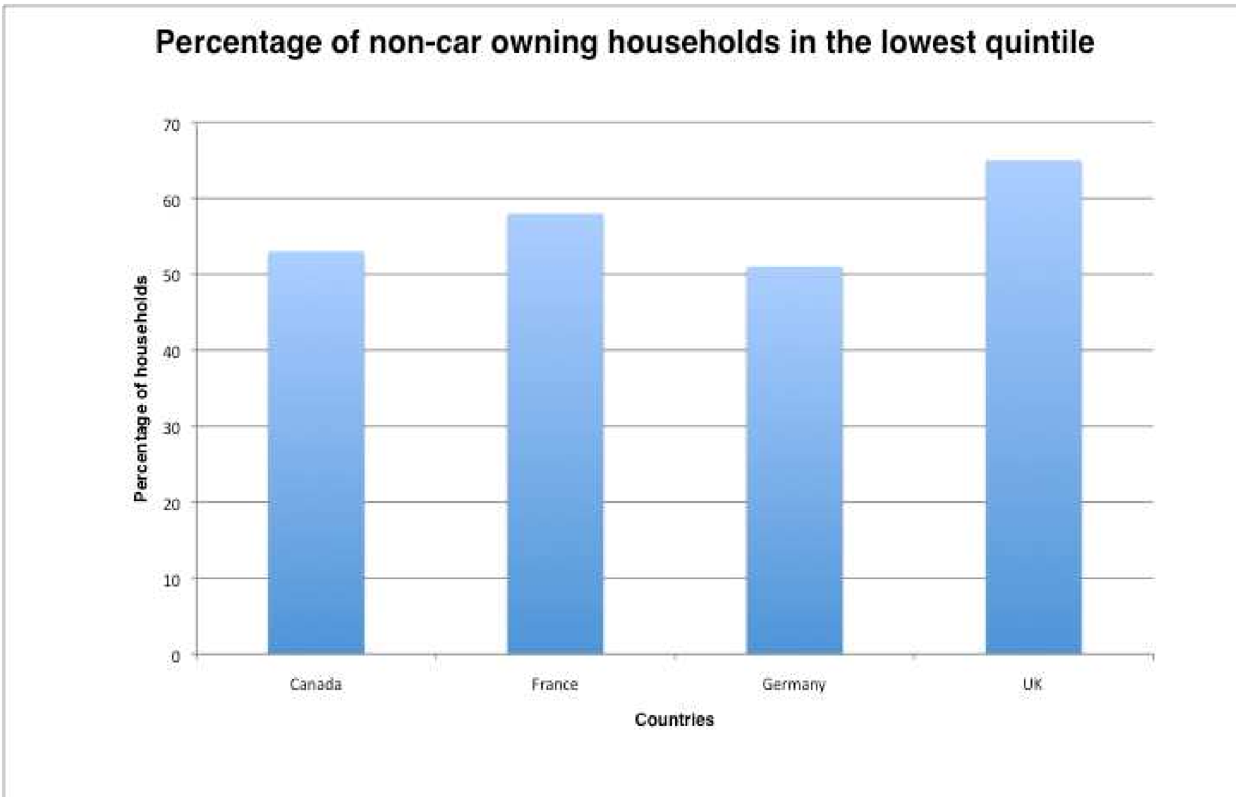


**Figure 5: Percentage of non-car owning households in the lowest quintile**
*Source: Lucas 2003*

One approach to equality of access to transport has been to promote the use of the car through massive investment in road building and parking facilities and measures to keep the cost of motoring relatively low. Data suggest, however, that the benefits of this have been reaped primarily by the wealthy. It is also important to point out that further promotion of car use has massive environmental implications, and we discuss this later. Encouraging public transport is the only way to increase the mobility of the least well off and reduce their isolation, without significant detrimental effects on the environment.

In terms of rail, the poor are not a major user group. As we can see from Figure 6, rail in the UK is most used by commuters who occupy the middle and higher income groups.[26] One obvious reason for this, according to Grieco and Raje (op cit), is that the poor are completely priced out of the rail market, particularly in the UK. This is regressive, as it is tantamount to imposing a higher marginal tax rate on the poor

[26] It would be interesting to see whether or not the poor used trains in other countries where fares were lower but unfortunately data of this sort is not available. We will return to the issue of fares and pricing in the next section.

when it comes to transport services.

To compound the inequality Grieco and Raje point out that cheap rail fares are not always accessible for people on low incomes because of the complexity of booking cheaper fares ahead of travel. This often requires access to the internet, use of which correlates with income. The best-quality services are also tilted towards those areas that are able to pay the most.

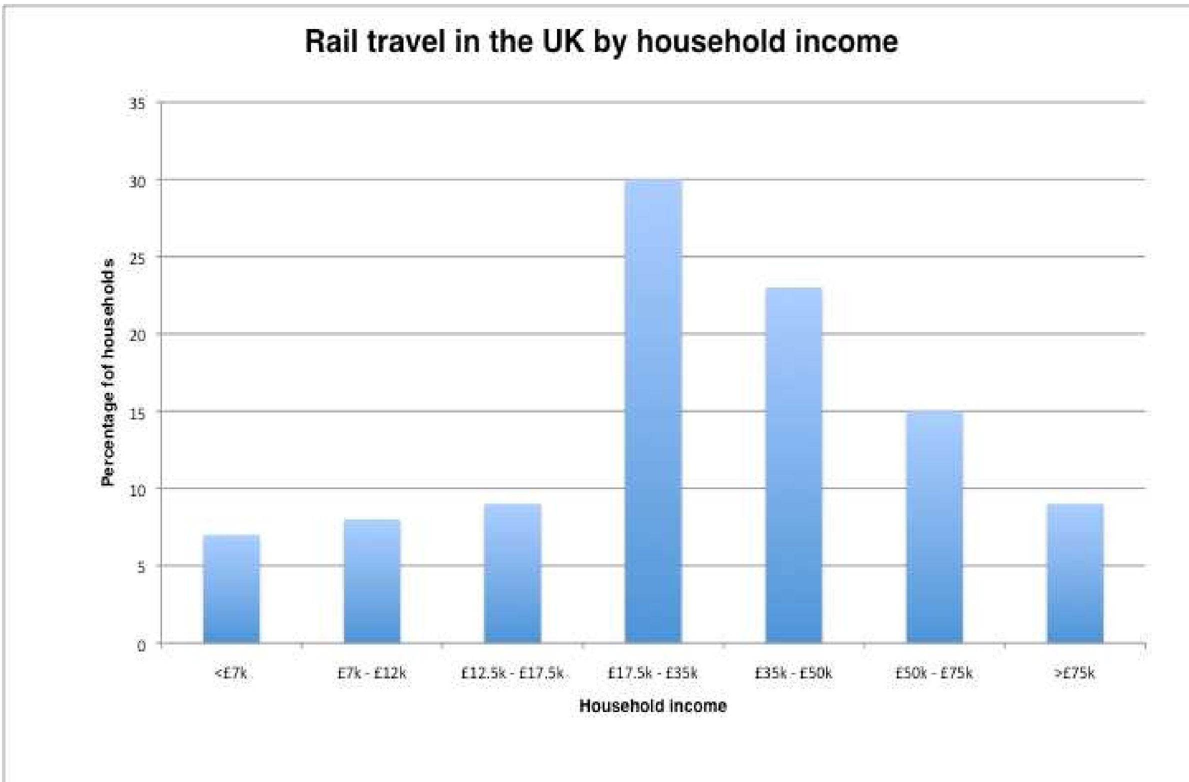


**Figure 6: Rail travel in the UK by household income**
*Source Givoni 2008*

Rail is often characterised as a service principally used by the wealthier commuter in the South East. However, on closer inspection this may not necessarily be the case. From Figure 6 we can see that almost a quarter of rail journeys are made by people on household incomes of below £17.5k, i.e. in the bottom two quintile groups (ONS, 2009). The group that use the railways in the greatest numbers are not the wealthy but middle-income households: those earning between £17.5k and £50k.

This needs to be put in the context of all journeys made by different income groups. As Figure 7 shows, those in the poorest quintile make 40 per cent fewer journeys than those in the richest. But when we calculate their rail use as a *proportion* of their journeys, the poorest quintile actually use rail for 8 per of their journeys, which is the same as the average across all quintiles. This suggests that the railways represent an important mode of transport for many part-time workers, pensioners and job seekers.

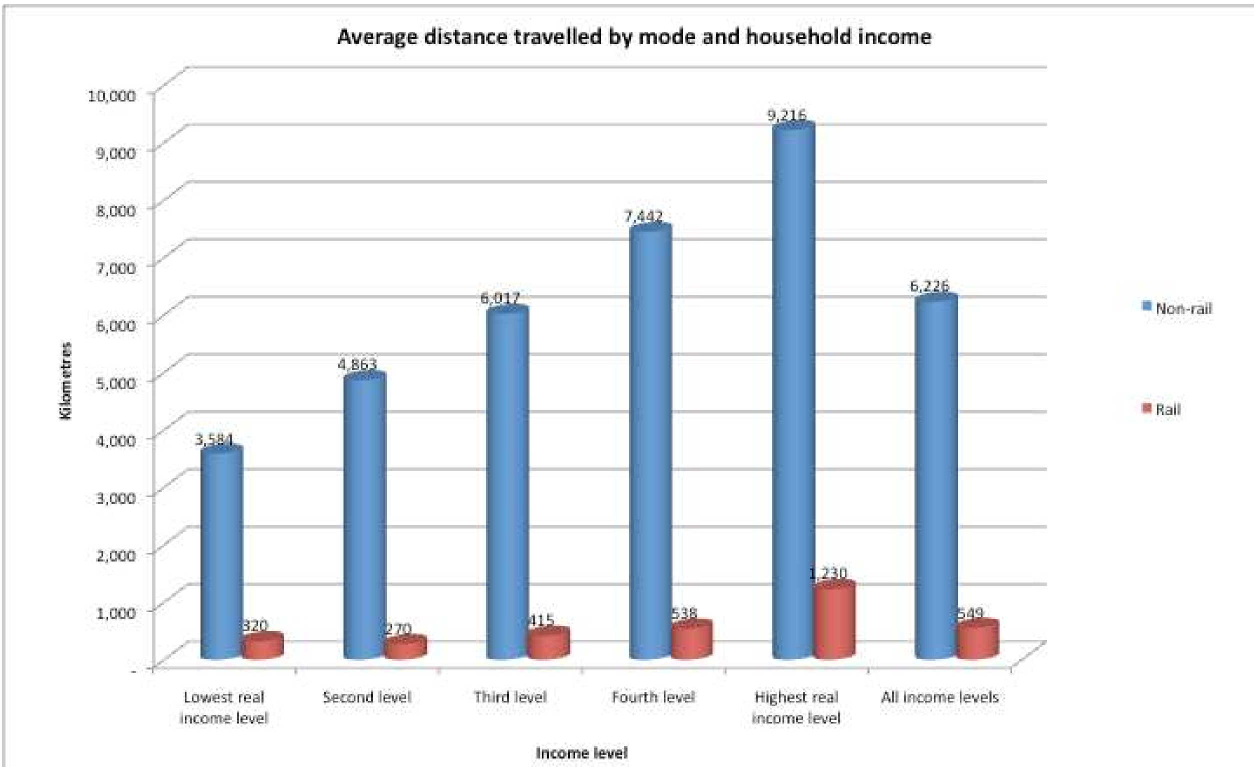


**Figure 7: Average distance travelled by mode and household income**
*Source: DfT*

## 2.4 The need for a 'whole journey approach'

To conclude: transport, and in particular public transport, can play a significant role in reducing social exclusion. This is an under-researched area but we know that people on the lowest incomes travel the least, are most excluded from essential services and have the least access to private transport.

The Matisse report has highlighted the importance of access being 'genuine' i.e. there needs to be serious provision in areas such as surrounding walking and waiting environments, information and marketing, personal security and the location and scheduling of public services, and not only in bus and train services themselves. The authors acknowledge that this 'whole journey approach' is easier when overall transport planning is in the hands of one organisation, as this makes it possible to run a seamless network of transport services, with efficient interchanges between modes (ibid).

In the next section we explore the rationale behind privatisation and the move towards a commercial model of ownership in the UK, and why this has not worked.

# 3. Fragmentation and inefficiency: why our rail system is lagging behind

In the first section of this paper we compared outcomes from the UK railways with inputs to arrive at a rounded assessment of value for money. In order to properly understand why the UK rail industry performs quite so badly, it is necessary to understand the privatisation model that was created and some of the perverse incentives and conflicts of interest that it produced.

This section reflects on these issues. It looks at where the current model is flawed, and assesses the direct financial costs of privatisation: the dividends that are paid out to shareholders in a privatised rail industry and the transaction costs of negotiating between many different providers. It shows that privatisation has not delivered the promised savings in public subsidies, and calls for subsidies to be applied more judiciously.

## 3.1 The UK rail privatisation model: promise and reality

Tyrell (2004) describes the 1980s and 1990s as the period when under British Rail the concept of a 'social railway' – combining a public service interest with an engineering focus on 'running the railway' – gave way to a culture of managing rail services like a business. As part of this, operating costs were greatly reduced in advance of privatisation.

The form of privatisation that was implemented was in keeping with the ideology of the then Conservative Government. A central aim in many areas of public services was to reduce the involvement of the State, and ultimately to create a 'smaller' State. This prompted a series of privatisations of public services such as water, gas and telecommunications prior to privatising the railways (Letza and Smallman, 2001). Privatisation was also seen as a means to reduce the power of trade unions in various industries, as this was regarded as economically counter-productive and politically threatening (Marsh, 1991). While privatisation was seen as a good thing in itself, the Government's programme had explicit aims – better performance, value for money and risk transfer – by which its success can be evaluated:

- Value for money

One major claim of the advocates of privatisation was that it would lead to greater efficiency and value for money by reducing waste and costs. Most ambitiously it was asserted that public subsidy would be progressively reduced to the point where the Government became a net earner from profitable routes (Jupe, 2009). Although the

Government agreed to a subsidy of £1.8 billion at the outset of privatisation, this support was intended to fall over time (Tyrell, 2004). Today, however, it stands at more than £5 billion. While subsidies have risen, passenger fares have also increased sharply.

- Performance

Alongside the anticipated improvement in commercial returns, privatisation was intended to drive performance through the introduction of market discipline and competition. This was simply not achieved initially, as the newly privatised industry suffered a prolonged period of poor punctuality (Hare 2003). A mixed safety record and a number of high profile train crashes then brought the industry to crisis point, culminating in the collapse of Railtrack.

The past five years have seen some improvement in performance on some indicators. But as we have seen, the UK is still a long way behind European standards. There have been suggestions that punctuality, which is only now back in line with the pre-privatisation era, has been partly achieved by artificially extending timetabled journey times (Shaoul 2006; Jupe 2009). Passenger numbers have increased significantly, but while this could be partly attributed to better advertising and promotion (as Tyrell acknowledges), most commentators agree that it is impossible to decouple from economic growth and increased overall prosperity throughout the past two decades.

- Transfer of risk

Another expectation of privatisation was that it would transfer risk from the public to the private sector and lift resource constraints. A franchising model was adopted (see next section), as this was seen as a way of sharing risks (Carney and Gedajlovic, 1991). Neither of these hopes has been fulfilled. Without subsidy, the train-operating companies (TOCs) would have made annual losses of over £1 billion (Jupe and Crompton, 2006). The net result, as Glaister (2004) suggests, is that there has not been "any real risk transfer from the public sector" (quoted in Jupe, 2009).

In order to shed light on why privatisation failed on each of these counts, we need to better understand the economics of the railways.

## 3.2 The economics of the railways

In the same way that running a school differs from running a paper factory, running a rail network differs from other types of public services. In this section, we look at the characteristics of the model as it operates in the UK and the problems that this has caused.

- Fragmentation

The franchise model of privatisation has broken what used to be an integrated rail industry into two parts: infrastructure and operations. There is substantial evidence that this fragmentation is at the heart of the problems that the UK has experienced.

As rail is generally considered to be a natural monopoly, which exhibits strong network effects, attempts to fragment it and inject competition are fraught with difficulties.

The rail industry is highly capital-intensive, and this means that franchises in a privatised service need to be long-term to encourage serious investment in infrastructure. Unfortunately long contracts can engender a lack of competition in tendering, while the transfer of franchises can lead to stagnation in service delivery as contracts draw to a close. Shorter contracts might keep franchisees on their toes, but they would also reduce the incentive to invest.

In reviewing the empirical and theoretical literature Friebel, Ivaldi and Vibes (2003) find that the separation of infrastructure from operations may not increase efficiency. It is interesting to note that the franchising model chosen for the rail industry was similar to the one that the Government had used for the electricity industry. That model, which created an oligopoly of generators, a network of regional monopoly distributors and a private transmission grid, was rejected by other countries. Hall (1999) finds that cost savings in UK rail privatisation were achieved solely through a reduction in the workforce and that these were swallowed by dividends rather than passed on to consumers.

- The network effect

In addition to these incentive issues, there is the obvious question of logistics. A national rail network is a hugely complicated, interconnected system, which needs to be timetabled with great care. It is not difficult to see that this will be more easily done with an integrated system, rather than one composed of a plethora of constituent parts. Upon privatisation, British Rail went from an integrated entity to a loose grouping of more than 100 companies. All these companies had their own sets of incentives, many of which were in conflict with each other.

For other utilities, which do not require precise timetabling, there is a technological argument for separation. But Tyrell, quoting Bitzan (2003), suggests that there are economies associated with vertical integration and also potential transaction cost savings (Tyrell, 2003). Without such integration, having a range of providers with multiple organisational interfaces can mean a wasteful duplication of activities. The experience of privatisation shows that we should treat the economics of the railways and other capital-intensive areas differently from other areas of policy.

- Perverse incentives

This issue is well illustrated by the case of GNER, one of the TOCs that went into administration after privatisation. In a paper on the subject Li and Stittle (2007) find ‘incomplete contracting’ to be at the root of why GNER went into decline and eventual bankruptcy. Put simply the interests of the shareholders of GNER’s parent company, Sea Containers UK, were at odds with the public interest. This led to agency problems such as ‘moral hazard’ and ‘free riding’.

Li and Stittle quote Hart, who makes the point that the private contractor theoretically has more incentives to innovate than the manager employed by the Government. In practice, however, “the private contractor’s incentive to engage in cost reduction is typically too strong since it ignores the adverse impact on quality” (Hart et al 1997:1129). In effect the Government remained in a position of ‘operator of last resort’ after privatisation, as it was obliged to provide continuity of public transport.

## 3.3 Leakage and interface costs

The issue of dividends in the rail industry is one of some controversy. According to Li and Stittle, GNER paid £146.6 million during its first franchise to its parent company, Sea Containers UK Ltd. This amounted to virtually all of GNER’s net earnings over that period. Although it was initially planned for GNER to pay a premium payment, this was dropped in favour of minor improvements and refurbishments. It is not clear whether these were ever made (ibid).

Interface costs occur because the rail industry consists of a multitude of suppliers and operators, each with a margin on the goods or services it supplies. Rather than there being one integrated provider, scores of companies now require a cut and the larger companies (such as the TOCs) have shareholders to service.

There are also direct costs of private ownership. The rail industry is highly capital intensive, making borrowing for investment purposes essential. Network Rail, for example, is currently carrying more than £22 billion worth of debt, £2.5 billion of which was inherited from BR, and £7.7 billion from Railtrack. The entity able to borrow at the lowest cost in any country is the state, with private firms paying a premium on this rate to reflect the risk of default (it is assumed that states do not go bankrupt). As a purely private company, and one that carries substantial risks, Network Rail has had to pay a substantial premium for its debt finance.

While Network Rail no longer pays dividends, it is still not an official public entity. It is now a ‘not for dividend’ company owned by its members – namely its passengers and other stakeholders such as TOCs, rolling-stock companies (ROSCOs) and the DfT. A number of commentators have suggested that the Byzantine legal structure of Network Rail was constructed to avoid the company’s liabilities appearing as part of the public debt, but a consequence of this is that it has to pay more for its borrowing than a public-sector body would.

Despite the fact that the Government guarantees Network Rail’s borrowings, the premium it pays for borrowing remains significant – as demonstrated by Jupe (2009), for example.[27] Jupe also highlights the problem of cash leakages and interface costs fuelling an increase in costs overall (Jupe, 2009).

[27] According to Jupe (2009), Railtrack distributed dividends totalling £709 million between 1995/96 and 2000/01, equivalent to 41% of the total operating profits of £1.7 billion generated over the six years.

A final cost issue relates to logistics. As we have seen, the number of different entities in the rail sector is now very large. This is compounded by the fact that many of them also sub-contract a considerable amount of work. While Network Rail took the positive step of bringing infrastructure maintenance back 'in house' in 2004, it still out-sources 'enhancements and renewals', which constitute around three quarters of total infrastructure expenditure.

The savings estimated to have arisen from bringing infrastructure in house were significant, which makes it baffling that the same has not been done with enhancements and renewals. The additional burden of costs that the rail system is bearing is a result of a damaging lack of integration.

Table 9 provides an estimate of a range of avoidable costs, all of which are directly attributable to the privatisation process or the fragmentation of the rail industry.

**Table 9. Costs of privatisation and fragmentation in £ millions, 2009 and 1997-2009**

| | *2009 figure* | *Total 1997-2009* |
|---|---|---|
| Total additional debt costs | 156.15 | 949.99 |
| Total dividend leakage* | 433.30 | 2,414.18 |
| Total interface/efficiency costs | 293.92 | 3,258.80 |
| **Total leakage and additional costs** | **883.37** | **6,622.97** |
| | | |
| Public subsidy | 5,213.00 | 35,875.00 |
| Costs of privatisation as % of subsidy (2000-2009) | 16.95 | 18.46 |

Sources: Jupe (2009); Shaoul (2006); annual reports (Network Rail, TOCs, ROSCOs); ORR (2010); RMT (2010) and author's own calculations
* Comprised of TOCs (the 'big five' operating companies), ROSCOs and Railtrack during its period of operation (for the 1997-2009 figure)

As we can see, this was more than £883 million in 2009 alone, or more than £6.6 billion between 1997 and 2009. Between 2000 and 2007 these avoidable costs represented a little under one fifth of the entire public subsidy paid to the different components of the rail industry.

As these costs are based on the profits of the industry, it is difficult to estimate what they might amount to in the future. However, if we take the average of the past five years (£744m) and project it forward for the next ten years, using a 3.5% discount rate, we arrive at an estimate of £6,700 million (see Appendix 1 for a detailed breakdown of these estimated costs on an annual basis by type and source, from 1997 to 2009). Further privatisation or fragmentation, including the current proposals to break up Network Rail, could increase these costs further.

## 3.4 Applying subsidies judiciously

While not all commentators agree that privatisation has failed (see Pollitt and Smith, 2005), the majority argue that fragmentation was problematic, and that the wrong form of privatisation was chosen (see, for example, Glaister [2004] and Tyrell [2004]).

All national rail systems receive a public subsidy – including in the US. The question is therefore not whether to fund the railways with public money, but how much subsidy should be applied and in what way, so as to maximise social value. While markets may have a role to play in some areas of public service, it does not follow that they always do. In deciding what role markets should play, policy-makers need to be mindful of their limitations.

The ultimate aim should always be to maximise the social value that public services can generate. The experience of privatisation in the UK suggests that the railways are not at all suited to being run as a profitable business. A social model for the railways is more common throughout Europe, and indeed all the comparator countries that we looked at have wholly or largely state-owned rail systems (see Appendix 3).

Some of these countries are considering restructuring, or are under pressure to do so. The fallout from the 2008 financial crisis has been far-reaching, and it is likely that continuing financial pressures will intensify efforts to cut costs. In the next section we look at future challenges such as this, and consider what kind of rail system we will need to respond to them.

# 4. Valuing the future: the benefits of a modal shift from roads to rail

As we have seen, the UK's rail system lags some way behind its European neighbours. There are significant costs associated with the failure to exploit the full 'social value' of the railways. We have also shown how the privatised model has failed to deliver its own objectives and the wider social and economic benefits that were mooted by its supporters.

The lessons of the recent past should make us concerned for the future, particularly when we consider the major environmental challenges we face. This section of the report describes those environmental challenges and outlines the 'modal shift' from trucks and cars to rail that will be required to meet them. To achieve such a shift there will need to be a significant change in the relative price of public and private forms of transport, and a fundamental change in the way our railways are run. By valuing the negative 'externalities' associated with road use – i.e. spill-over costs and side-effects – we can demonstrate the monetised value of making this transition.

## 4.1 Transport and climate change

The 2008 Climate Change Act committed the UK to binding emissions reductions targets. But many experts are sceptical about the UK's ability to achieve these, given the relative lack of progress to date and the constraints imposed by existing policy in key areas such as transport. The act requires that by 2050 the UK's greenhouse gas (GHG) emissions should be cut to 80 per cent below 1990 levels.

A quarter of the emissions produced in the UK are from transport (10 $MtCO_2$). Almost all of these (90%) come from road transport, with 55% of total transport emissions attributable to cars alone (Climate Change Committee, 2006). Transport was the only sector whose carbon emissions were higher in 2005 than they were in 1990 (Commission for Integrated Transport, 2007)[28]. To have any chance of achieving the emission cuts that it is committed to, the UK will need to achieve a major shift in transport use.

Options to cut emissions in transport tend to take a number of forms:

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[28] The Commission for Integrated Transport (CfIT) is an independent body advising the Government on integrated transport policy. The CfIT takes a broad view of integrated transport policy and its interface with wider government objectives for economic prosperity, environmental protection, health and social inclusion.

- Demand management
- The fuel efficiency of vehicles
- The carbon content of fuels
- The fuel efficiency of vehicle use
- The choice of mode.

While it is clear that any efforts to reverse the trends in transport emissions will need to rely on a combination of these, our primary focus in this report is on the choice of mode, and specifically on the strategic role that rail could play.

The Government has yet to formally adopt a target on transport-specific emissions reductions – an omission criticised by the Committee on Climate Change and the Sustainable Development Commission.

In 2005 the Department for Transport (DfT) commissioned the Vibat Report to assess the feasibility of achieving a 60 per cent cut in transport emissions by 2050. But the then Secretary of State distanced himself from the findings on publication (CCC, 2006). The authors of that study argue that the 60% target is around the level required to achieve a future $CO_2$ atmospheric concentration of 500 ppm, assuming targets are met in other sectors. Far from achieving this reduction, however, their modelling predicts that a continuation of existing policy will see emissions from transport continue to rise.

We have compared those projections with scenarios developed by the European Commission. As Figure 8 shows, they plot a very similar course. The DfT by contrast, using its own modelling based on existing policy and the assumptions in the 2004 White Paper, estimates that emissions will fall by 2030, including a 22 per cent cut in $CO_2$ emissions from cars.

The DfT's predictions owe much to the efficiency improvements it anticipates in road transport and aviation. But even if the assumptions underpinning the DfT's modelling were correct (and given the heavy reliance on industry claims of efficiency gains there are reasons to believe they are not) a 60 per cent cut by 2050 is highly unlikely if not impossible given our current policy trajectory (see Figure 8).

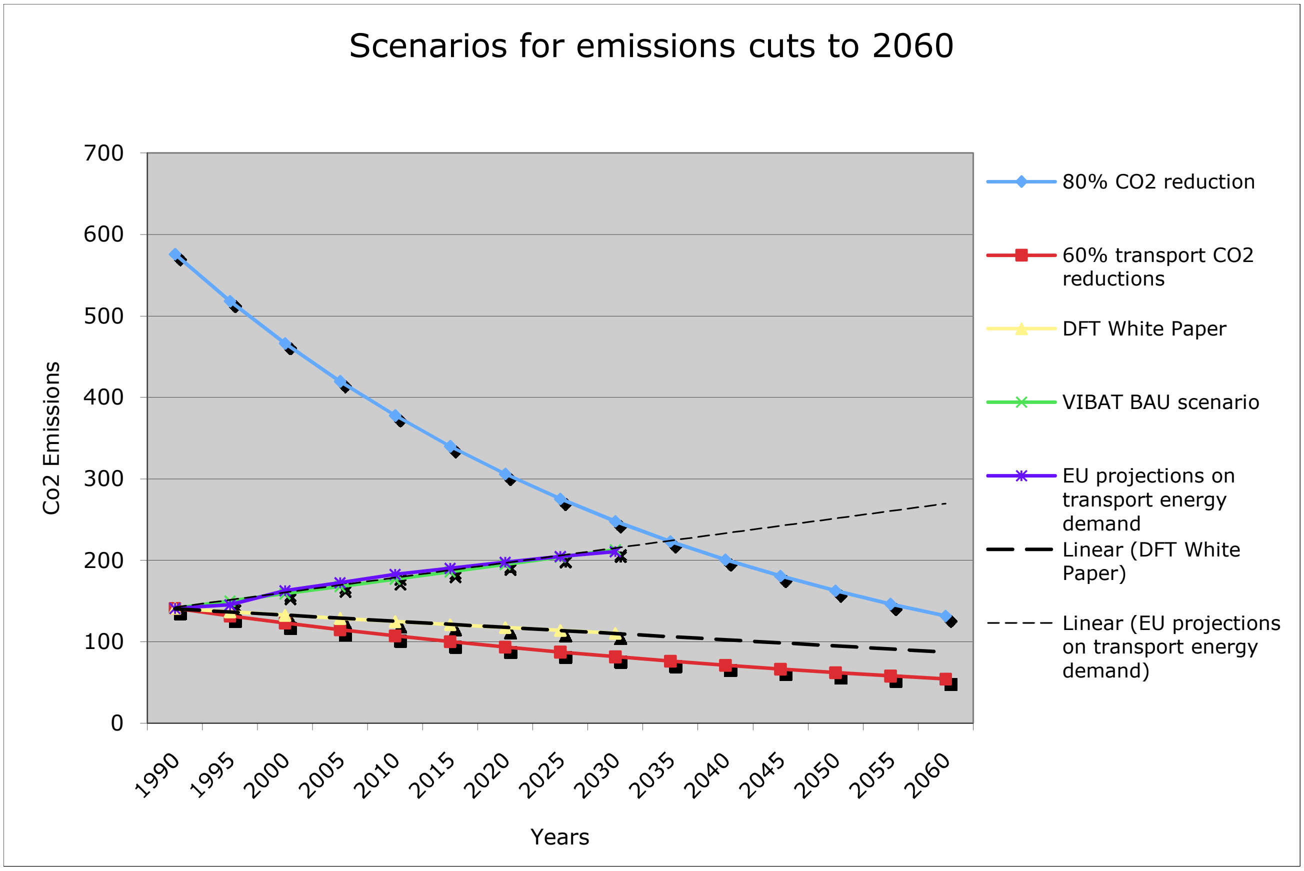


**Figure 8: Emissions cuts required by 2050, and projections based on various scenarios**
*Source: DfT, Vibat, European Energy and Transport Trends and author's calculations (- - - denotes extrapolated from 2030)*

When we project forward to 2030, we can see that 96 per cent of transport emissions will come from private forms of transport and trucks (See Figure 1, Appendix 2). Because of the size of their contribution to total emissions, the bulk of the cuts required will need to be made in road and air travel.

As Figure 9 shows clearly, it is difficult to see how this can happen without significant, immediate intervention. The figure also illustrates the risks inherent in the DfT approach, which is heavily reliant on hoped-for technological efficiency gains. Some of these (as with aviation) are not yet even technically possibly.

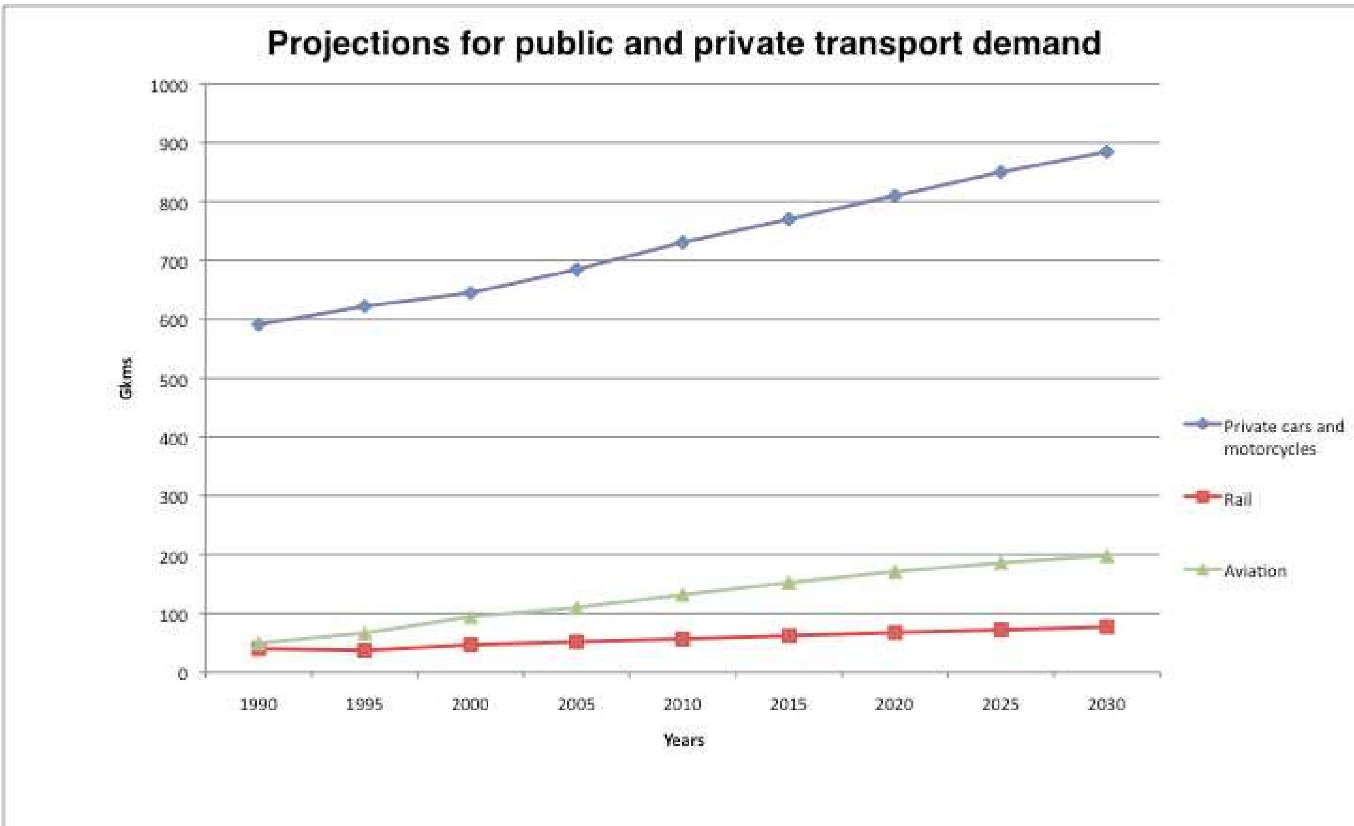


**Figure 9: Passenger activity projections, based on existing policy**
*Source: European Commission Energy and Transport Outlook and author's calculations*

This is a challenge faced by all developed countries. All rely heavily on energy-intensive modes of transport, and these are the areas in which the most growth is predicted in the future.

### 4.1.1 Comparing transport modes with other countries

Despite the similarity of the challenge, some countries have responded differently than has the UK. As we can see from Figure 10, Spain is the only country that will have higher emissions per head of capita in 2010 than the UK.

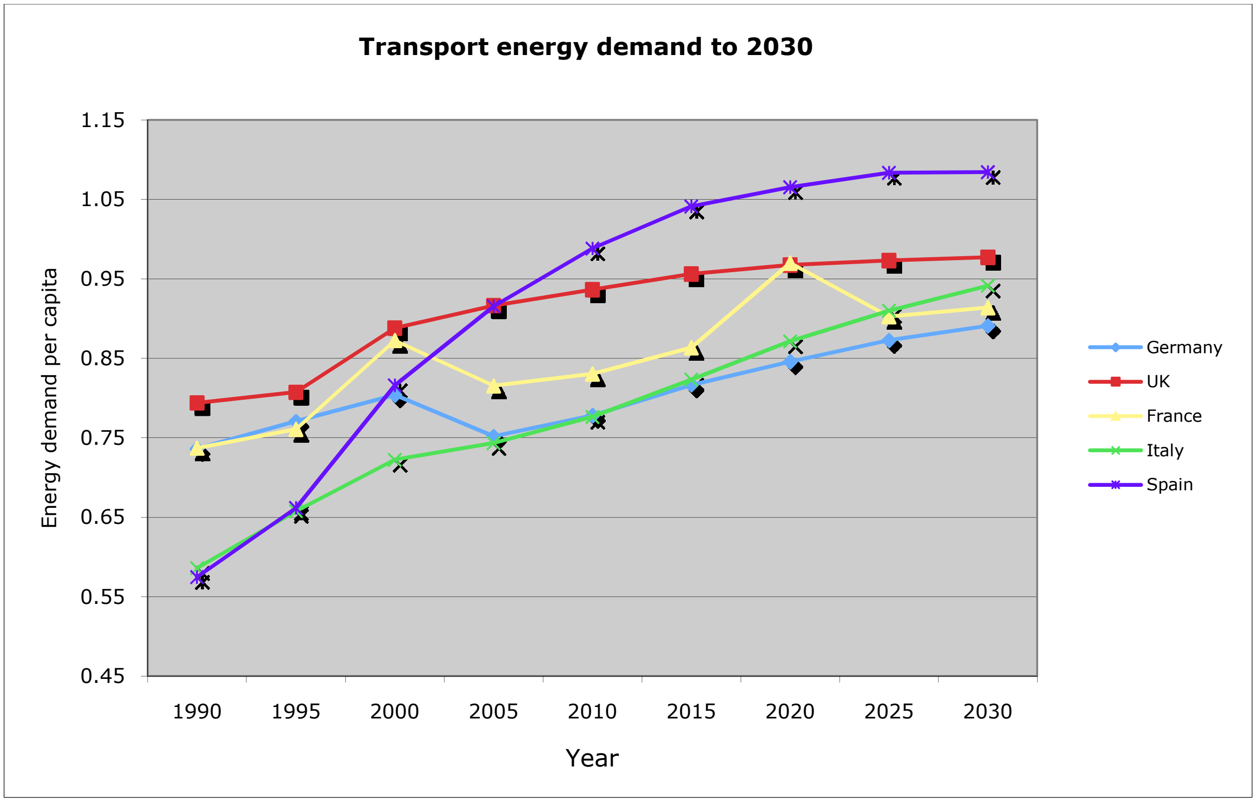


**Figure 10: Transport energy demand per head of capita**
*Source: European Commission Energy and Transport Outlook and author's calculations*

A glance at projected modes of travel helps to explain this. The UK is heavily dependent on energy-intensive modes (Figure 2, Appendix 2). After adjusting for population, the UK is predicted to have a greater demand for air travel than France, Germany and Italy, and a lower demand for rail than France or Germany.

Spain, in contrast, is notably more dependent on car and plane travel than the UK. But we must bear in mind that Spain has the largest investment programme in high-speed rail anywhere in the world except China. By the end of the decade most of the Spanish peninsula will be connected. The projections in Figure 2 in Appendix 2 do not take account of this.

There is widespread recognition that the current balance between modes of transport is unsustainable – we drive and fly too much, we do not use trains, buses, cycles or our own legs anything like enough. However, this problem is projected to worsen rather than improve (see Figure 3, Appendix 2). In this section we model the modal shifts that will be required to put the UK's transport sector onto a more sustainable path.[29]

### 4.1.2 Achieving a modal shift in freight

[29] We recognise that walking and cycling need to play a much more important role in the transport mix but as this report is concerned with rail we have not included them in our analysis.

We begin with freight. As we can see from Figure 11, the majority of the UK's freight is moved by road, and it is projected that this will continue. Although we have seen small increases in the use of rail freight, these have been eclipsed by greater expansion in the use of road transport.


**Figure 11: The projected evolution of freight to 2030**
*Source: European Commission Energy and Transport Outlook and author's calculations*

Of all the modes of transport considered in this report, road haulage is the most problematic from an environmental perspective. The most significant increases in emissions in recent years have been driven by the increasing use of vans and HGVs. Fuel efficiency in the design of vans has lagged behind improvements with cars, to the extent that the carbon intensity of vans has changed relatively little.

Table 10 compares the efficiency[30] of different modes of freight transport.[31] Not only does rail freight have a fraction of the intensity of road transport, but it is also on course to make significantly greater efficiency improvements.

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[30] By efficiency we mean the ratio of passenger kilometres travelled to energy input. Cars are less environmentally efficient than trains because they carry small numbers of people for the amount of fuel used. However, car travel has become less fuel-intensive and further improvements are anticipated, whereas we are yet to see similar progress with road freight.
[31] Based on European Commission Energy and Transport Outlook (2007).

| Table 10: Comparing energy efficiency projections for road and rail by 2030 | | | |
|---|---|---|---|
| | 2010 | 2030 | % change |
| Trucks | 77.4 | 72.4 | 6% |
| Rail | 4.3 | 1.8 | 60% |

In light of this, a shift from road to rail is essential if we are to stand any chance of meeting the 2050 emissions target while also accommodating an anticipated increase in demand for freight transport. When we model this from the 1990 baseline the figures are stark (Figure 4, Appendix 2).

We are already 20 years on from that 1990 baseline. When we look at it in this way the scale of the task becomes even more daunting (see Figure 12). This issue presents considerable urgency. Unlike with car transport, we cannot assume that there will be any great efficiency gains. Neither is there another low-energy mode that could be easily developed.[32]

[32] Although inland waterways are also utilised, these are less efficient than rail. In our calculations we have projected that future use will be more or less constant because the nature of goods transported means they are not necessarily suitable for transporting by road or rail.

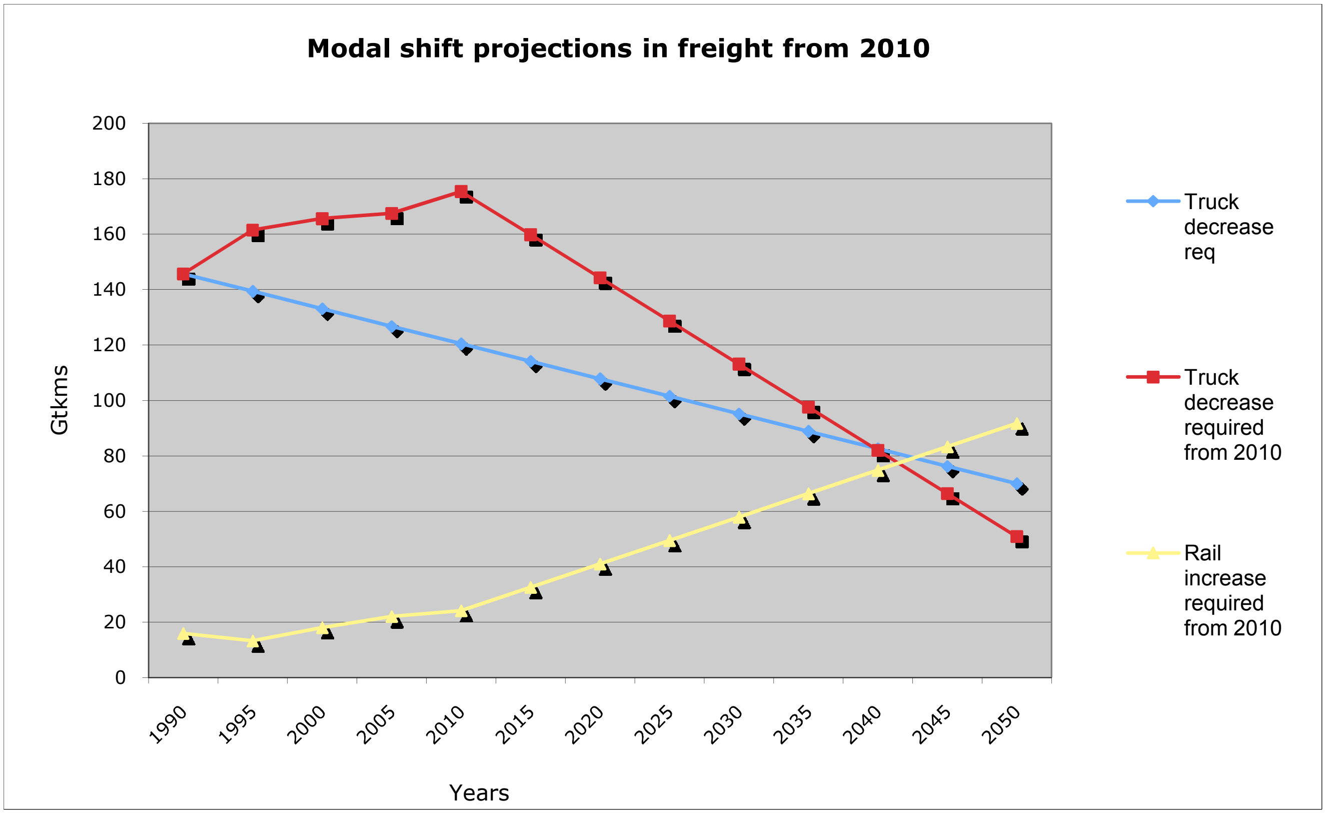


**Figure 12: Modal shift projections in freight from 2010 (Gtkms)**
*Source: European Commission Energy and Transport Outlook and author's calculations*

### 4.1.3 Achieving a modal shift in passenger transport

In some respects the case of passenger transportation is even more alarming. The main factor in that sense of alarm is the dramatic expansion of aviation. Table 12 compares aviation to other forms of transport. Not only does it start from a much higher level but also projections for efficiency improvements are not very optimistic. In particular, it compares unfavourably to rail.

In common with many policy documents on transport and climate change, we believe that aviation should be treated separately because of the scale of its impact. We have therefore excluded it from our model, and held its emissions constant at 1990 levels.[33] This is not to make light of it. On the contrary, the data clearly show that

[33] So great is aviation's share of what is by today's standards a very small carbon budget, that predictions of modal shifts became completely unrealistic. In our business-as-usual scenario, allowing aviation to meet the growing demand for air travel would require an almost complete cessation of car journeys to compensate. There is a case, therefore, for treating aviation separately. In our model we assume that aviation's emissions would remain constant at the 1990 figure of 6,779 ktoes. Although this is unrealistic, by 2010 emissions had more than doubled to over 15,000 ktoes. This was partly due to growth in aviation but also its carbon intensity. However, including it would have made any other projections completely unrealistic.

allowing aviation to rise inexorably is completely incompatible with any attempt to meet the 60 per cent target. Data from the DfT and CCC show that aviation, if allowed to continue to grow, could account for 75 per cent of total UK emissions by 2050 (Kersley and Lawlor, 2010). However, tackling the specific challenges of aviation is outside the scope of this paper.

| Table 11: Efficiency of different modes (energy expended per Gkm) | | | |
|---|---|---|---|
| | 2010 | 2030 | % change |
| Passenger cars and motorbikes | 35.63509444 | 31.25381572 | - 12% |
| Air travel | 113.8286581 | 107.6829884 | - 5 % |
| Rail | 26.21634276 | 9.737564767 | - 62% |
| Public road | 9.483101392 | 9.02173913 | - 4% |

Our second assumption relates to car use. Again, under a business-as-usual scenario, we would need to see completely unfeasible reductions in passenger activity in order to reach the Government's target. Therefore we had to build in some assumptions about technological improvements. We assume, for example, that 50 per cent electrification of the car fleet will be achieved.[34] We have also assumed that by 2050 all of our electricity will be coming from renewable sources. This is technically possible, although it remains challenging.

Using this assumption we see a 25 per cent transfer from road to rail as necessary to hit the 2050 target. This may not sound large, but it is a major challenge when we consider that rail's current share of all transport is only 6 per cent and falling, while the contribution of cars is 75 per cent and rising.

[34] According to the Department of Energy and Climate Change (DECC) a 65 per cent take-up of electric cars by 2050 is "considered possible by most stakeholders" (2050 Pathways Online Calculator). The 50 per cent target is therefore realistic.

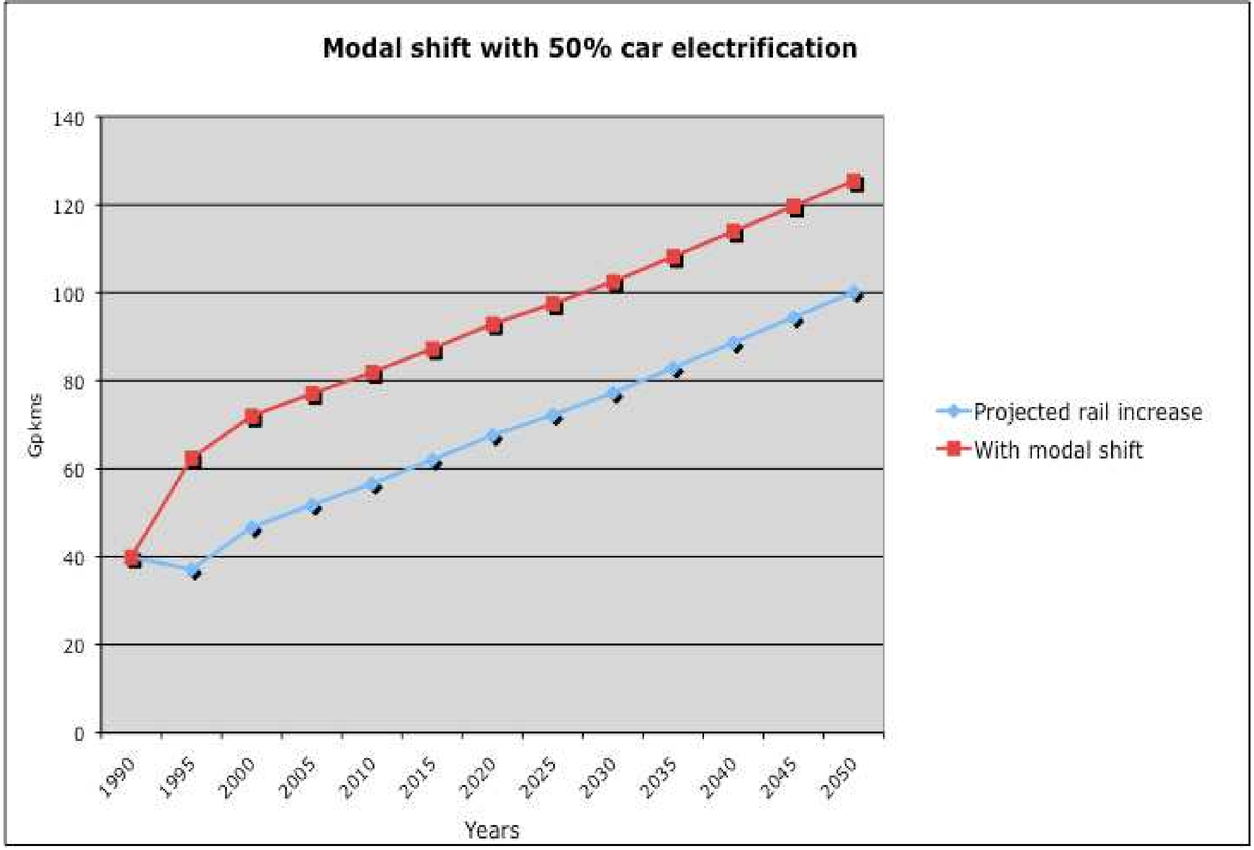

**Figure 13: Modal shift in rail usage**
*Source: European Commission Energy and Transport Outlook and author's calculations*

Finally there is the issue of efficiency. Rail is currently one of the most energy-efficient ways to travel and move goods (see Figure 5, Appendix 2). In addition to this, the long-term projections on efficiency improvements are positive. As we have seen, trucks and air travel are where the fewest gains can be made. While there is potential in electric cars, this would require not only massive investment but also a complete decarbonisation of our energy supply. Although the technology has been available for some time, we are yet to see widespread take-up.

This is where publicly owned forms of mass transport can have an advantage, as they are not so reliant on lots of individuals making the 'right' decisions. Decisions that are taken centrally about what is in the public interest can take effect far more quickly.

In the next section we look at the area of pricing. Putting a value on what cheaper rail fares and an increase in rail use could deliver socially and environmentally.

## 4.2 Counting the cost of 'business as usual'

The price of different modes of transport has always been an area of controversy. For decades economists have been arguing that as road space becomes scarcer it should be rationed by price, and that road users should pay the marginal social cost of using the network (Newbury, 1990).

The European Commission has estimated that there is enough knowledge to launch pricing reform but reforms to transport pricing have still not occurred.[35] A review by the Centre for International Economics could find no evidence that estimated road cost externalities have been quantitatively linked to the setting of public transport subsidies, or to fare setting (CIE, 2001).

A major potential benefit of pricing reform is reducing the number of trips where the benefit to the user is less than the cost to the whole of society. The majority of the experiments with pricing transport externalities have focused on increasing the price of car use through tolls and congestion charges. While these have sometimes been effective in influencing behaviour, behavioural change has tended to take the form of travelling at different times and on other routes rather than switching to public transport. There is little net environmental of social gain here.

This experience suggests that increasing the price of car use needs to be accompanied by significant reductions in fares on public transport for a modal shift to occur. In the case of train travel lower fares would serve to reflect the positive externalities associated with the railways – their lower marginal social cost relative to road use. One attractive approach might be to ring fence revenues from car use to help subsidise rail fares (see CIE, ibid.).[36] This would also be socially progressive.

In this section, we put a value on the positive externalities that would be produced by achieving the outcomes from the previous section. These are reduced congestion, fewer accidents and lower carbon emissions.[37]

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[35] Getting the Prices Right, 2001

[36] With freight, there is a danger that companies would simply increase prices and pass the costs on to consumers. It is important therefore that this is combined with non-price instruments.

[37] We have not included air pollution, noise, or other quality-of-life benefits. Although data exists on some of these outcomes, we are also mindful of the fact that road users make considerable contributions through direct taxation to the exchequer. On the other hand, the State gives massive indirect subsidy to car users through road-building programmes, which are mostly free to users. By only selecting a few of the most significant costs, we are able to show the scale of the potential savings, although we acknowledge that further work is required to arrive at a total cost.

### 4.2.1 Accidents and congestion

Road transport is the least safe form of transport. In 2004 over 16,000 people were killed or seriously injured on the roads (ONS). Road accidents are the leading cause of death and hospital admissions for people in the EU until middle age. It is estimated that they cost about 2% of the GDP of EU member states.[38]

The UK has some of the worst traffic congestion in Europe, with a greater percentage of road links being congested than in comparator countries (see Figure 14). By 2050 it is projected that our roads will have to support an additional 300 Giga passenger kilometres of travel, a 41 per cent increase on 2010 levels.[39] This follows a 30 per cent increase from 1990 to 2010, a period of rapid growth in car ownership. DfT estimates from 2002 show that an increase of 20 to 25 per cent in traffic led to an increase in congestion of 11 to 20 per cent (Goodwin, 2004).

UK citizens already have the longest commuting times (see Figure 15), and high car use is a factor in this. According to the 2001 census, 34 per cent of people travelled to work by car compared with only 2.5 per cent by train (ONS, 2001). A recent study by the University of Sussex found that people that commute by public transport instead of by car experienced stress levels that were 33 per cent lower. This indicates that not only does commuting by car waste time but it also has the potential to affect people's health and well-being. For our calculations we had insufficient data to be able to monetise such benefits but they could and should be taken into consideration.

[38] EU Transport and social exclusion unit, 2003

[39] *European Commission Energy and Transport Outlook*

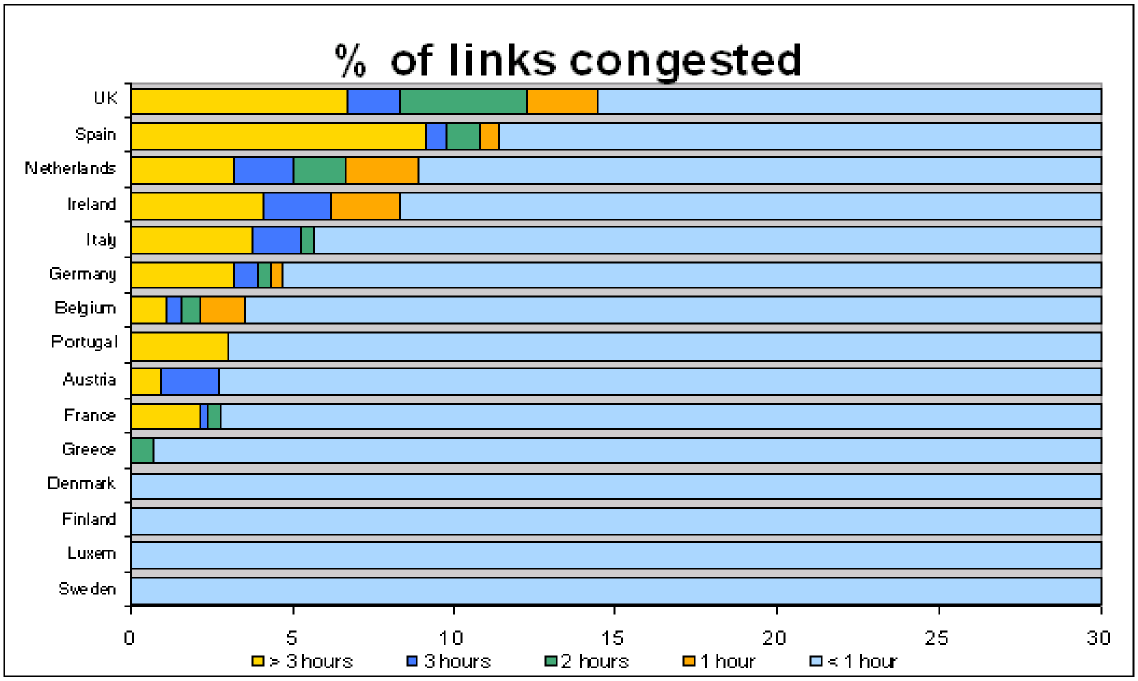


**Figure 14: Percentage of road links congested (hours per day)**
*Source: European best practice in delivering integrated transport, CfIT, 2001.*

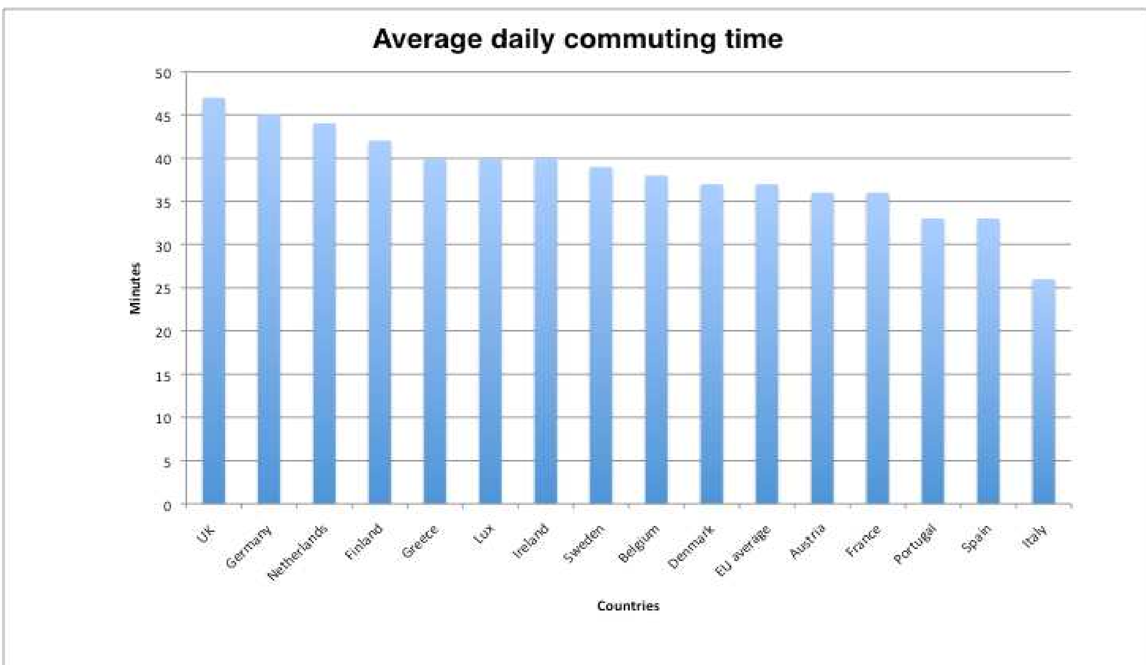


**Figure 15: Average daily commuting time (minutes)**
*Source: European best practice in delivering integrated transport, CfIT, 2001.*

### 4.2.2 Valuing the modal shift

Previous studies have attempted to put a value on total congestion costs to the UK economy. However, the findings of these studies are often misleading, as with the widely quoted figure of £20 billion.[40] Goodwin points out that zero congestion would not be an efficient condition for the UK, so the total cost approach to valuing it is problematic. Instead, we need to calculate the marginal costs of increases, or marginal savings from decreases.

In a review of other studies Goodwin suggests that the marginal savings from achieving optimal traffic flows are in the region of £4-6 billion. Trucks are a major contributor to this. For LGVs alone the external costs are estimated to be in the region of £6.8-7.8 billion, based on mid-range valuations These figures included accidents, noise and emissions, though congestion was by the far the largest component of the costs calculated (Allen, Piecyk and McKinnon, 2008).

It is difficult to arrive at a marginal cost per additional freight truck on the road. According to Goodwin, the most comprehensive calculations carried out to date have been by the Strategic Rail Authority (2003). These include a wide range of externalities, including congestion (see Table 12).

Table 12: SRA proposal for values of external benefits of rail and road freight (pence per lorry mile)

| | Motorway | | | London and conurbation | | Rural and urban | | Weighted |
|---|---|---|---|---|---|---|---|---|
| | High congestion | Medium congestion | Low congestion | Trunk and principle | Other | Trunk and principle | Other | |
| Accidents | 1.5 | 1.5 | 1.5 | 3.8 | 3.1 | 3.8 | 3.1 | 2.9 |
| Noise | 4 | 4 | 4 | 11 | 9 | 2 | 4 | 3.8 |
| Pollution | 5.7 | 5.7 | 5.7 | 18.8 | 22.8 | 3.9 | 4.8 | 6.3 |
| Climate change | 2.7 | 2.7 | 2.7 | 2.6 | 2.5 | 2.4 | 2 | 2.5 |
| Infrastructure | 5.7 | 5.7 | 5.7 | 9.1 | 28.7 | 11.2 | 35.3 | 12.5 |
| Road congestion | 79 | 37 | 6.3 | 121.9 | 135.5 | 45.8 | 10.6 | 43.9 |
| Unquantified | 8 | 8 | 16 | 8 | 9 | 21.5 | 22 | 16.9 |
| Taxation | -29 | -29 | -29 | -29 | -28 | -29 | -28 | -28.9 |
| Rail costs | -8.8 | -8.8 | -8.8 | -8.8 | -8.8 | -8.8 | -8.8 | -8.8 |

Again quoting Goodwin, what the figures suggest is that – for congestion alone – a single lorry kilometre removed from the road network by transfer to rail, would give

[40] This has been quoted by the Adam Smith Institute and the CBI, among others.

economic benefits of up to 84 pence, depending on the level of congestion, and under current conditions the overall average would be 27 pence benefit.[41] Although considered controversial because of their magnitude, the climate change costs increasingly seem low in the light of the 2008 Climate Change Act.

By 2050 we have estimated that a 53 per cent decrease in road transportation from 1990s levels will be required to meet emissions targets, assuming no significant efficiency improvements are realised. If we compare this to business-as-usual projections for road transportation, a 71 per cent decrease will be required. This equates to a reduction in that year of 168 billion tonne kilometre. Using the weighted average, of 27.3 pence, it is possible to arrive at an annual cost.

If we project forward from 2015, we can see the kinds of economic savings that could be realised from making such a shift. The reduction in congestion alone by 2050 translates into a present value of £73 billion.[42]

Next we looked at road accidents. Using the SRA figures and the same assumptions as above, we are able to calculate the potential savings from achieving a 53 per cent cut in freight travel and arrive at a present value of £27 billion.[43]

The final cost that we included was climate change, again using the SRA figures. This was controversial, as at £54 billion it is only two thirds of the cost of congestion.[44] This does not make intuitive sense, given the implications of not meeting the climate change targets. What this suggests is that the price of carbon is grossly underestimated. However, other studies that have monetised the externalities from road use have reached similar conclusions – congestion swamps all other costs.[45] Nonetheless, it shows us that there are significant savings to be made, in the region of almost £155 billion, by making this modal shift.

We undertook a similar exercise for the modal shift in passenger use. These costs are not insignificant but smaller by comparison with freight. This is partly because the modal shift required is less significant as a consequence of the efficiency gains that can be achieved through electrification. In addition, there are projected efficiency gains in car engines, which will reduce emissions, and the costs are higher.

The outcomes that we have monetised are accidents and climate change, as a marginal cost per car kilometre for congestion could not be found. Our costs come from a report by Samsom e. al (2001). Initially we plotted the expected passenger

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[41] Converted to kilometres using 1km = 0.623711 miles

[42] Calculated using a 6 per cent discount rate – the high end of the rate used for CBAs on HSR (see Graham 2005).

[43] Calculated using a 3.5 per cent discount rate, which is the Treasury's recommended rate for social returns.

[44] Calculated using a 3 per cent discount rate, which following the Stern Review is the Treasury's recommendation for environmental returns.

[45] Goodwin 2004, Cabinet Office, 2009.

kilometres on a business-as-usual scenario to 2050 (See Appendix 4). As with the other costings we have made estimates from 2015 onwards to allow required changes to take place.

We assumed a linear rate of electrification until the 65 per cent target was achieved by 2050. It was then possible to calculate the difference between the required passenger kilometres to reach the 60 per cent climate change reduction target and what could be achieved through electrification. This gave us an absolute number of journeys that would need to shift to rail and from this we were able to calculate our costs (see Table 13).

| Table 13: Cost per kilometre* (£) | | | |
|---|---|---|---|
| | High | Low | Average |
| Accidents | 0.06 | 0.78 | 0.46 |
| Climate change | 0.15 | 0.62 | 0.31 |
| | | | |

*Source: Sansom et al (2001) quoted in Cabinet Office (2009)*
* Based on 1998 prices. Averages are not weighted and are calculated by the author. Other costs and benefits were also available but these have not been included in the calculations.

Using the mid-range figures, estimates for accidents and climate change up to 2050 give us a figure of almost £4 billion in value.

## 4.3 A final reckoning

In this report we have outlined the fundamental shift from road to rail that will be required to meet binding climate change targets. We have argued that our fragmented rail industry is not well placed to respond to this challenge, particularly compared with countries in Europe that have retained control over their railways.

In the course of our report, however, we have also accumulated a substantial body of data that shows not only how much our underperforming rail system is costing us, but also the extent of the social, environmental and economic value that could be realised with a different model and a fresh approach.

When we aggregate all our figures, we find that a better railway system has the potential to deliver a total 'saving' of almost £479 billion by 2050 (see Table 14). Like all of our other estimates in this report, this figure allows for a lag of five years in order for policy changes to be implemented and cultural changes to take effect, so the £479 billion figure is the projected saving in the 35 years from 2015 to 2050.

| Table 14. Potential social, economic and environmental value of better railways (£ billion) | |
|---|---|
| **Passengers** | |
| Affordability | 162 |
| Comfort | 104 |

| | |
|---|---|
| Speed | 58.2 |
| **Wider society** | |
| Road congestion | 73.5 |
| Climate Change | 54 |
| Road accidents | 27.3 |
| **Total** | **479** |

Such a strategic shift will not happen overnight. In order to achieve the changes set out in this report, what is needed above all is a radical overhaul of transport pricing.

Transport in general, and car use in particular, tends to be ‘price inelastic’: the public are not responsive to changes in prices. As a result, attempts to change behaviour through pricing have been difficult. It is not possible within the scope of this paper to estimate what level of pricing change would have the desired effect.

But important work is being done in this area elsewhere, not least within the European Commission. It is clear from our research and the work of others that in recent years pricing policy has gone in the opposite direction of where it needs to go. Private forms of transport have become cheaper relative to public transport, even though they pollute more, cause more accidents and congestion, contribute to longer commuting times and fuel an insatiable demand for an ever-expanding road network.

Nothing less than a seismic shift in relative pricing is needed to tackle these negative trends and enable a rejuvenated rail system to take its place at the heart of a more sustainable future.

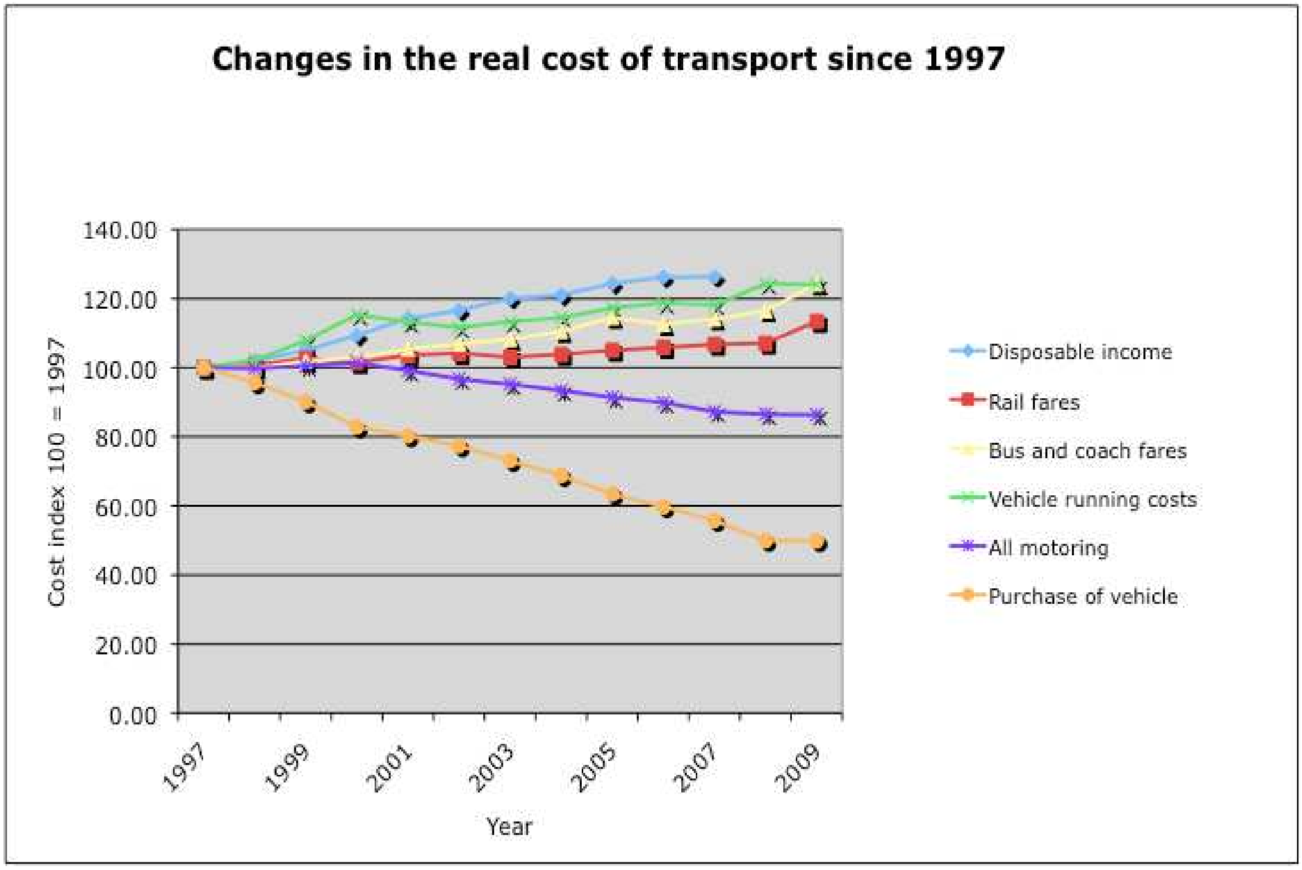


**Figure 16: Changes in the real cost of transport by mode**
*Source: ONS*

# Conclusions

In this report we have presented evidence that demonstrates how poorly the UK's railways perform on affordability, comfort and speed when compared with those of our European neighbours. When we measure the impact of this underperformance thoroughly, we can see that it translates into a substantial cost for our society to bear – over £324 billion between now and 2050. In addition to this there are 'hard cash' implications in terms of the leakage and interface costs that stem from the UK's privatisation model. We have seen that these have amounted to £6 billion since 1997.

These figures do not include the social exclusion impacts of poor access to train travel. These may be substantial, as we have seen in section 2. In pursuing a commercial model for the railways, policy-makers have squeezed out issues of access and equity in a drive for greater profit.

There are also additional costs associated with having a railway system that is not fit for what the future has in store. In section 4 we estimated the modal shift from road to rail that will be required to meet future climate change and congestion challenges. Being able to meet these challenges would deliver a further £155 billion of social value.

This paper prompts three further research questions. Firstly, in light of a large public-sector deficit and the current wave of cuts in public spending, how can we continue to fund our railways to the level required? The UK has only recently reached the level of subsidy invested over many years in the French railways – the best-performing system in our analysis. What alternative models are there for funding the railways into the future, apart from further fare increases and taxpayer funding?

One approach that we believe is worth pursuing involves looking closely at who benefits most from our railways, in terms of the outcomes that we have set out in this paper. By quantifying the total benefits for various stakeholders – businesses, for example, and households whose property values have appreciated – it should be possible to calculate how these different beneficiaries should contribute to the costs of the system. Such a model is already being used to fund Crossrail in the UK, and similar approaches have been used in France.

Secondly, taking a social value approach provides an opportunity to improve accountability in the rail industry. At present railway companies are accountable first and foremost to their shareholders, then passengers and the State. From the State's perspective profitability and reducing levels of public subsidy are key measures of success. But adopting a genuine multi-stakeholder approach could see the industry being measured against social and environmental objectives as well as economic ones, allowing the travelling public and wider society to hold it to account. This would provide an alternative to the current profit-driven model, shifting incentives away from a cost-cutting agenda and towards a more outcomes-focused approach.

Finally, not enough is known about the social exclusion impacts of access to transport generally and fare increases specifically. More research needs to be done in this area, in relation both to rail travel and to bus services. In parallel with the privatisation and fragmentation of the rail network we have seen gradual deregulation and privatisation of the buses. This has caused bus fares to rocket, hitting the poor hard, but there is a lack of empirical research in this area – particularly by government.

It is clear to us – and most commentators agree – that the form of rail privatisation adopted in the UK left a lot to be desired. Alarmed by the spiralling costs that have followed privatisation, successive governments have initiated various reviews to explore ideas for reform – culminating in the current McNulty review. In none of these reviews, however, has a return to largely or wholly public ownership been treated as a serious option. We believe that it is time for the debate to reflect the huge societal costs associated with the current privatised model, and the many benefits a renationalised railway might generate.

In its submission to the McNulty review the Association of Train Operating Companies recommended the break-up of Network Rail. This would mean a plethora of different companies competing to run the tracks and stations. Our research shows this could be a very bad idea because it threatens to further fragment the railways, compounding some of mistakes of privatisation. Any decisions regarding the value for money of the railways need to take account of the long-term social, economic and environmental benefits we have outlined in this report.

Railways have always been economically strategic for the UK. Our report shows that they are also increasingly important from an environmental perspective. Other countries have understood the role and potential of railways better than us, making the kind of investment necessary to ensure a service of quality and viability. But unlike countries such as Spain and China, we are failing to invest properly in our future.

In recent years UK transport policy has been dominated by ‘predict and provide’, an approach that is wholly unsuitable for the transport and environmental challenges that we now face. Our railways have been forced down a privatisation route that has not paid off. We simply cannot afford to ‘leave to the market’ the primary responsibility for achieving the kind of radical modal shift that is urgently needed.

Through the lens of social value, we can see the huge potential that the railways have to help forge a transport system that is genuinely focused on broad social, environmental and economic outcomes, rather than simply moving people around.

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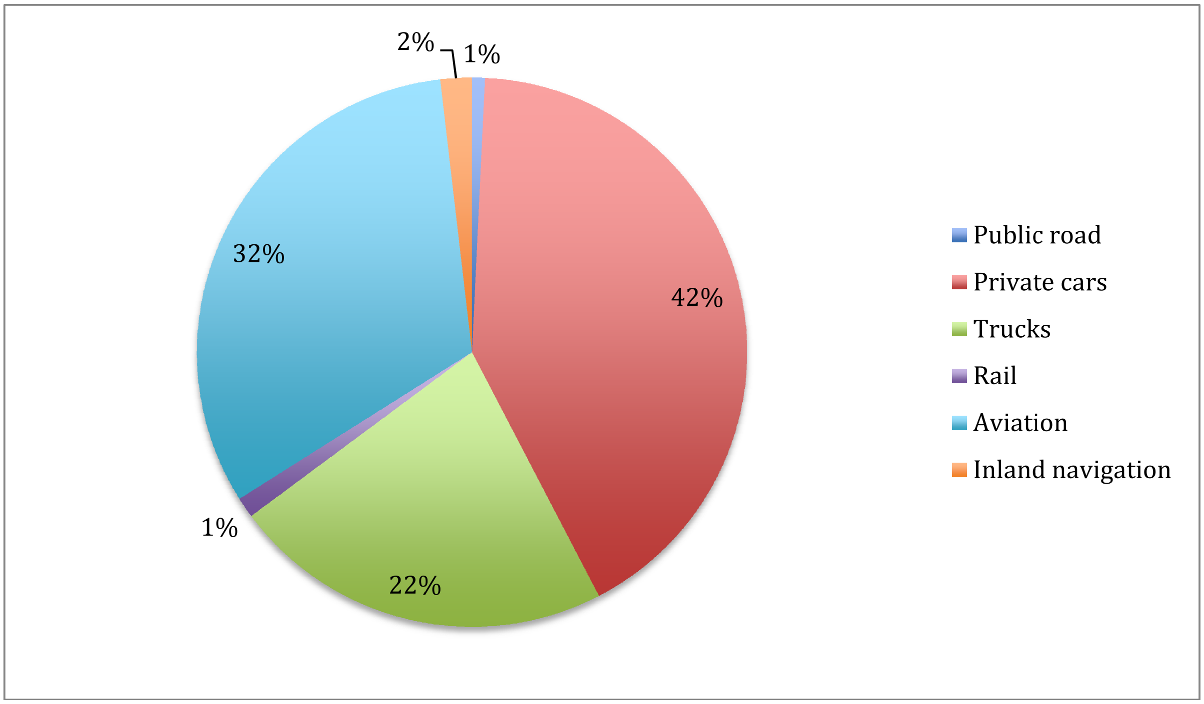
# Appendix 1 – Leakage and interface costs

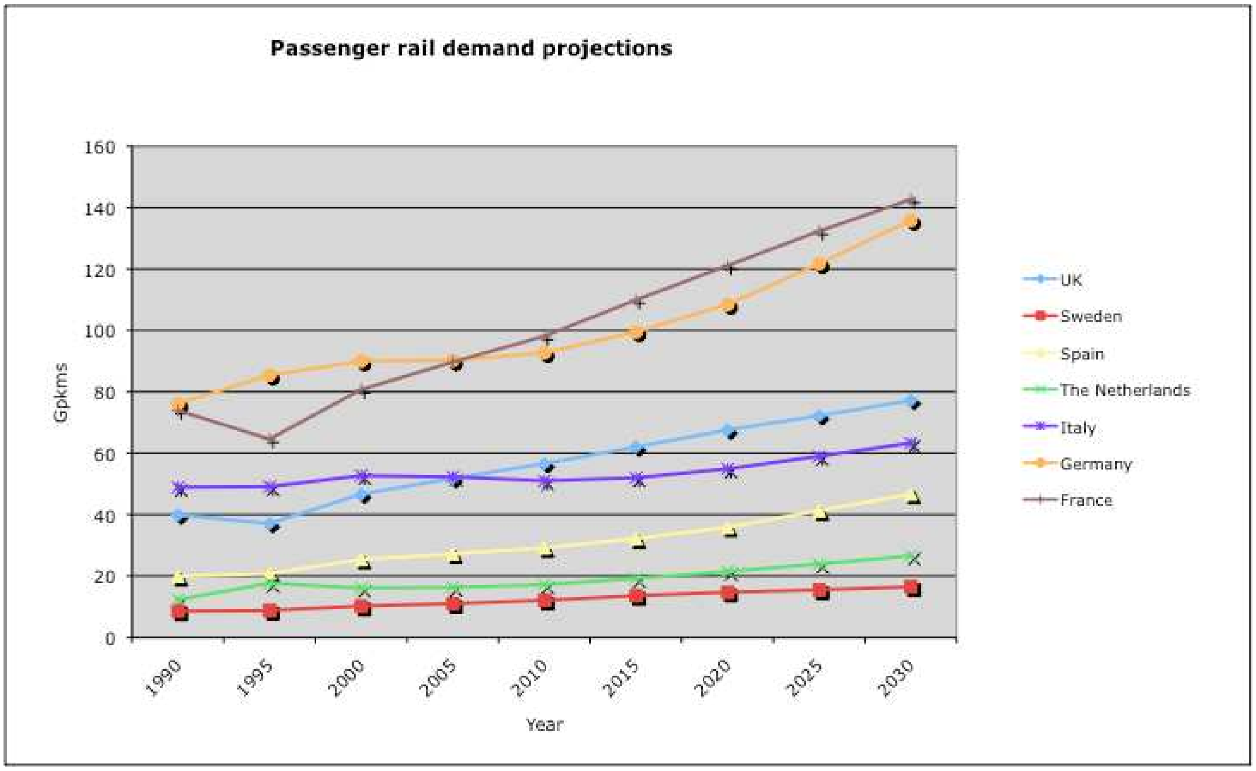
| Appendix 1. Costs Directly Attributable to the Privatisation and Fragmentation of the UK Rail Industry (leakage + interface costs) £ Millions | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | |
| Debt | 1009.0 | 1456.0 | 2384.0 | 3333.0 | 3967.0 | 7716.0 | 9744.0 | 12935.0 | 15678.0 | 18201.0 | 18394.0 | 20350.5 | 22307.0 | |
| Borrowing costs | 39.0 | 40.0 | 81.0 | 137.0 | 164.0 | 318.0 | 361.0 | 438.0 | 733.0 | 872.0 | 1019.0 | 1017.5 | 1115.4 | |
| Estimated public sector borrowing costs | 33.5 | 33.6 | 68.8 | 117.0 | 140.1 | 252.4 | 305.2 | 367.4 | 622.2 | 736.7 | 873.7 | 875.1 | 959.2 | |
| Potential additional debt costs | 5.5 | 6.4 | 12.2 | 20.0 | 23.9 | 65.6 | 55.8 | 70.6 | 110.8 | 135.3 | 145.3 | 142.5 | 156.1 | |
| Dividends (infrastructure) | 111.0 | 121.0 | 133.0 | 137.0 | 138.0 | | | | | | | | | |
| Arriva Dividends (UK rail) | | | na | 7.3 | 7.4 | 7.6 | 7.8 | 7.8 | 8.6 | 8.7 | 9.2 | 10.5 | 50.3 | |
| First Group dividends (UK rail) | | 4.2 | 5.1 | 7.1 | 7.5 | 8.4 | 8.8 | 9.2 | 9.4 | 10.1 | 11.1 | 13.5 | 84.6 | |
| National Express Dividends (UK rail) | | | 1.4 | 1.9 | 2.0 | 2.3 | 2.5 | 2.6 | 3.0 | 3.5 | 3.8 | 4.2 | 15.2 | |
| Go-Ahead Dividends (UK rail) | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.5 | 0.7 | 0.8 | 0.9 | 1.1 | 1.1 | 34.8 | |
| Stagecoach Dividends (UK rail) | | | | 11.7 | 10.7 | 7.4 | 7.4 | 8.3 | 8.1 | 7.9 | 9.0 | 6.5 | 41.8 | |
| HSBC Rail | | | | | | | | 31.6 | 48.5 | 29.5 | | 32 | | |
| Porterbrook leasing | | | | | | | | | | | | 616.18 | | |
| Angel Trains | | | | | | | 56.00 | 60.00 | 0.00 | 60.00 | 107.00 | 20.00 | 206.60 | |
| TOCs subcontractors' operating margins | 44.9 | 35.9 | 45.8 | 34.7 | 50.6 | 61.8 | 65.9 | 67.5 | 69.2 | 71.0 | 72.7 | 74.6 | 76.4 | |
| ROSCO subcontractors' operating margins | 15.90 | 17.50 | 11.80 | 12.60 | 12.10 | 12.10 | 12.50 | 12.8 | 13.1 | 13.5 | 13.8 | 14.1 | 14.5 | |
| Cost of outsourced infrastructure maintenance + E&Rs* | 33.88 | 41.93 | 115.71 | 129.29 | 177.45 | 167.65 | 157.85 | 368.62 | 252.00 | 221.00 | 233.00 | 210.00 | 203.00 | |
| | | | | | | | | | | | | | | **Total 97-2009** |
| Total additional debt costs | 5.46 | 6.36 | 12.24 | 19.99 | 23.95 | 65.58 | 55.80 | 70.56 | 110.84 | 135.34 | 145.27 | 142.45 | 156.15 | 949.99 |
| Total dividend leakage | 111.15 | 125.43 | 139.65 | 165.27 | 165.97 | 25.99 | 82.99 | 120.23 | 78.26 | 120.69 | 141.19 | 704.07 | 433.30 | 2414.18 |
| Total interface/efficiency costs | 94.68 | 95.33 | 173.31 | 176.59 | 240.15 | 241.55 | 236.25 | 448.98 | 334.37 | 305.43 | 319.54 | 298.70 | 293.92 | 3258.80 |
| **Total leakage + additional costs** | **211.29** | **227.11** | **325.20** | **361.85** | **430.07** | **333.12** | **375.04** | **639.77** | **523.47** | **561.46** | **606.00** | **1145.22** | **883.37** | **6622.97** |
| | | | | | | | | | | | | | | **Total 2000-09** |
| Public subsidy | | | | 1418.0 | 1214.0 | 1826.0 | 2588.0 | 3622.0 | 3791.0 | 4602.0 | 6308.0 | 5293.0 | 5213.0 | 35875.0 |
| Additional leakage/costs as a % of subsidy | | | | 25.5 | 35.4 | 18.2 | 14.5 | 17.7 | 13.8 | 12.2 | 9.6 | 21.6 | 16.9 | 18.5 |
| Sources: Jupe (2009); Catalyst (2005); annual reports (Network Rail, TOCs, ROSCOs); ORR (2010); RMT (2010) and author's own calculations | | | | | | | | | | | | | | |
| * Maintenance and Enhancement and Renewals (E&Rs) 100% outsourced up to 2003/4, after which maintainenance taken in-house. Thereafter additional costs refer to E&Rs only | | | | | | | | | | | | | | |

# Appendix 2 – Modal shift data

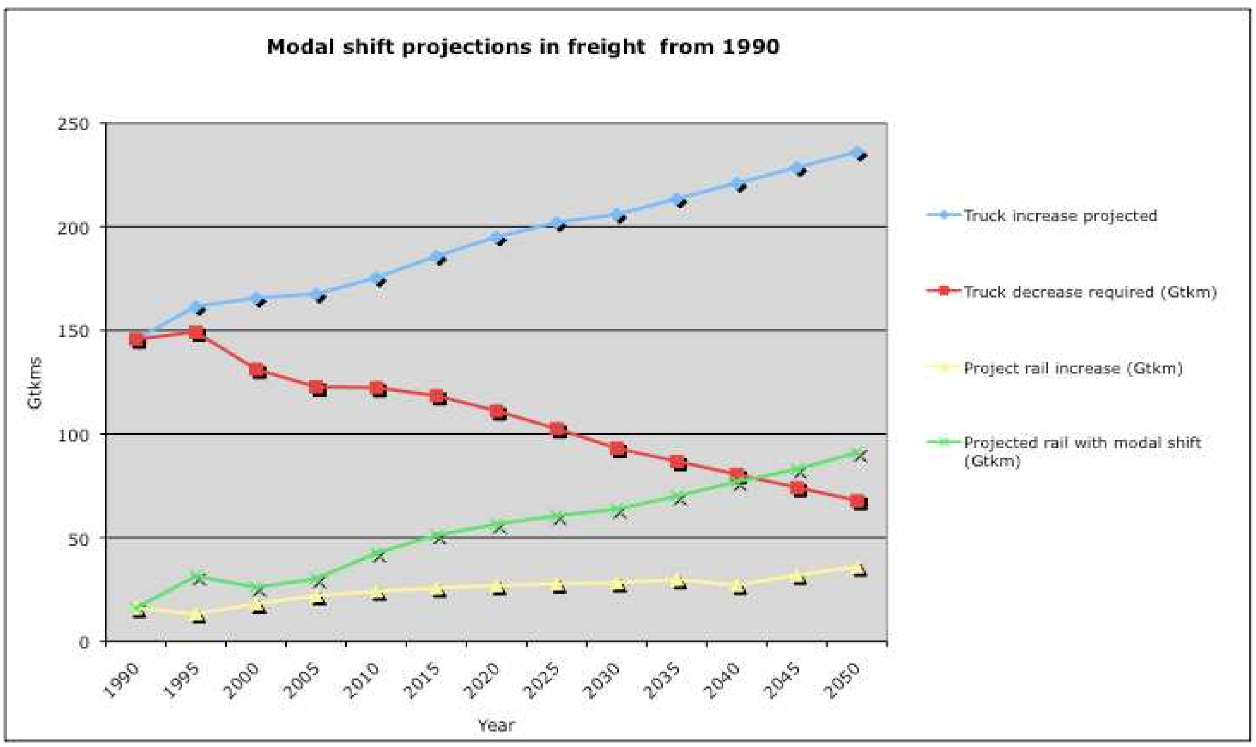
This Appendix contains the supporting graphs for section 2.1.



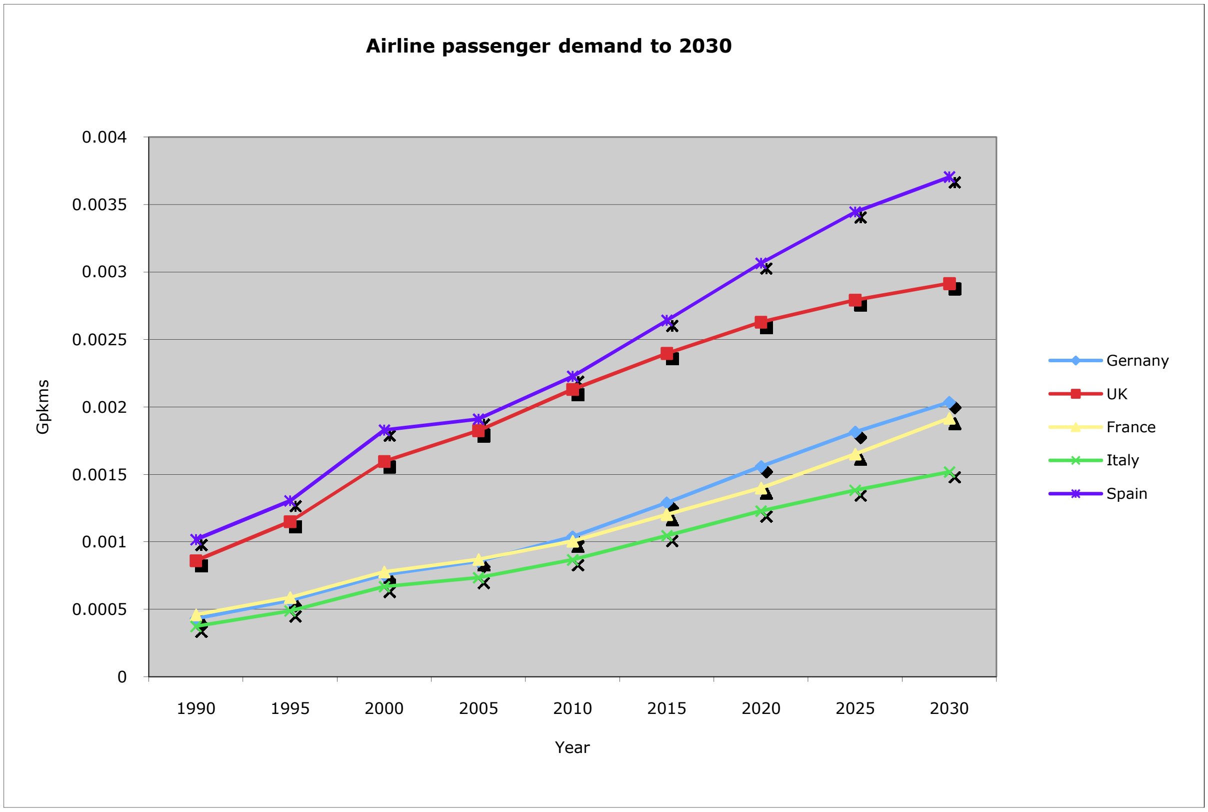

1. Proportion of $CO_2$ from transport modes in 2030



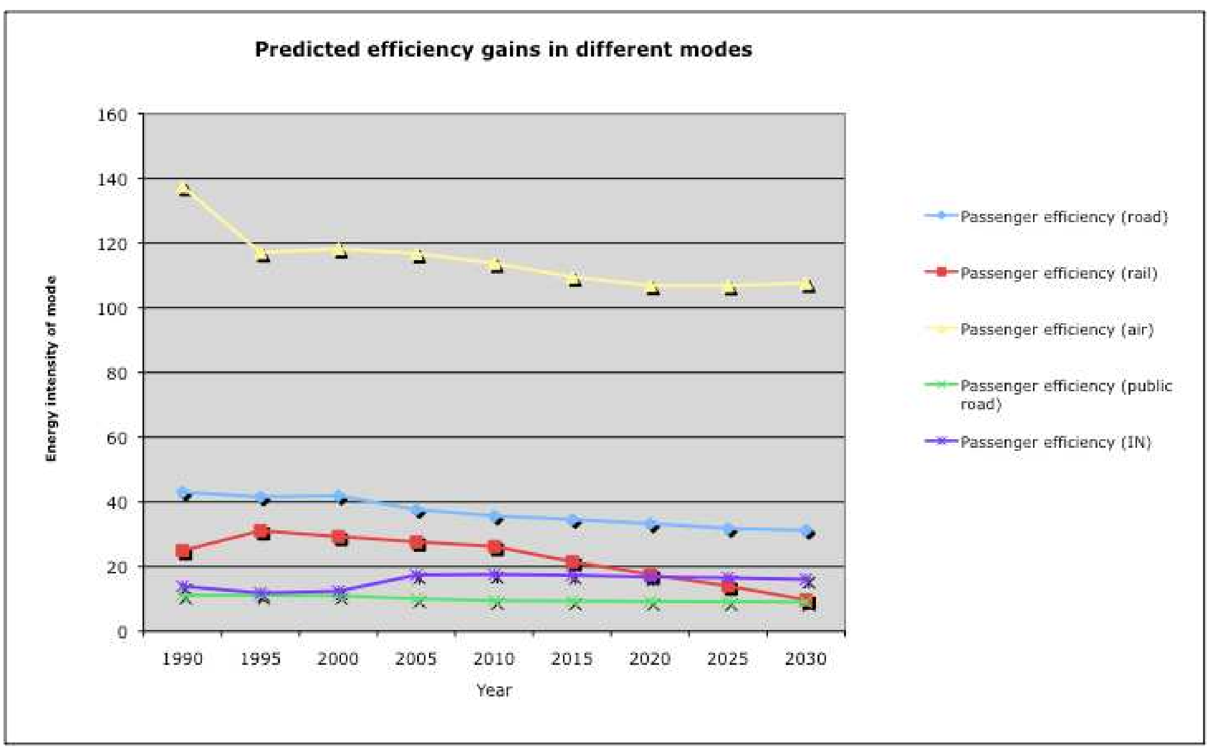

2. Passenger rail projections (Gpkms)




3. Modal shift projections from 1990 (freight)




4. Airline passenger demand to 2030 (Gpkms)




5. Predicted efficiency gains in different modes

# Appendix 3: Case studies of ownership structure in other countries[46]

## France

Société Nationale des Chemins de fer Français (SNCF) provides all domestic passenger rail services in France and is state owned. Some services are branded differently. National long-distance high-speed services, for example, are branded Train à Grande Vitesse (TGV), while international services have individual brands that include Eurostar. In Paris commuter Réseau Express Régional (RER) services are managed by SNCF and Régie Autonome des Transports Parisiens (RATP), the regional transport authority responsible for public transport in Paris. Track is owned and maintenance is paid for by the state-owned Réseau Ferré de France (RFF), although maintenance is carried out by SNCF.

## Italy

In Italy state-owned FS Holding owns national infrastructure manager RFI and incumbent rail operator Trenitalia, which provides three principal categories of rail services on the RFI network:

- Long-distance services, including the current Intercity, Intercity Plus, EurostarCity Italia, Eurostar Italia, Eurostar AV Italia (high speed) and T-Biz brands. These services are essentially commercially viable and are run at Trenitalia's discretion and to its own timetables. There are some indirect grants for these services, however, from government and the regions.
- Long distance Public Service Obligation (PSO) overnight services operated under the Espresso and Intercity Notte brands. These are funded by government. At present Trenitalia operates all these services, although there is provision for public tender.
- Regional services procured by regional governments through negotiation or, in some cases, by public tender.

Italy has a number of regional operators, often owned by the regions, of which the largest are LeNord (Milan), FSE (Puglia), FER (Emilia Romagna), Circumvesuviana (Naples) and GTT (Turin). These services do not normally use the national network, except for some services provided for Trenitalia around Milan and Turin.

Finally, Cisalpino, a joint venture between Trenitalia and Switzerland's SBB,

[46] The information in this table is drawn Stear, Davies and Gleave (2009)

operates some international services between Italy and Switzerland although within Italy these services have the same fares and ticketing regime as EurostarCity Italy and Intercity Plus services.

## Spain

The state-owned operator Renfe Operadora provides rail services on the national network. There are no privately operated passenger services currently, although there are some private freight operators. Renfe operates commuter, regional, long-distance and high-speed services. It is also responsible for maintaining its rolling stock. Some suburban railway services currently operated by Renfe are expected to be transferred to regional governments to manage in the future.

Administrador de Infraestructuras Ferroviarias (ADIF), a public body, is responsible for the infrastructure management of most (over 95%) of the rail network in Spain. ADIF maintains lines and stations. It charges rail companies for running services on the network and providing services such as ticket offices.

Some routes that are not part of the national network have services provided by other operators, including the following publicly owned companies (managed by regional governments):

- Ferrocarrils de la Generalitat de Catalunya (FGC), which runs services in Catalonia
- Ferrocarrils de la Generalitat Valenciana (FGV), which runs services in Valencia
- Feve and EuskoTren, which runs services in the Basque region.

These operators also manage the track on which their services run.

## Germany

Germany's federal structure means that responsibility for transport is divided between the federal government (Bund) and the States (Länder). In addition to the national rail infrastructure there are a number of smaller networks and lines owned by the Länder or privately.

Deutsche Bahn (DB), the integrated national rail company, was restructured in 1994 to become a public limited company that is currently wholly state owned, although partial privatisation is being considered. Since 1999 DB has been restructured with the following principal subsidiaries:

- DB Netz, which manages the national rail infrastructure
- DB Fernverkehr, operator of long-distance services
- DB Regio, operator of regional and local services.

In practice Germany's geography, with clusters of cities within commuting distance of each other, means that even long-distance services may serve local and commuter travel.

At a local level the Länder have since 1999 had the power to procure local services by competitive tender, either through their PTAs (“Verkehrsverbunde”) or through a separate tendering authority. However, DB retains ownership of most of the rolling stock, with the exception of a rolling stock pool established by the Lower Saxony Länder, making it difficult for new entrants to compete unless they buy new stock. Nonetheless, some Länder have actively sought alternatives to DB and groups such as Veolia and Keolis now provide many local services under contract.

DB Fernverkehr’s services across PTA borders are in principle commercial and subject to open access competition but, partly because of the difficulties of obtaining suitable rolling stock; this has not yet emerged in practice.

# Appendix 4: Value of modal shift in passenger cars

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transport activity cars (Gpkms) | 770.1 | 780 | 789.9 | 799.8 | 809.7 | 809.7 | 819.85 | 830 | 840.15 | 850.3 | 850.3 | 858.85 |
| Less 65 per cent electrification | 770 | 760.375 | 750.8703125 | 741.484434 | 732.215878 | 723.06318 | 714.02489 | 705.099579 | 696.285834 | 687.582261 | 678.987483 | 670.500139 |
| Efficiency rate | 34.57732762 | 34.57732762 | 34.57732762 | 34.5773276 | 34.5773276 | 33.266642 | 33.266642 | 33.266642 | 33.266642 | 33.266642 | 31.2538157 | 31.2538157 |
| Emissions from diesel cars | 26624.54227 | 26291.73549 | 25963.0888 | 25638.5502 | 25318.0683 | 24053.8839 | 23753.2104 | 23456.2952 | 23163.0915 | 22873.5529 | 21220.9497 | 20955.6878 |
| Level required to reach 60% target | 14608 | 14225 | 13841 | 13458 | 13074 | 13074 | 12731 | 12388 | 12045 | 11702 | 11702 | 11394 |
| Difference | 12016 | 12067 | 12122 | 12181 | 12244 | 10980 | 11022 | 11068 | 11118 | 11172 | 9519 | 9561 |
| Modal shift in Gpkms | 348 | 349 | 351 | 352 | 354 | 330 | 331 | 333 | 334 | 336 | 305 | 306 |
| Value of reduced accidents (low) | 20851167 | 20939074 | 21034200 | 21136454 | 21245747 | 19802723 | 19879429 | 19962913 | 20053092 | 20149880 | 18274974 | 18355420 |
| Value of reduced climate change (low) | 52127918 | 52347685 | 52585499 | 52841135 | 53114369 | 49506808 | 49698572 | 49907283 | 50132729 | 50374701 | 45687434 | 45888551 |
| Value of reduced accidents (high) | 271065175 | 272207964 | 273444597 | 274773901 | 276194717 | 257435403 | 258432576 | 259517873 | 260690191 | 261948444 | 237574657 | 238620463 |
| Value of reduced climate change (high) | 215462062 | 216370433 | 217353398 | 218410024 | 219539390 | 204628141 | 205420766 | 206283437 | 207215280 | 208215429 | 188841394 | 189672676 |
| Value of reduced accidents (mid) | | | | | | | | | | | | |
| Value of reduced climate change (mid) | | | | | | | | | | | | |
| Total low | 72979086 | 73286760 | 73619699 | 73977589 | 74360116 | 69309532 | 69578001 | 69870197 | 70185821 | 70524581 | 63962408 | 64243971 |
| Total High | 486527237 | 488578397 | 490797995 | 493183924 | 495734107 | 462063544 | 463853342 | 465801310 | 467905471 | 470163873 | 426416051 | 428293139 |
| PV Low | 1,410,855,343.46 | | | | | | | | | | | |
| PV High | 9,405,702,289.75 | | | | | | | | | | | |
| Mid-point | 3,997,423,473.14 | | | | | | | | | | | |

| Year | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transport activity cars (Gpkms) | 867.4 | 875.95 | 884.5 | 884.5 | 891.834 | 899.168 | 906.502 | 913.836 | 921.17 | 928.504 | 935.838 | 943.172 |
| Less 65 per cent electrification | 662.118888 | 653.842402 | 645.669372 | 637.598504 | 629.628523 | 621.758167 | 613.986189 | 606.311362 | 598.73247 | 591.248314 | 583.85771 | 576.559489 |
| Efficiency rate | 31.2538157 | 31.2538157 | 31.2538157 | 30.3088447 | 30.3088447 | 30.3088447 | 30.3088447 | 30.3088447 | 29.4362374 | 29.4362374 | 29.4362374 | 29.4362374 |
| Emissions from diesel cars | 20693.7417 | 20435.0699 | 20179.6315 | 19324.874 | 19083.3131 | 18844.7717 | 18609.2121 | 18376.5969 | 17624.4311 | 17404.1257 | 17186.5742 | 16971.742 |
| Level required to reach 60% target | 11087 | 10780 | 10473 | 10473 | 10198 | 9923 | 9648 | 9373 | 9373 | 9127 | 8881 | 8635 |
| Difference | 9607 | 9655 | 9707 | 8852 | 8885 | 8922 | 8961 | 9003 | 8251 | 8277 | 8305 | 8337 |
| Modal shift in Gpkms | 307 | 309 | 311 | 292 | 293 | 294 | 296 | 297 | 280 | 281 | 282 | 283 |
| Value of reduced accidents (low) | 18442232 | 18535330 | 18634636 | 17523532 | 17589559 | 17661562 | 17739468 | 17823204 | 16818412 | 16870883 | 16928967 | 16992594 |
| Value of reduced climate change (low) | 46105581 | 46338326 | 46586590 | 43808831 | 43973896 | 44153905 | 44348671 | 44558009 | 42046030 | 42177207 | 42322417 | 42481485 |
| Value of reduced accidents (high) | 239749021 | 240959296 | 242250266 | 227805922 | 228664261 | 229600307 | 230613088 | 231701647 | 218639354 | 219321477 | 220076570 | 220903722 |
| Value of reduced climate change (high) | 190569735 | 191531748 | 192557904 | 181076502 | 181758771 | 182502808 | 183307840 | 184173104 | 173790256 | 174332456 | 174932658 | 175590138 |
| Value of reduced accidents (mid) | | | | | | | | | | | | |
| Value of reduced climate change (mid) | | | | | | | | | | | | |
| Total low | 64547813 | 64873657 | 65221226 | 61332364 | 61563455 | 61815467 | 62088139 | 62381213 | 58864441 | 59048090 | 59251384 | 59474079 |
| Total High | 430318755 | 432491043 | 434808170 | 408882425 | 410423032 | 412103114 | 413920928 | 415874751 | 392429610 | 393653933 | 395009228 | 396493859 |
| PV Low | | | | | | | | | | | | |
| PV High | | | | | | | | | | | | |
| Mid-point | | | | | | | | | | | | |

| Year | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transport activity cars (Gpkms) | 950.506 | 957.84 | 965.174 | 972.508 | 979.842 | 987.176 | 994.51 | 1001.844 | 1009.178 | 1016.512 | 1023.846 | 1031.18 |
| Less 65 per cent electrification | 569.352495 | 562.235589 | 555.207644 | 548.267549 | 541.414204 | 534.646527 | 527.963445 | 521.363902 | 514.846853 | 508.411268 | 502.056127 | 495.780425 |
| Efficiency rate | 29.4362374 | 28.6279882 | 28.6279882 | 28.6279882 | 28.6279882 | 28.6279882 | 27.8772304 | 27.8772304 | 27.8772304 | 27.8772304 | 27.8772304 | 27.8772304 |
| Emissions from diesel cars | 16759.5952 | 16095.6738 | 15894.4779 | 15695.7969 | 15499.5995 | 15305.8545 | 14718.1586 | 14534.1816 | 14352.5044 | 14173.0981 | 13995.9343 | 13820.9851 |
| Level required to reach 60% target | 8389 | 8389 | 8169 | 7949 | 7728 | 7508 | 7508 | 7311 | 7114 | 6917 | 6720 | 6720 |
| Difference | 8371 | 7707 | 7726 | 7747 | 7771 | 7798 | 7210 | 7223 | 7238 | 7256 | 7276 | 7101 |
| Modal shift in Gpkms | 284 | 269 | 270 | 271 | 271 | 272 | 259 | 259 | 260 | 260 | 261 | 255 |
| Value of reduced accidents (low) | 17061695 | 16151914 | 16191771 | 16236898 | 16287231 | 16342704 | 15517932 | 15546157 | 15579330 | 15617392 | 15660280 | 15283738 |
| Value of reduced climate change (low) | 42654237 | 40379786 | 40479427 | 40592246 | 40718078 | 40856759 | 38794831 | 38865391 | 38948326 | 39043480 | 39150700 | 38209345 |
| Value of reduced accidents (high) | 221802031 | 209974886 | 210493021 | 211079680 | 211734004 | 212455149 | 201733122 | 202100035 | 202531294 | 203026095 | 203583642 | 198688595 |
| Value of reduced climate change (high) | 176304178 | 166903114 | 167314966 | 167781284 | 168301388 | 168874605 | 160351969 | 160643618 | 160986413 | 161379716 | 161822895 | 157931960 |
| Value of reduced accidents (mid) | | | | | | | | | | | | |
| Value of reduced climate change (mid) | | | | | | | | | | | | |
| Total low | 59715931 | 56531700 | 56671198 | 56829145 | 57005309 | 57199463 | 54312764 | 54411548 | 54527656 | 54660872 | 54810981 | 53493083 |
| Total High | 398106209 | 376878000 | 377807987 | 378860964 | 380035392 | 381329754 | 362085090 | 362743653 | 363517708 | 364405811 | 365406537 | 356620554 |
| PV Low | | | | | | | | | | | | |
| PV High | | | | | | | | | | | | |
| Mid-point | | | | | | | | | | | | |

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