



Initial Industry Plan

England and Wales

Proposals for Control Period 5 and beyond

September 2011





RFOA Rail Freight Operators' Association

Railway Industry Association

Train Operators Working Together ATOC

NetworkRail

Contents

Foreword

This Initial Industry Plan (IIP) for England and Wales sets out how the industry can deliver a more efficient and better value railway and how the railway can play a key role in driving sustainable economic growth. The IIP examines the key choices and options facing funders in specifying the future outputs of the railway and the level of funding required. These choices will inform the development of the Government's High Level Output Specification and Statement of Funds Available to be published in summer 2012 as part of the Periodic Review 2013 process as well as informing the programme of franchise re-letting.

The development of the IIP has been overseen by the Planning Oversight Group (POG) which involves representatives of Network Rail, passenger and freight train operators and suppliers. This work has built on the successful cross-industry work on Route Utilisation Strategies and has sought input from cross-industry groups responsible for co-ordinating industry plans in relation to safety, performance, sustainability, capacity, access strategies, asset management, technology and innovation.

The recently established Rail Delivery Group (RDG), made up of the Chief Executives of the passenger and freight train operating owning groups and Network Rail, has been established to provide leadership on cross-industry issues enabling a higher performing, more cost effective and sustainable rail network for Britain's rail users and taxpayers. This plan has been produced under the aegis of the RDG and summarises the key priorities which RDG has identified where such a cross-industry group can effectively improve the value for money of the industry.

The document is structured to explain the role rail can play in meeting the needs of funders and users, the opportunities to improve the value for money and affordability of today's railway and the choices facing funders as to how rail can contribute further to the achievement of sustainable economic growth. The document examines these opportunities and choices at a sector and market level, with separate analysis for each of the London and South East, Long Distance, Regional and Freight sectors. A separate IIP has been prepared for Scotland, reflecting the devolved specification and funding of the railway. Finally, the document summarises the implications for the development of the High Level Output Specifications and Statements of Funds Available for publication next summer and the development of Network Rail's Strategic Business Plan in January 2013.

The industry is determined to take up the challenge to improve efficiency posed by the Rail Value for Money study, led by Sir Roy McNulty and published in 2011. The IIP identifies the impact of such cost savings on industry affordability and the role that funders and the Office for Rail Regulation (ORR) can play to facilitate this. The industry is already developing proposals to tackle costs and develop greater partnerships between train operators, Network Rail and their supply chains. Change and collaboration is required by all parties involved in the specification and delivery of the rail system. The RDG will take ownership of key cross-industry initiatives that cannot be delivered without collective action across the industry.

It is anticipated that revenue growth and cost reduction will mean that many services will cover their costs by the end of Control Period 5 (CP5) even after providing for the cost of financing inherited debt. Within sectors, however, there will be the opportunity to improve value for money by making difficult choices about some services. Equally within some sectors value for money can be improved through further efficiencies. It must also be recognised that many services that do not cover their costs make important contributions to the economy and to local communities and ongoing government support will be required if the current levels of service are to continue into CP5.

The importance of continued investment in infrastructure to sustainable economic growth is now widely recognised. Investment is also key to driving long term revenue growth. Innovative ways of financing these investments can be pursued but continued government support will be required to facilitate these investments.

There are important decisions ahead for funders and regulators if the industry is to deliver a more affordable railway that drives a prosperous low carbon economy. The key decision areas include:

- reform of the franchising process to provide the industry with greater flexibility to deliver better value for money outputs, reducing costs and growing revenue;
- fares policy where government has indicated a desire to move away from real fare increases but which is conditional on improvements in the value for money of rail;
- reform of the regulatory framework to provide aligned incentives between Network Rail and train operators and the ability to share in success through alliancing and collaboration;
- the setting of outputs and funding for the industry through the periodic review and franchise re-letting processes, and the freedom for the industry to deliver users' and funders' requirements as efficiently as possible;
- the commitment to investment to increase rail's contribution to sustainable economic development and provide industry with the confidence to develop longer term relationships with suppliers in relation to the procurement of rolling stock, electrification and infrastructure programmes; and
- creating the right environment for more risk capital to be attracted to the railway.

The IIP provides a starting point for discussions with government and ORR on the priorities for CP5, the programme of franchise re-letting and the necessary reform to the overall framework within which the industry operates to deliver a high performing and value for money railway.

Executive Summary

The Secretary of State for Transport has stated that rail should be at the forefront of the Government's transport strategy – contributing to the Coalition's twin goals of economic growth and carbon reduction. However he has also made it clear that the current cost of the railway is unsustainable as highlighted by Sir Roy McNulty's Rail Value for Money study.

The industry is determined to meet the challenge of improving the value for money of the railway. The Initial Industry Plan (IIP) sets out how the industry intends to reduce its costs and, combined with the industry's continued success in attracting increasing numbers of passengers, improve significantly the affordability of the railway.

A more affordable railway provides government with the opportunity to consider the choices – and the appropriate balance – between fares, investment and subsidy in specifying the outputs and funding for the railway. It is due to publish the High Level Output Specification (HLOS) for Control Period 5 (CP5, 2014 – 2019) in summer 2012.

The IIP seeks to help inform these choices. The industry recognises that there is a limit on the funding available and that there are competing priorities for these funds. The industry can make a compelling case for investment in rail and how it can contribute further to the achievement of sustainable economic growth.

The IIP offers a railway that by the end of CP5:

- is more **efficient** and more **affordable to the taxpayer** – efficiency improvements and continued revenue growth could reduce the annual net cost of the current railway to the taxpayer to £1billion (a 66 per cent reduction compared to the end of CP4). These cost savings allow government to consider the balance of investment in service improvements, the level of fares and the level of ongoing subsidy

- stimulates **economic growth** through the efficient movement of people and goods into and between major economic centres by:
  - providing an additional 170,000 seats at peak times for commuters on key urban networks
  - delivering a step change in the rail connectivity of major economic centres providing a stimulus to economic growth and development
  - providing capacity to accommodate a 30 per cent increase in rail freight

- maintains high levels of **reliability** and focuses on improving areas of poor performance which have significant impact on users

- better meets the **needs of passengers** in key areas such as journey information, comfort, and accessibility, which together with high levels of reliability, can help the industry make steps towards meeting its ambition to achieve 90 per cent **customer satisfaction** in the longer term

- maintains high levels of passenger, public and workforce **safety** while continuing to improve safety culture throughout the industry and reduce safety risk at level crossings by 50 per cent

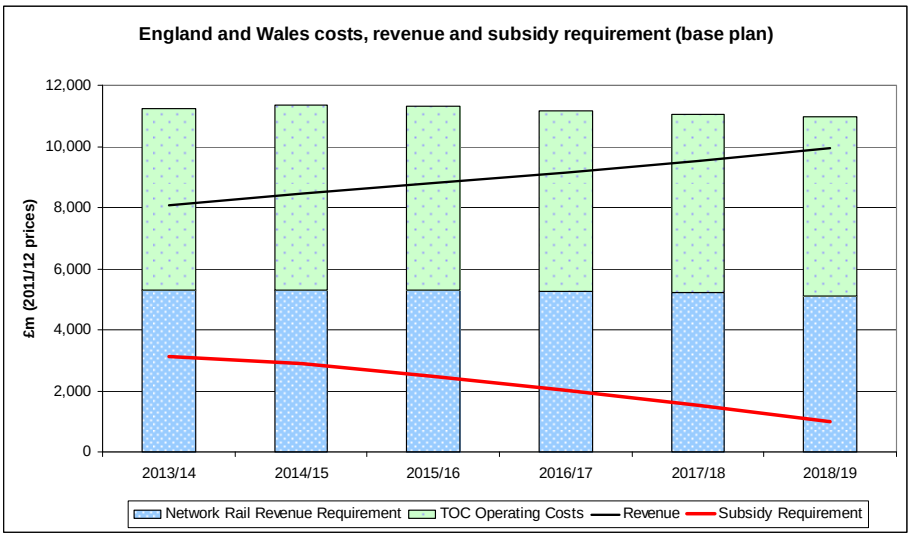
- contributes towards a **lower carbon economy**, reducing industry's CO_2 emissions per passenger kilometre by 25 per cent and removing the equivalent of one million lorry journeys off the road per year, a reduction in CO_2 emissions of 500,000 tonnes

The IIP offers **value for money** investments to deliver improvements in the key outcomes for funders and users. The schemes proposed to deliver these better outcomes have an overall benefit cost ratio of **4.5:1**.

Efficiency and affordability

The Rail Value for Money (RVfM) study challenged the industry to reduce costs without reducing the outputs delivered by the order of 20-30 per cent by the end of Control Period 5 (CP5) compared to 2008/09. The industry is determined to take up this challenge. The Rail Delivery Group (RDG) has been established to provide leadership on cross-industry issues. This plan summarises the key priorities where RDG can effectively improve the value for money of the industry.

The IIP identifies opportunities to reduce costs that give the industry the confidence it can at least deliver efficiencies consistent with the RVfM "should cost" low levels of efficiency. Delivering these savings will require positive action from the industry, but also from government and regulators to facilitate fundamental change to the franchising and regulatory frameworks. The graph below illustrates the impact of delivering this level of efficiency on the subsidy required in CP5 while at the same time delivering the significant capacity committed in the base plan. The base plan includes investment in Network Rail's operating and asset information strategies as core initiatives to reduce its costs.



Note: Costs are the sum of train operator costs (including margin) and Network Rail's net revenue requirement. The subsidy requirement reflects the underlying difference between the expected demand and revenue growth and these costs. The actual level of subsidy will depend on policy decisions such as fares policy, franchise policy, existing franchise agreements and the extent to which reductions in net cost are reinvested in improved services described below.

The IIP reflects the decision that regulated fares should rise by RPI+3 per cent between 2012 and 2014. Beyond this time, improvement in rail industry finances will increase the options open to government, including that of moving from the RPI +1 per cent built into this forecasts to RPI if the industry is successful in delivering the scale of savings identified in the RVfM study.

Network Rail forecasts it can largely through its own initiative deliver a 16 per cent reduction in its costs by the end of CP5 compared to its expenditure in CP4. This is consistent with the indicative CP5 savings assumed by ORR in the last periodic review. The IIP describes the key initiatives Network Rail is currently developing, and in some cases already implementing, that will reduce its costs to achieve this level of efficiency gain. Delivering greater efficiencies would require a step change in the degree of cross-industry collaboration. Network Rail will reflect progress on developing further its efficiency initiatives for CP5 in its Strategic Business Plan (SBP), to be published in January 2013.

The industry's subsidy requirement is driven to a significant extent by the need to pay back the cost of previous investments which are reflected in Network Rail's Regulatory Asset Base and associated debt. This debt reflects recent investment to expand the railway to support economic growth but also historic costs inherited when Network Rail took over ownership of the infrastructure and in the cost of addressing the backlog of previous underinvestment in the infrastructure. Network Rail will continue to explore with ORR and government options for financing the Regulatory Asset Base.

Funders drive value for money from passenger train operators primarily through franchising - a highly competitive process which has attracted the involvement of companies with strong track records in cost efficiency. Train operator unit costs per passenger kilometre (excluding access charges) have fallen since privatisation, and have declined in real terms since 2005/06. In addition, train utilisation (average loading calculated as passenger kilometres per train kilometre) has risen by 24 per cent. Changing how funders procure future rail services can enable operators to address key issues such as labour productivity, resource allocation, rolling stock procurement, and ticketing and retail arrangements that will allow them to deliver further cost savings whilst meeting the needs of customers.

Train operators and Network Rail are exploring the benefits of greater collaboration or partnership and a key enabler for this is the current process of devolution within Network Rail of decision making to a local level, providing greater focus and responsiveness to the needs of the train operators. Network Rail is also developing plans which will engage suppliers much earlier in the delivery of projects providing greater scope for innovation and competition. These initiatives are key enablers of improved efficiency.

The industry is committed to developing plans which make progress towards the "high" end of the cost savings identified in the RVfM study. The study identified a number of barriers to achieving higher savings and the RDG will develop more detailed proposals for what would need to change to deliver these savings.

A key challenge to the industry from the RVfM review concerns the average number of passengers per train. Train utilisation on the railway in Great Britain is very different to that in other European countries. The factors that influence this include economic geography, configuration of rolling stock, infrastructure capability, the timetable and the trade off between frequency and length of trains. The industry has commissioned further work into this issue to examine the measurement of utilisation, and to assess whether there are opportunities to improve in this area. This work will also assist in the further development of the industry's rolling stock proposals.

Meeting the needs of customers

The interventions proposed in the IIP have been developed based on industry's understanding of what its customers require and how it can best meet these needs. Meeting them in a cost effective way will contribute to improving the affordability of the railway and support economic growth. The provision of rail services has to address a range of diverse market needs which require different strategic approaches:

- in the London and South East commuter market, rail plays a dominant role (45 per cent of peak journeys into central London), and will continue to support London's economy. Growth is forecast to continue in the long term, and major investments in infrastructure including the Crossrail and Thameslink programmes are already under way to accommodate a continued

rise in passenger numbers. Peak crowding on some corridors still needs to be addressed, as does the accommodation of overall demand in the longer term. There may be opportunities at the margin to manage demand using fares and ticketing technology, however further additional rolling stock and infrastructure capacity will be required if rail is to support growth;

- the commuter markets to other major employment centres in England and Wales have seen a sharp growth in demand for rail over the last decade as factors such as the concentration of employment in urban centres, increased road congestion, and the increase in the relative cost of commuting by car has made rail a more attractive choice. Rail has an opportunity to increase its market share and benefit from continued growth, but peak crowding will need to be addressed in some areas. The efficient utilisation of existing resources, particularly rolling stock, will help but there is a sound business case for investment to support the growth of the regional economies these services support;
- demand in the long distance and interurban travel markets is expected to continue to grow as real earnings increase in the medium term, and as rail becomes a more attractive option. There are opportunities for improved capacity utilisation and revenue to be managed in this market, but the continued growth in overall market size is expected to require additional rolling stock;
- other significant passenger markets include the non-commuter leisure and business markets in London and the South East and around other major centres, and the non-urban markets. Demand is expected to grow in all these markets, and the resources required are mainly addressed by those providing for the commuter and long distance markets. The priorities in these markets are to optimise the service provision to provide best value for money; and
- freight demand has grown in CP4, and additional traffic has been accommodated by the first major investments in a Strategic Freight Network. The overall market is expected to grow, and rail will attract a greater market share, particularly in the container and European sectors for the transport of consumer goods. The IIP includes plans to develop the Strategic Freight Network to accommodate new traffic, and stimulate further modal shift from road to rail with associated economic and environmental benefits.

Delivering economic growth

Rail transport plays a key role in enabling economic growth in Great Britain. It moves people and goods to key centres of economic activity in a safe, efficient and sustainable way.

The IIP sets out the key outputs and interventions that will increase rail's contribution to sustainable economic growth. The IIP includes significant investment already committed through the last periodic review and commitments made since then, including the Thameslink and Crossrail programmes, Reading remodelling, introduction of the Intercity Express Programme and electrification on the Great Western Main Line and in the North West.

Beyond these investments, the IIP identifies investments that allow rail to make an even greater contribution to economic growth including investment in replacement and new rolling stock, the continued electrification of the network, the Northern Hub programme, freight capacity and capability schemes, station capacity schemes and journey time improvements.

Sustainability

The industry recognises that economic growth must be delivered in the context of wider social, economic and environmental issues. The industry is committed to understanding better the nature of its impact on issues such as accessibility, climate change adaptation, waste impacts, management of the natural environment and fairness in the inclusion and diversity of people. This will allow the industry to develop and implement plans to contribute further to sustainable development in Great Britain.

This IIP provides forecasts of the carbon impact of operating rail services, demonstrating that emissions can be stabilised by the end of CP5 and substantially reduced in the longer term. A core component of the industry's strategy to address climate change is network electrification. Electric rail services are more carbon efficient than their diesel counterparts, and with Government's plans to decarbonise the grid in the coming decades this benefit will increase substantially.

There is potential for improvements beyond these forecasts. The industry proposes the implementation of a Carbon Management Framework, applying a whole system approach and employing robust measurement, which will remove the key barriers to an even more carbon efficient railway.

By addressing these issues the industry can contribute to the achievement of national climate change goals, both through absolute reductions and through an increasing share of journeys encouraged from other more polluting modes.

Investment choices

The IIP sets out a range of options for investment in the railway. This includes funding of £4.5 billion to complete significant investment already underway such as the Thameslink and Crossrail programmes and committed electrification schemes.

The IIP includes proposals for up to an additional £4.9 billion investment beyond that already committed. The incremental annual subsidy to the industry required to fund this investment is £260 million by 2019.

The industry believes that the benefits of this continued investment are substantial with an overall socio-economic benefit cost ratio of 4.5:1. Some investments are self-funding, albeit over a longer period than a single regulatory control period, and this therefore requires that the industry finance the required investment. In other cases, the investment is justified on wider socio-economic criteria and, where the industry is also required to finance these investments, it is important the longer term implications for government subsidy are understood.

The IIP includes provision for a number of funds. Experience of using funds in CP4 has demonstrated the value of such an approach giving the industry flexibility to determine the most cost effective way to deliver outputs, with potential benefit cost ratios of between 1.9:1 and 4.8:1, providing the flexibility to respond to emerging risks and unforeseen circumstances.

Robust governance arrangements are critical to ensuring that the use of funds is based on delivering value for money on a whole industry basis. The industry will further develop its governance arrangements for such funds to strengthen the role of cross-industry decision making, and in light of the creation of the RDG and its role in providing strategic oversight to such groups as the National Task Force.

Although the industry has developed this as a single preferred plan, there are options within this plan where choices can be made. The industry will continue to explore opportunities which are not included in this plan to provide value for money improvements to the railway and the plan will continue to evolve. The table below summarises the key investments in the IIP and how these contribute to the outcomes which are important to the industry's stakeholders.

Illustrative table of IIP proposed investment and linkages to policy outcome

Outcome	Example investments	Contribution to outcome
Reduced costs and a more efficient railway	Electrification schemes such as Great Western, North West England, Midland Main Line, Cardiff Valleys and North Trans Pennine Network Rail operations strategy Other operational efficiency schemes	Long term reduction in whole industry operating costs
Continued economic growth in London and the South East	Thameslink Crossrail Reading remodelling Other capacity and station schemes in the south east	Provision of additional capacity to accomodate forecast demand growth
Stimulating the northern economy through improved access and connectivity to labour and markets	Northern Hub	Provision of additional capacity and through journey opportunities
Improved journey times and connectivity between other economic centres	Targeted journey time reduction schemes, including line speed improvements in the East Midlands, Yorkshire, Bristol and Oxford areas	Reduced journey times on key interurban flows
A more efficient, greener and safer transport system	Strategic Freight Network New and cascaded electric trains including the Intercity Express Programme Electrification schemes (see above)	Stimulate modal shift from road and air to rail Replacement of life expired rolling stock Fuel efficiency and alternative sources
A safer railway for workers, users and general public	Closure or upgrade of level crossings	Reduction in safety risk at level crossings
Improving the quality of the service to customers	Passenger information improvements Station capacity and access enhancements	Improved passenger information Improved accessibility
Addressing identified end user needs	Performance fund Journey time fund	Performance improvement Journey time improvement

Making choices and trade offs

It is for government to decide how far it wishes to help fund the programme of proposed investments. Even where there is a strong economic case, there will be issues of affordability, particularly in the current economic climate. The industry is committed to working with government to help inform its choices in advance of the High Level Output Specification. Potential trade offs include:

- existing projects and commitments versus new commitments - the plan includes substantial investment in projects which have already started or where commitments have been made to do so before CP5;

- sustainable subsidy reduction - investments which are self-funding and to minimise whole life costs should be considered separately from other investments which require ongoing public subsidy;
- output trade offs - there is scope for alternative trade offs, for example between journey time, performance and punctuality; and there are also trade offs between the level of these outputs and cost or subsidy requirement;
- prioritising outcomes - the options highlighted in this plan are categorised based on their primary impact on key outcomes and different public policy choices between these outcomes would therefore drive different decisions about which options to prioritise; and
- charging and financing options - the Government is conducting a review of fares policy and we have also identified the potential for alternative ways of financing past and future investments.

Next steps

The IIP will inform our discussions with government as to the outputs to be delivered and the relative priorities for investment in developing the High Level Output Specifications and the level of cost savings achievable in determining the Statements of Funds Available to be published in summer 2012.

In order to deliver the benefits of the proposed investments in CP5, the plan assumes some schemes that are currently unfunded can begin to be progressed in CP4. For this to happen, discussions with funders and ORR will be required to seek approval to such early start proposals.

Once the outputs have been specified in the HLOSs, Network Rail, in collaboration with the rest of industry, will develop its Strategic Business Plan, to be published in January 2013. This will set out how Network Rail, working with the industry, believes it can deliver the outputs specified in the most cost effective and sustainable way in CP5.

1 Introduction

1.1 Purpose

This Initial Industry Plan (IIP) sets out the industry's view of how the railway could develop during Control Period 5 (CP5, 2014-19) and beyond to deliver a better value for money and affordable railway that can support and stimulate sustainable economic growth. The IIP has been produced to inform the development of the Governments' High Level Output Specifications (HLOSs) and Statements of Funds Available (SoFAs) to be published in summer 2012, the periodic review process more generally and to inform broader government decision making in relation to industry reform and franchise re-letting.

1.2 Scope

The IIP seeks to inform funders as to the potential level of subsidy required in CP5. The level of subsidy is influenced by exogenous factors which influence demand growth, and factors directly affecting the cost of rail travel to users, such as fares, the cost of running the railway, the level of outputs to be delivered, the volume of work required, the size of the workforce, wage levels and the cost of materials. All these factors have been considered in developing the forecasts in this plan.

The plan provides a forecast of subsidy, and underlying revenues and costs for CP5. In doing so the IIP provides revenue and cost forecasts for the operation of franchised train services and the funding requirement to operate, maintain, renew and enhance the infrastructure at a sector level (London and the South East, Long Distance and Regional). It should be noted that the financial forecasts are based on a set of assumptions, particularly relating to future passenger demand, fares policy, changes in real prices and deliverability of efficiencies. There are inevitable forecasting uncertainties in all these assumptions, and the long term financial forecasts should therefore be considered with this in mind.

Where appropriate, forecasts of freight sector outputs have been developed and the impact of freight traffic on infrastructure costs assessed. The key industry outputs for which forecasts are provided relate to safety, performance, capacity, and carbon emissions.

Recognising the devolved funding responsibilities, a separate IIP has been prepared for Scotland by the industry to inform the development of a High Level Output Specification and Statement of Funds Available by Scottish Ministers.

1.3 The current railway

In the context (Chapter 2) and the sector based chapters (Chapters 4 – 7), analysis is provided of the outputs and costs of the "current railway". Where the IIP refers to the current railway, it is examining a scenario that assumes committed changes to today's railway. In particularly it examines the outputs and costs of a railway that assumes delivery of Network Rail's Control Period 4 (CP4, 2009 – 2014) enhancements programme plus the Thameslink and Crossrail programmes, Reading remodelling, West Coast schemes, committed electrification schemes and the Intercity Express Programme which are delivered to planned timescales in CP5, but that no new enhancements to the railway are delivered beyond these schemes.

1.4 Subsidy analysis

The IIP assesses the overall subsidy requirement of the rail industry in England and Wales. This analysis forecasts the total costs of franchised passenger operations and infrastructure management costs together with income from fares and other sources.`

The costs and revenues of the three passenger sectors (London and South East, Long Distance and Regional) have also been assessed. The costs of train service operations and fares income can be forecast at sector level, since these are directly allocated to the service groups within each sector. The allocation of infrastructure costs by sector is less straightforward, and there are several approaches which can be used (for example allocation of costs to prime user, assessment of cost avoided, or simple allocation by vehicle mileage).

For the purposes of providing an illustrative affordability analysis, infrastructure costs have been allocated to sectors on the basis of the proportion of fixed track access charges allocated to each operator in the Office of Rail Regulation (ORR) determination for the 2008 Periodic Review. This approach will allocate costs differently from some of the other approaches mentioned above, and comparisons of affordability between sectors should therefore be considered with this in mind. The calculations are also sensitive to the assumed allocation of sunk costs between sectors.

1.5 Further development of Control Period 5 plans

The forecasts in this document and the underpinning assumptions will be improved as the elements of the plan are developed further. In particular Network Rail's development work towards production of its Strategic Business Plan (SBP) in January 2013 will reflect further development of its asset policies, progression of projects through their development stages and further progress of its initiatives to deliver efficiencies.

The industry will continue to develop its improvement plans in key areas such as safety, service quality, operational performance and sustainability. The Rail Delivery Group (RDG) will develop its plans to tackle key cross-industry initiatives to reduce costs and progress on these will inform the periodic review and franchising processes. The outputs and funding requirements of individual franchises will be firmed up as each franchise is re-let. The franchising process is a commercially competitive process and is an opportunity for bidders and funders to explore alternative proposals that may not have been identified though the development of the IIP. It is important however that the outputs expected from Network Rail, set through the periodic review process, and from the franchises remain aligned as new franchise terms are agreed.

1.6 Structure

The document is structured as follows:

Chapter 1:	Introduction: Describes the purpose and structure of the document
Chapter 2:	Context: Describes the key issues to be addressed and key assumptions made in developing the IIP
Chapter 3:	Improving value for money: Examines the potential for reducing cost and providing greater value to funders and users
Chapters 4-7:	Sector level (London and the South East, Long Distance, Regional, and Freight) analysis of the issues and options
Chapter 8:	Network strategies and plans: Addresses key issues and opportunities which affect the rail network as a whole
Chapter 9:	Assessment of the IIP: Sets out the strategic, financial and economic case for the IIP and the business case analysis to inform the decisions to be made
Chapter 10:	Next steps: Sets out the implications for the development of the HLOSs and SoFAs and the development of Network Rail's Strategic Business Plan

2 Context

This chapter explains the context within which the Initial Industry Plan (IIP) has been developed. It is organised as follows:

- **Government policy:** Plans for the railway need to be developed to meet the needs of funders and in the context of broader public policy;
- **user satisfaction:** Against the background of today's railway, planning the future of the railway must start with an understanding of the drivers of passenger and freight user satisfaction;
- **today's railway:** In many ways the railway today is a success. This section briefly summarises the railway's usage and performance today and how this is expected to change over time;
- **sustainable development:** The nation's infrastructure, including the railway plays a critical role in supporting the economy. This section outlines the approach adopted in developing plans which aim to promote sustainable economic development;
- **long term planning:** The railway comprises long life assets which need to be planned as a system based on an understanding of how each market can be expected to develop. Plans for Control Period 5 (CP5) are developed in the context of a longer term planning framework for the industry which builds on the Route Utilisation Strategies (RUSs) which have been developed and established over the last few years; and
- **choices and trade offs:** The IIP seeks to inform funders as to the key choices and trade offs that need to be made in producing the High Level Output Specifications (HLOSs) and in specifying franchises, that will allow the industry to develop its plans for CP5.

2.1 Government policy

The Government's vision is for a transport system that is an engine for economic growth; is cleaner and greener and improves the quality of life in our communities. A system in which rail has a key role to play. With a safe, customer-focused rail system that supports a growing economy, by improving capacity, connectivity, performance, and productivity. Contributing to our wider climate change objectives, by reducing transport's carbon emissions, and encouraging modal shift from road and aviation. And delivering value for the farepayer, the freight customer, and the taxpayer - as well as playing its part in reducing the deficit.

The Rt Hon Philip Hammond MP
June 2011

The role of rail must be seen in a broader context of public policy. Alongside economic and demographic trends, there are a number of key policy areas which will influence rail's future role including transport policy itself but also key policy areas such as land use and energy. Transport policy can significantly affect the relative quality and cost of different transport modes. Decisions on the prioritisation of investment across modes and regulatory interventions, for example road speed limits and lorry weights, will influence the relative competitiveness of different modes. Likewise the relative price paid by users of different modes and the impact of taxation on the relative cost of different modes will impact the relative attractiveness of rail.

Rail can both shape and be shaped by land use and planning policy. At a macro level rail can support the growth of specific regions and cities and help close the north-south economic divide through improved connectivity between regions. At a micro level individual planning decisions will affect rail's local impact, for example the location of freight terminals or the role of rail in major regeneration projects.

There are a number of ways in which energy and climate change policy and rail interact:

- as a major user of electricity and diesel the rail industry is sensitive to changes in the availability and cost of energy. Significant changes are expected in the future driven by market dynamics and government policies (both at national and European jurisdictions) addressing the need for reliable, low carbon energy supplies;
- rail's contribution to mitigating climate change through electrification is, in part dependent on decisions taken elsewhere on the mix of energy sources for power generation (these also have a material effect on the demand for rail freight) and also how a distributed generation network may impact upon the railway's own energy distribution and management networks;
- rail needs to plan for the longer term impacts of a changing climate and its impact on infrastructure and operations. Through the remainder of this control period and the next the industry will develop its understanding of the key issues in more detail. Through this the industry will develop and implement a long term programme for adaptation; and
- where policy is orientated towards shifting or changing transport, including the potential for inducing mode shift from road and air modes to rail in order to reduce overall carbon emissions and also policies that may incentivise a reduction in overall travel.

A number of policy issues such as national road pricing could have a profound long term impact on rail but are unlikely to have an impact in CP5, having been ruled out in this parliament and given the lead time for implementation. Land use policies could have some effect by the end of CP5 but with around two per cent of all land use changing annually, that effect, whilst potentially significant over 30 years, will be more limited in CP5. Consumer trends, however, would be expected to be much more dynamic over the next seven years with potential implications for rail.

There are a number of specific policy areas where it is important to be clear as to the assumptions made as they potentially have an impact on shorter term plans for CP5. By definition, any material changes to these policies are likely to have an impact on the output and cost forecasts included within the IIP.

2.1.1 Sustainability policy

Government continues to confirm its commitment to seeking sustainable development in the UK[1]. The industry recognises the need to further develop its approach to sustainable development. The industry expects to show much more robust and verifiable progress as it is increasingly held to account in this area and comparisons with other transport modes become more rigorous.

2.1.2 Energy and climate change policy

The IIP uses the Department for Energy and Climate Change's most recently published forecast for energy sources covering both costs and carbon intensity.

[1] Embedding sustainable development. Defra. 2011. Available at http://sd.defra.gov.uk/documents/mainstreaming-sustainable-development.pdf

There is a great deal of uncertainty in this area and changes to these forecasts may be expected. This could have a material impact on cost and carbon forecasts in the IIP.

In two year's time the Government intends to publish its national climate change adaptation plan. If this sets out any priorities that the industry is not aware of this could have a significant impact on our plans.

2.1.3 High speed rail

The Government has consulted on proposals for a 'Y-shaped' high speed rail network that would reduce journey times from London to Birmingham to 49 minutes, and from London to Manchester and Leeds to around 80 minutes. This proposal is essential to providing additional north-south capacity between major economic centres including London, Birmingham, Manchester, and Leeds. In developing a strategy for the network the IIP has assumed that the first part of High Speed 2 (HS2) from London to the West Midlands will start construction during CP5 with the line open for operation in 2026. It is assumed that the wider high speed network to places including Manchester and Leeds would not be operational until the 2030s, but that trains to the North West and Scotland will use the first section of HS2 from 2026.

Given the early stage of development of these proposals the financial and economic impact of the high speed line proposals are not reflected in the forecasts of future outputs, revenues and costs for the current network. Any industry costs associated with the development of this project are assumed to be funded by the promoter. The industry considers it is important that worthwhile investment in HS2 is not at the expense of continued investment in the rest of the network. If this happened it could re-create a backlog of renewal requirements to maintain existing capability.

2.1.4 Fares

Last year the Government announced increases of 3 per cent above RPI for regulated fares for 2012 to 2014. In light of the Rail Value for Money (RVfM) study's recommendations, the Government has also committed to a fares review as a first step towards a simpler, fairer and more effective fares system. Government has also made clear that the level of future fare increases will, in part, be influenced by the level of cost savings the industry can deliver.

For the purposes of this plan, it is assumed that regulated fares will increase by RPI+3 per cent per year for three years and then fare increases will return to the previous RPI+1 per cent per year. In light of the Government's forthcoming fares review, the industry has not examined alternative fares assumptions and looks forward to participating in this review.

If ultimately fares policy is different to this assumption, it could have a material impact on the level of demand, revenue, expenditures and interventions set out in the IIP.

2.1.5 Regulatory and franchising frameworks

The RVfM study recognised that if industry is to achieve the level of cost savings thought possible, then significant reform is required of the framework within which the rail industry operates, particularly the franchising and regulatory frameworks. The IIP includes analysis of the potential efficiencies that could be delivered by reform to the industry framework and identifies the key areas of reform required to facilitate these cost savings.

2.1.6 European legislation

The railway increasingly operates within a European Union (EU) wide legislative and regulatory framework. Current proposals, including the reform of the First Railway Package and the extension of the Eurovignette are assumed to be implemented in this plan. Specific initiatives, such as extension of the Technical Standards for Interoperability are addressed later.

2.2 Understanding and improving user satisfaction

A key ambition of this plan is to improve end user satisfaction in a value for money and affordable way. Improving user satisfaction will potentially maintain and enhance revenue, improve market share and attract new users, delivering modal shift from road and air.

This plan seeks to demonstrate a clear understanding of the key drivers of satisfaction and the priorities of end users and develop clear initiatives to address those drivers that are within the control or influence of the industry.

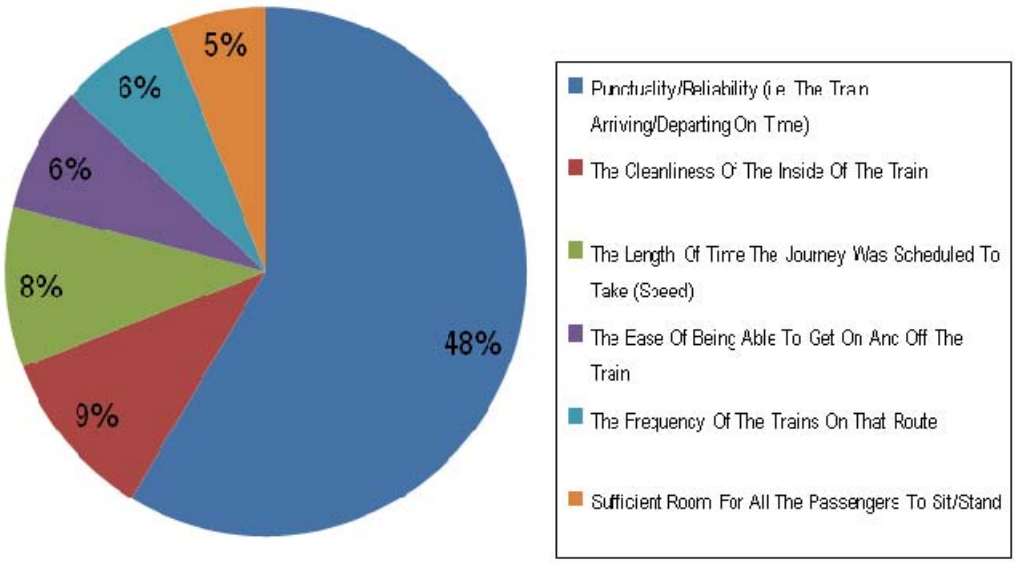
In developing this plan the industry has sought insight into the drivers of user satisfaction from Passenger Focus and the Rail Freight Group and the industry is grateful for their input to the development of this plan.

2.2.1 Passenger satisfaction

Improving customer satisfaction is a key to the success of the railways. Customer satisfaction is essential to reduce barriers to usage of the railways, thereby enabling rail usage to grow and hence supporting economic growth, facilitating a reduction in unit costs and reducing environmental impacts through modal shift.

Figure 1 below shows the major drivers of customer satisfaction, estimated by Passenger Focus through comparison of overall satisfaction scores with the scores for satisfaction with individual criteria.

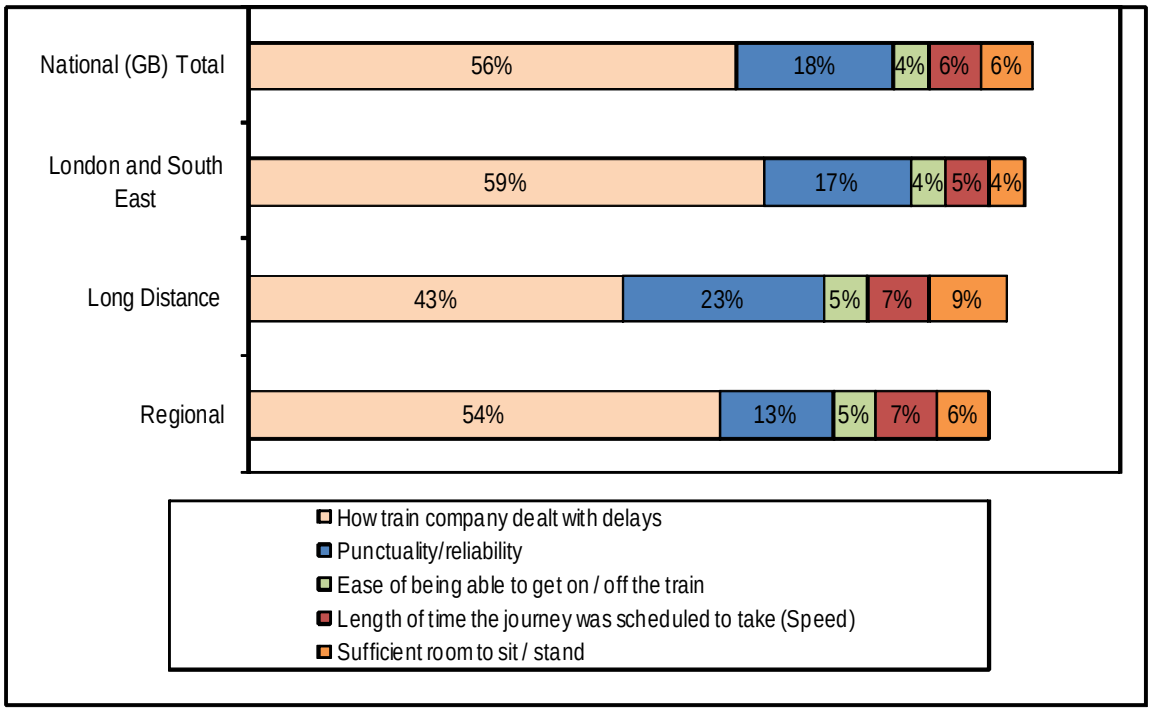
Figure 1: Drivers of passenger satisfaction (England and Wales)



Source: Passenger Focus, based on combination of Spring and Autumn 2010 surveys
NB: Chart excludes individual criteria whose relative impact on overall satisfaction is below 5%

It is also insightful to understand the key drivers of dissatisfaction. Figure 2 shows that the manner in which the train companies deal with delays is a major issue across all sectors, followed by the punctuality and reliability of the train service. These are both areas which are specifically addressed in the IIP through the customer information strategy, and initiatives to reduce the impact of performance incidents.

Figure 2: Main drivers of passenger dissatisfaction (network)



Source: Passenger Focus, based on combination of Spring and Autumn 2010 surveys
NB: Chart excludes individual criteria whose relative impact on overall satisfaction is below 5%

Looking forwards, research published by Passenger Focus[2] identifies the top five passenger priority areas for improvement as value for money, punctuality, frequency of service, availability of a seat and information during delay. Although not highlighted in surveys by customers as a major priority for improvement, journey time is in practice often a key determinant of rail's market share of trips taken, a fact underlying all demand forecasting for the industry and supported by a wide body of research[3], and is therefore of fundamental importance to the industry's ability to deliver cost effective growth, and to support and stimulate sustainable economic growth.

Passenger satisfaction is driven by a combination of factors, including the quality of service received and the price that is paid for it. The industry conducts significant market research which complements the work carried out by Passenger Focus, indicating that optimising quality and value will drive up satisfaction. Different passenger groups have specific requirements, for example commuters require high frequency, punctual services with good on board environment if customer satisfaction is to continue to improve.

2.2.2 Trains

The most important drivers of customer satisfaction are the core elements of the train service itself in terms of performance (punctuality and reliability), the time taken for a given journey, providing sufficient frequency of service and availability of a seat.

[2] Passengers' priorities for improvements in rail services, August 2010
[3] The industry's "Passenger Demand Forecasting Handbook" lists over 30 studies

Going beyond these factors, other important drivers of satisfaction on the train include train cleanliness, the ease of getting on and off trains, seating comfort and information provision.

The ease of getting on and off trains and seating comfort are to some extent determined by the level of capacity provided in relation to demand and hence crowding, for which changes to rolling stock and timetables are likely to be the most effective solutions (although also noting potential demand management solutions through, for example, shoulder peak pricing).

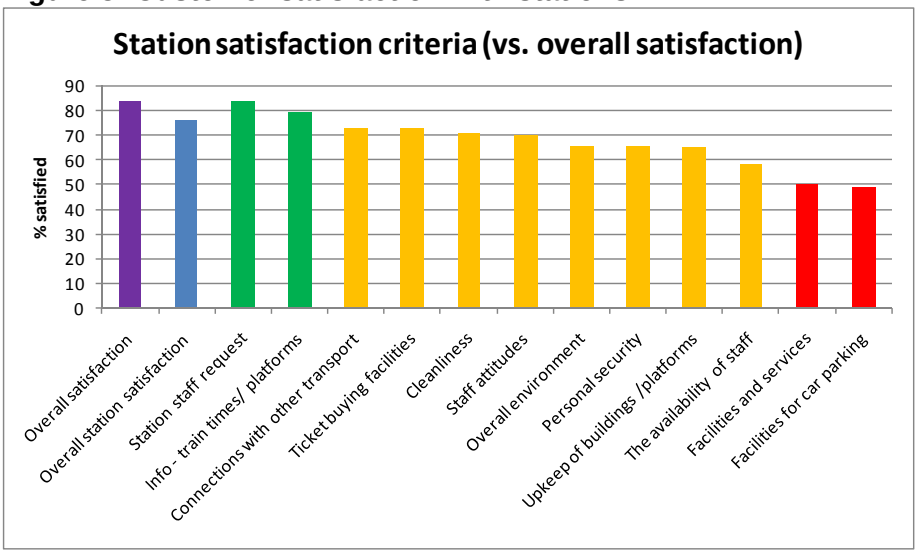
Train cleanliness is an important quality factor which is generally managed by train operators as part of their franchise obligations. Information provision is acknowledged to be vital, and is covered later in the IIP.

Customers' expectations of on train service vary between different sectors. For commuters, the key requirement is a seat on a punctual and clean train, but there is little expectation of personal attention from staff. Some commuters welcome the presence of a guard while others find Driver Only Operation (DOO) just as acceptable (and it is generally, of course, deliverable at lower cost). For customers using long distance services, however, services such as catering and wi-fi are an important element of the rail offer, in comparison with alternatives such as driving. The situation for regional railways is somewhat intermediate, reflecting the mix of urban and rural routes that they support. This is borne out by an analysis of causes of customer dissatisfaction (based on Passenger Focus's analysis of the detailed responses of customers expressing overall dissatisfaction with their rail service), as shown in Figure 2.

2.2.3 Stations

Figure 3 shows the levels of customer satisfaction at stations, based on Passenger Focus's survey in Spring 2011, with a comparison with overall levels of customer satisfaction. The individual elements are coded red (up to 50 per cent satisfaction), orange (51-80 per cent) and green (over 80 per cent).

Figure 3: Customer satisfaction with stations



Source: Passenger Focus, Spring 2011 survey

The survey results highlight that satisfaction with stations is below customers' overall satisfaction, with particular dissatisfaction with station and car parking facilities and

low levels of satisfaction with the overall environment and state of the buildings, as well as with personal security and staff availability.

2.2.4 Freight user satisfaction

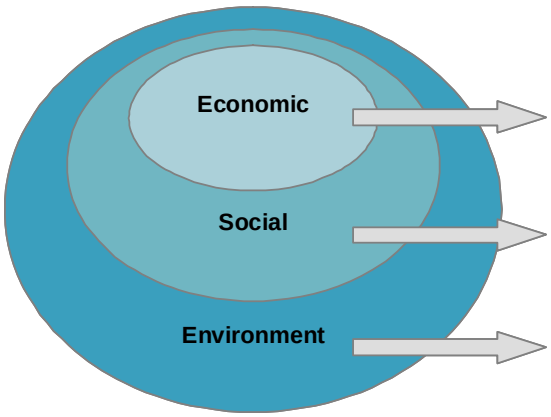
In most markets rail operators are competing directly with road operators to move goods around Great Britain. In order to compete, rail must offer a logistics package that can satisfy the individual needs of customers, but at an overall price and level of service quality at least equal to the road offering.

The users of rail freight range from industrial users such as power station and quarry owners, through steel and car manufacturers, to shipping lines and (increasingly) logistics companies and retailers. The requirements for each customer are different, but all customers want a competitive price together with a reliable and consistent service. Increasingly, as society changes, customers are seeking train services which run across 6 or 7 days a week. The road network is available 24 hours a day, 7 days a week, and lorries can access it at all times. To be able to compete fully, rail must be able to offer an equivalent service.

In order for rail freight to continue to grow, therefore, the rail freight offering must continue to evolve. Road's inherent flexibility, coupled with assets that have a shorter life (which in turn enables new technologies to be adopted more easily and quickly) means rail has to become ever more efficient in order to compete effectively.

2.3 Sustainable development

The railway in Great Britain plays a significant role in providing strong, economically viable communities. The IIP sets out the industry's view on how it should develop services in the future that will further develop this role. The industry can continue to facilitate development in Great Britain, both nationally and locally, whilst playing an important role in the transition towards a low carbon and environmentally sustainable economy. The concept of sustainable development recognises the need for economic development to be underpinned by stable social and environmental performance.



Rail will support sustainable development in Great Britain by providing services that –

- Deliver value for money to taxpayers and customers, that contributes to sustainable economic growth in a manner that meets global expectations of economic, social and environmental wellbeing
- Meet the needs of our customers, funders and local communities, while addressing relationships with our lineside neighbours; and
- Achieve increasingly sustainable environmental performance, ultimately in line with the planet's environmental limits

The proposals in this IIP represent a critical step, but not a full plan, towards delivering a sustainable rail industry. Through the revenue we generate, the people we employ, the resources we use, and the land we own, the industry itself has a potentially substantial positive impact on sustainable development in Great Britain. The industry is committed to get better at understanding the nature of these impacts, through the development of sustainability management systems. This will enable us to better address issues such as accessibility, climate change adaptation, waste

impacts, managing our natural environment and ensuring fairness in the inclusion and diversity of our people.

Development of the plan is only a start. The industry will make a difference through delivering the plan and ensuring sustainability is about “how we do business”. This will be achieved by implementing the rail industry’s sustainable development principles:

Customer-driven: Embed a culture where dialogue with customers puts them at the very heart of the railway, and where they are able to make optimal travel and logistics choices.

Putting rail in reach of people: Position rail as an inclusive, affordable and accessible transport system through the provision of information and accessible facilities.

Providing an end to end journey: Work together with all transport modes to provide an integrated, accessible transport system.

Being an employer of choice: Respect, encourage and develop a diverse workforce, support its wellbeing and actively consider and address the challenges of the future global labour market.

Reducing the industry’s environmental impact: Operate and improve the business in a way that minimises the negative impacts and maximises the benefits of the railway to the environment.

Carbon smart: Pursue initiatives to achieve long term reductions in carbon emissions through improved energy efficiency, new technology and lower carbon power sources and facilitate modal shift, helping others make more carbon efficient journeys.

Energy wise: Maximise rail’s energy efficiency for traction and non-traction use.

Supporting the economy: Boost the productivity and competitiveness of Great Britain, at a national and regional level, through the provision of efficient passenger and freight services and by facilitating agglomeration and catalysing economic regeneration.

Optimising the railway: Maximise the rail system’s capability and build on its strengths to deliver a transport system that is efficient and offers good value for money.

Being transparent: Promote a culture of open and accountable decision making and measure, monitor and report publicly on our progress toward sustainability.

2.4 Long term planning

It is important that the plan is resilient to potential changes in the natural, regulatory, financial and operational environments within which the railway operates. Long term planning is vital for the industry and its funders. The development of a clear long term vision enables efficient planning, facilitates efficient short to medium term investment decisions as well as ensuring an efficient and sustainable railway for future generations. Planning Oversight Group (POG) published in the Long Term Planning Framework document[4] a longer term vision that by 2035 rail will deliver:

- passenger satisfaction levels of at least 90 per cent;
- capacity to accommodate approximately twice as many passengers as today, with reduced journey times, as well as better connectivity between services and between modes;

[4] Long Term Planning Framework, August 2010

- improvements in the product offer for freight customers resulting in higher user satisfaction and a significant increase in rail modal share;
- levels of reliability and safety that are among the best in Europe;
- a financially sustainable railway through improved efficiency and revenue generation; and
- a reduction in carbon dioxide emissions in support of national targets.

The industry has sought to develop the IIP with some understanding of the future uncertainties that the industry, and society more generally, faces. The industry has developed through the Network Route Utilisation Strategy (RUS) process a number of scenarios to help test the robustness of decisions and policies in the face of such uncertainties. These scenarios help the industry to understand what is within its control and what isn't. As such they can help in assessing the robustness of plans.

The Network RUS identified four scenarios on the basis of two factors viewed to be critical to rail demand (both passenger and freight) and sufficiently uncertain to justify scenario analysis. These were the degree to which sustainability will be pursued and the degree to which the UK participates further in global trade (or whether the economy becomes more decentralised).

The key factors that vary between these scenarios include the level of economic development, the degree to which the UK trades with other countries, social trends, energy prices and the degree to which each mode recovers its external costs (and consequently its competitiveness). Long term forecasts of long distance passenger and freight demand were developed for each of the scenarios.

Growth in passenger numbers is forecast on all long distance rail corridors in all four scenarios but is particularly strong in the scenarios that reflected higher economic growth. The sustainability agenda is beneficial to long distance rail, particularly in markets in which rail currently has low market share such as cross-country and trans-Pennine corridors. In all scenarios passenger growth rates are higher on routes which have a higher proportion of business trips.

The thirty year growth rates for freight also vary considerably between the scenarios. The globalisation / decentralisation dichotomy has a great effect on the market for imported goods – which dominates the intermodal and Channel Tunnel markets. Similarly, assumptions on the use of coal in the sustainability agenda have a direct impact on the amount of coal carried from ports to power stations. The sustainability agenda overall has a positive impact on rail freight.

The IIP has been developed primarily on the basis of sustainable growth.

2.5 The railway today

This section sets out the railway as it is today, the demand and revenue it generates, how much it costs and the outputs it delivers and how these are expected to change over time. In this chapter analysis is provided of the outputs and costs of the "current railway". Where the IIP refers to the current railway, it is examining a scenario that assumes committed changes to today's railway. In particularly it examines the outputs and costs of a railway that assumes the Thameslink and Crossrail Programmes, Reading remodelling, West Coast schemes, committed electrification schemes and the Intercity Express Programme are delivered to planned timescales but that no new enhancements to the railway are delivered beyond these schemes.

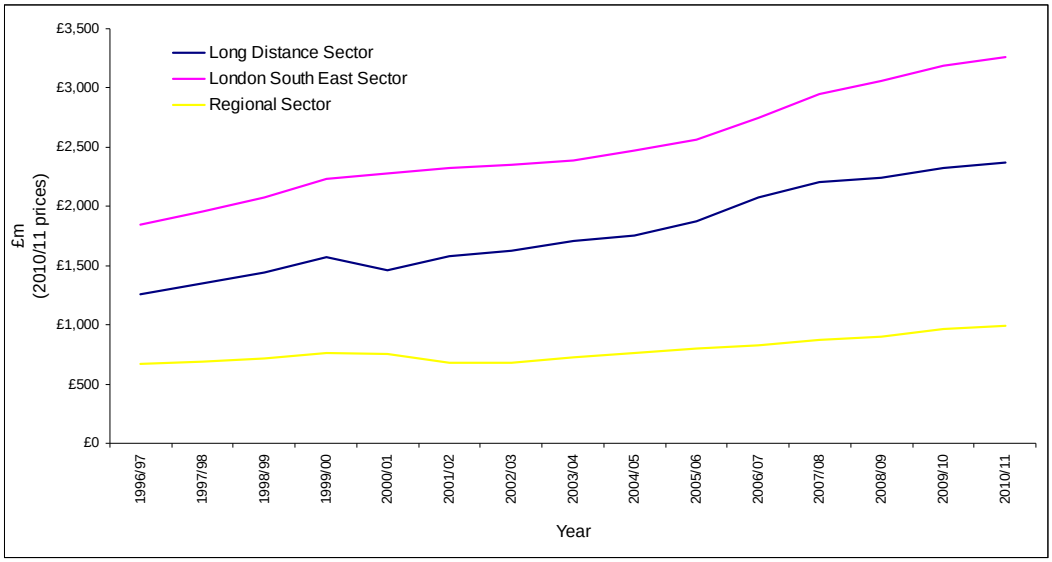
The rail industry is a success in many respects. In 2010/11 the number of timetabled train kilometres was about 510 million, up 14 per cent from 2003/4[5]. At the same time 90.8 per cent of franchised train services ran on time[6], an increase of more than 10 per cent since 2002/3. The freight market has also enjoyed strong growth. There has been a 26 per cent increase in freight moved to 19 billion tonne kilometres per year since privatisation.

At the same time rail safety is at an all time high, significantly better than road and comparable with air transport. Customer satisfaction has improved, reaching an all time high of 84 per cent of passengers[7] satisfied with their journey in spring 2011. The greatest improvements have occurred in service reliability and train quality factors such as cleanliness and seating. Investment in improving facilities such as stations and new rolling stock contributes to the general increase in satisfaction and has supported growth in patronage over the last decade. Significant increases in capacity have been delivered through resource planning, timetabling and investment in rolling stock and infrastructure.

2.5.1 Demand and revenue

External factors including economic growth and increasing road congestion, along with continued investment in the rail product, has led to significant increases in patronage and revenue since privatisation. Since 1996/97 passenger revenue has increased by 75 per cent in real terms, whilst demand has increased by roundly 70 per cent over the same period. Some 35 per cent of passenger revenue is from regulated fares, the majority of which is season tickets in London and the South East.

Figure 4: Great Britain passenger revenue growth



Rail already has a strong share in certain markets, in particular commuting into central London and increasingly, other major cities; high speed and long distance travel and movement of bulk freight and container traffic. In other markets, such as shorter distance freight and rural passenger, rail has a generally lower market share than road (although, for example in rural areas, it does play a part in promoting social inclusion and alleviating congestion in regional sectors).

[5] ORR National Rail Trends
[6] ORR National Rail Trends
[7] Passenger Focus National Passenger Survey Spring 2011

In part growth has been stimulated by investing in rail capacity, connectivity, and journey times. Some of this growth is however simply a reflection of longer term growth in the economy and population of the UK.

Passenger growth has also been supported by underlying structural changes in the economy, employment and travel markets favouring rail. The strength of these underlying trends was most recently evident during the recession when national passenger kilometres continued to grow, albeit at a reduced rate, despite national economic output falling over 6 per cent.

These underlying structural changes are set to continue, and coupled with a return to longer term trend rates of economic growth will drive continued growth in passenger demand. In the freight market, further growth in imports coupled with an increasing trend to containerise goods will drive longer term growth.

Rail is well placed to respond to this growth, as the longer term trends in the market play to rail's core strength of moving large volumes of goods and passengers over long distances, between and into city centres, in a sustainable and efficient manner.

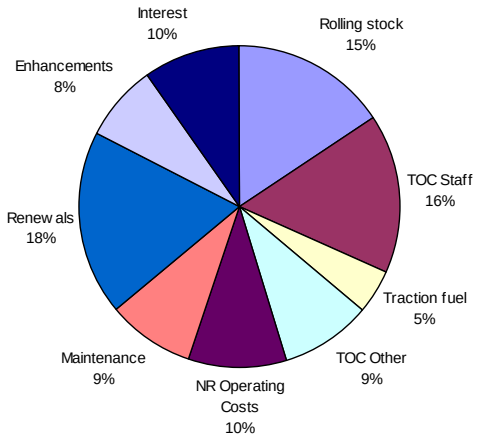
The growth in demand for peak passenger rail services forecast in the IIP is a natural consequence of national and regional planning decisions already taken. For example, the need for additional capacity on the West Anglia route was effectively embedded by the decision to focus population growth within South Cambridgeshire and the M11 corridor. And the strong rail growth in cities such as Leeds and Liverpool is a consequence of decisions taken to regenerate and focus economic growth in the city regions and in city centres in particular.

In the freight market, the globalisation of trade is driving up the volume of goods entering via the UK's deep ports. The real choice is therefore not about whether to provide or not, but how best to provide it. Rail offers a more sustainable choice in this context.

2.5.2 The cost of today's railway

Whole industry costs in England and Wales were around £12 billion in 2009/10, a little over half of which was accounted for by Network Rail. Franchised train operators incurred net costs (excluding Network Rail's access charges but including rolling stock lease costs) of £5.5 billion. Figure 5 below shows the breakdown of industry costs in 2009/10.

Figure 5: Rail industry costs 2009/10



Infrastructure costs

Table 1 summarises Network Rail's expenditure in England and Wales for the financial year ended 31 March 2010 (rebased to 2011/12 prices). The figures exclude income, corporation tax and all internal industry transfer payments, such as track access income and incentive regime payments.

Table 1: Network Rail expenditure in England & Wales 2009-10 (2011/12 prices)

Category	£m	%	Commentary
Operating expenditure (less traction power for train operators)	1,164	18%	The single largest element is staff costs. Other significant costs include office accommodation and insurance. Some costs are considered "non-controllable" including, business rates, British Transport Police costs and ORR fees. These represented one third of total operating expenditure.
Maintenance expenditure	1,051	16%	The maintenance function employs nearly half of the total Network Rail headcount in forty maintenance delivery units and a central unit. The single largest elements of headcount and expenditure are in track (40%) and signalling (16%).
Renewal expenditure	2,231	34%	£683m (31%) was spent on track, £419m (18%) on signalling and £302m (14%) on structures including bridges and tunnels.
Enhancement expenditure	942	14%	Expenditure included Thameslink Programme (£422m), Kings Cross Station (£92m), Reading Station (£32m), Access for All (£57m) and North London Line Capacity (£44m).
Interest costs	1,166	18%	Finance costs on existing loans, the government guarantee and the increase in value of index linked debt.
Total	**6,556**	**100%**	

Half way through the five year Control Period 4 (2009 – 20014) Network Rail continues to reduce running costs and remains on target to achieve the challenging efficiency savings that it set out as part of the CP4 Delivery Plan in 2009. Network Rail reduced the running costs of the railway by £450 million in 2010/11, and by around £630 million since the start of this regulatory period in 2009/10.

Comparing Network Rail's efficiency

For Period Review 2008 (PR08), a key element of ORR's assessment of Network Rail's efficiency potential was based upon an econometric analysis commissioned from the Institute for Transport Studies (ITS) at the University of Leeds. The ORR econometric analysis uses the UIC's "Lasting Infrastructure Cost Benchmarking" (LICB) for European rail infrastructure managers since 1996. The countries covered are the UK, Netherlands, Norway, Portugal, Finland, Sweden, Ireland, Belgium, Germany, Austria, Italy, Denmark and Switzerland.

Network Rail has been developing a better understanding of the benchmarking and econometric analysis. This has identified significant issues in establishing the actual efficiency gap between Network Rail and its comparators.

Comparing data is not straightforward. Network Rail has concerns about the completeness and consistency of the historical data in LICB. Major data inconsistencies remain around renewal and enhancement costs with the key leading countries, as well as in relation to maintenance versus renewal costs. Further work is required to address these definitional differences. Network Rail is actively engaged in the LICB project to promote further quality assurance of input data, clarification of cost definition and cost allocations, break down of expenditure by assets and activities and then analysis by volume and unit costs, and detailed review of the major drivers for activity volumes and unit costs. This work has confirmed Network

Rail's view that the scale of the gap identified by ORR has been overstated. At the same time however it has helped Network Rail to identify areas where it can improve efficiency as well as areas where it represents best practice. Network Rail is also clear that if the size of the gap is less than previously thought to be the case this does not necessarily reduce the scope for improvements in efficiency since the benchmarks provided by other railways should not represent the limits of the company's ambition and it believes there is significant scope for improvement.

Network Rail is working with its partners from the European Rail Infrastructure Managers (EIM) to exchange best practice in asset management and to explore opportunities to improve econometric analysis across the European rail network.

Network Rail has identified issues concerning econometric modelling including data comparability, purchasing power parity, steady state adjustment, elasticity of the structural factors considered, the time dimension in the model and some of the omitted variables. Network Rail will continue to work with ORR and ITS on the development of the econometric models used.

Network Rail believes that benchmarking provides a helpful approach to assist it in developing its efficiency plans and in supporting effective regulation. Network Rail remains committed to learning from other railways and similar businesses and is currently engaged in an extensive benchmarking project.

Franchised train operating costs

Table 2 shows approximate train operating costs in England and Wales in 2009/10. These exclude all train operating costs relating to the ScotRail franchise specified and funded by Transport Scotland, although the figures do include costs associated with Anglo-Scottish services operated by franchises specified and procured by the Department for Transport (DfT). The figures in Table 2 exclude all internal transfer payments, such as track access charges and Schedule 4/8 receipts, and profit.

Table 2: Train operating costs in England & Wales 2009-10 (2011/12 prices)

Category	£m	%	Commentary
Rolling stock	1,900	35%	Rolling stock costs cover train leasing and maintenance expenditure. These costs reflect a number of factors, principally the level of output specified in the timetable.
Staff	1,900	35%	Staff costs include both operational and management / administrative staff. Operational staff include train drivers, other on train staff, station staff (including those required to resource the ticket office network), plus other train production and maintenance staff. Operational staff costs account for around 90 per cent of all train operator staff costs, and reflect a number of factors including the level of output specified by funders.
Traction fuel	550	10%	In the short term the cost of traction fuel is determined by the timetable and input prices. Longer term costs will reflect other factors including improvements in vehicle fuel efficiency, the relative mix of electric and diesel services, and the unit cost of diesel and electric current for traction.
Other	1,100	20%	Other costs relate to a range of activities including the head office function, and include costs such as back office networks, utilities, Information Technology, and marketing. Some of these costs are fixed in relation to the train service specification.
Total	**5,450**	**100%**	

Freight

Freight traffic makes up a small but important part of the railway. Freight traffic accounts for 7 per cent of traffic on the network measured in train kilometres. It operates commercially and only receives limited grant support from government to encourage modal shift from road to rail. Apart from some small exceptions, it pays only variable track access charges and does not contribute to the fixed cost of the railway, except on freight only lines.

2.5.3 Train utilisation

The RVfM study compared "train utilisation" (i.e. average train passenger loadings) between Great Britain and other European railways. This analysis provides a valid challenge to the industry, and the industry is currently undertaking further work in this area to better understand:

- whether or not the comparative measure suggested by the RVfM study is appropriate to achieving best value, or if some other measures would be more useful;
- if there are economic, geographical, market or structural issues causing this outcome;
- the degree to which franchise specification contributes to the outcome; and
- if it is actually open to influence, and if so over what timescale.

The potential importance of improving train utilisation to deliver efficiencies highlights the need for any barriers to this being removed, whether this relates to coordination of services and infrastructure developments or removing inflexibilities in service specification.

Metrics

There are a number of metrics that can be used to measure resource utilisation, each focusing on different aspects of efficiency and hence on different elements of the industry's costs. Some of the key metrics are:

- average vehicle loadings (i.e. passenger kilometres per vehicle kilometre), which focuses on the efficient use of vehicle capacity, and hence on vehicle related operating costs such as fuel and variable maintenance costs (both train and network);
- average train loadings (i.e. passenger kilometres per train kilometre), the measure used in the RVfM study. This focuses on the efficient use of train capacity, and hence on train related operating costs such as traincrew. At times and places where the network is capacity constrained, it is also a measure of the efficient use of network capacity;
- fleet utilisation (i.e. average kilometres run per year by each vehicle in the fleet). This focuses on the use of the rolling stock fleet, and on what return the industry gets from the large fixed cost that this represents; and
- loading or revenue per diagram, which provides an indication of the extent to which vehicles or trains are utilised across the whole timetable rather than focussing on individual train services. This recognises that in many cases vehicles may be used for "bounce back" to provide two, or more, peak journeys in any one peak period.

It is helpful to consider these metrics together, as many decisions are in effect trade offs between them.

As the RVfM study noted, the resource base and utilisation of different rail networks is influenced by factors external to the rail industry, and in particular by aspects of economic geography such as:

- the extent to which population, and employment, are concentrated in the main cities;
- whether there is one dominant city;
- distances between the main cities; and
- the role of suburbs relative to city centres, including typical commuting distances.

Such differences can be seen within Great Britain as well as between different countries. For example, within the Long Distance sector, average loadings throughout a train's journey tend to be higher on services with mainly end to end demand (e.g. London – Leeds) than on services with substantial intermediate demand (e.g. London – Swansea via Reading, Bristol, Cardiff).

The industry intends to commission work to deepen its understanding of the differences in resource utilisation between European countries, including differences in economic geography and their implications.

Although it can be helpful to understand external influences on utilisation, and to make comparisons with other networks, the key issue is to improve the value for money of the railway in Great Britain. In considering this, it is helpful to divide services into four broad categories of the commuter peak, the off peak, long distance yield managed services and the "social railway".

The commuter peak

Most of the UK railway is peak driven. Its resource base (trains and infrastructure) is determined by the need to accommodate peak demand. This is the case not just for London and South East and regional urban services, but to some extent for many interurban services that help to serve peak markets as part of their journey.

Improving value for money in the peak is about maximising resource utilisation, thus minimising the resource base, as well as optimising the timetable and fares offer. The key issues here are:

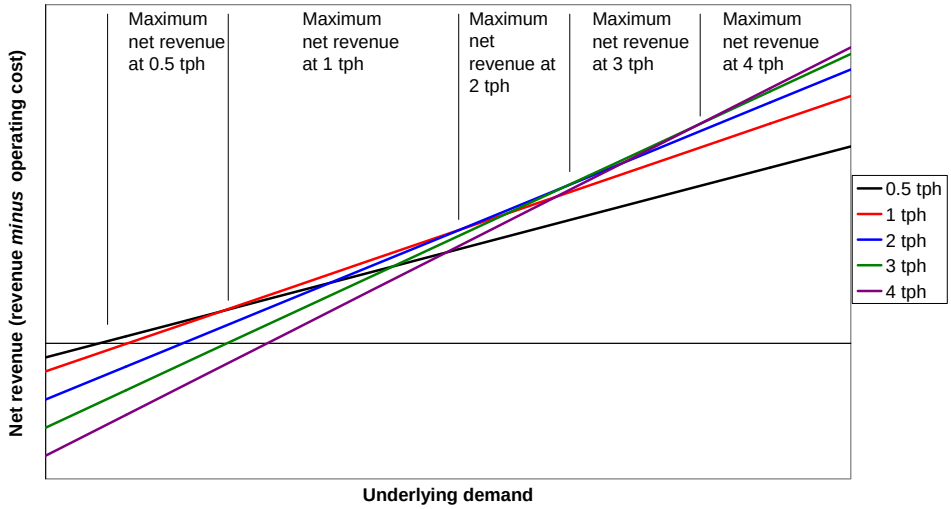
- maximising vehicle loadings by matching capacity to demand as closely as possible. The gradual build up of demand along many routes means that vehicles are less than fully loaded for much of their journey. Timetable solutions are possible and economic on certain routes. On other routes, the main way to improve utilisation is to start services at a number of intermediate locations along the route, which generally requires infrastructure such as turnback sidings and crossovers. The industry is investing in such infrastructure in CP4 where it is justified by the savings in rolling stock and further investment is proposed in this plan for CP5. Flexibility in the service specification will be required to allow a better match of supply and demand; and
- running trains at maximum length where possible (and where demand requires it). Again this can require infrastructure investment. The industry is investing in widespread platform lengthening in CP4, and our CP5 plans make further use of this capacity as the first response to increasing peak demand. In certain cases coupling and uncoupling train formations in the off peak can match supply and demand, as well as reducing costs.

The off peak railway

In the off peak, the cost of leasing the train fleet can effectively be regarded as a sunk cost. The frequency of off peak services is a trade off between the extra revenue generated by more frequent services, and the marginal costs of using rolling stock (principally fuel, maintenance and traincrew – although at least some traincrew time is effectively paid for by the need to resource peak services). The trade off can also be put in terms of resource utilisation. Running more frequent off peak services may reduce average loadings (thus getting a lower return on vehicle operating costs), but will improve fleet utilisation and improving the return on vehicle leasing costs.

This trade off is illustrated in the chart below, which shows how net revenue (i.e. revenue minus operating cost) varies with train frequency and the level of underlying demand. The key point is that, in some circumstances, higher frequency off peak services generate net revenue for the industry, even if average loadings are reduced as a result.

Figure 6: Net revenue at different train frequencies



The details of this trade off will vary significantly between routes, depending on the market, rolling stock and other factors. Illustrative modelling of London & South East off peak services[8] suggests that:

- on outer suburban services, a 2 trains per hour (tph) service generates net revenue (compared to a 1 tph service) if average loadings are of the order of 80-100 passengers per train;
- on inner suburban services, where passenger journeys are shorter and hence frequency is more important in generating demand, a 4 tph service generates net revenue (compared to a 3 tph service) if average loadings are of the order of 50-60 passengers per train; and
- even if train loadings are significantly below break even point, higher service frequencies can still represent high value for money in terms of the benefits to users and reduced road congestion.

Off peak train lengths should be matched to demand as far as practicable within the constraints of the operating environment; higher train loadings are needed to justify longer trains. Conversely, many regional off peak services are formed of 2 or 3 car

[8] Assuming 4-car Electric Multiple Units, DOO operation, and using typical RUS appraisal assumptions

trains and so break even, or represent good value for money, on lower loadings than those quoted above.

It is also important, on mixed use routes, to consider the trade off between off peak services and other services, including freight.

The yield managed railway

Many long distance services, while helping to serve commuter peaks, are primarily yield managed. Operators here aim to maximise revenue by using yield management techniques such as pricing, advance purchase discounts and ticket restrictions; the main constraints on this are requirements such as regulated fares, delivery of Service Level Commitments (SLCs) which include first and last services, etc. For these services, although increasing average loadings is desirable, revenue per vehicle mile (or revenue per vehicle in the fleet) is perhaps a better measure of overall efficiency.

The social railway

Some rail services are provided mainly for socio-economic reasons; to connect communities, and give those without access to a car access to employment and other activities. Such services are unlikely to cover their costs. The key factors in improving resource utilisation are:

- matching train length to demand – in practice often meaning the use of 2 or even 1 car trains; and
- efficient diagramming of rolling stock: the timetables of many services are dictated as much by this as by market requirements.

2.5.4 The outputs of today's railway

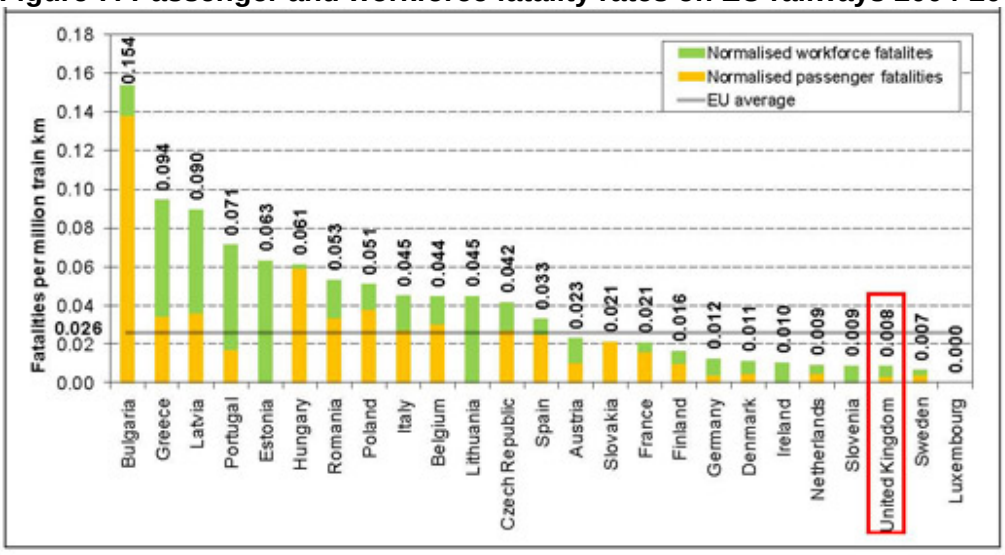
Safety

Rail continues to be one of the safest forms of transport. Serious train accidents are rare. There were no passenger or workforce fatalities in train accidents in 2010/11. This is the fourth year in succession that the railway has achieved this. There were also no fatalities to members of the public in train accidents.

Sadly, eight passengers died in separate incidents last year, all at stations, four of which were as a consequence of falling from a platform. There was one workforce fatality when an infrastructure worker died after falling from a height. There were 31 fatalities to members of the public, 27 of which were trespassers and four were pedestrians at level crossings.

Safety on the UK's railways compares favourably with other EU countries. Passenger and workforce fatality rates in the UK were well below the EU average over the six year period 2004-2009. The countries with similar rates to the UK include Germany, the Netherlands and Scandinavian countries.

Figure 7: Passenger and workforce fatality rates on EU railways 2004-2009



Source: ORR Health and Safety Report 2011

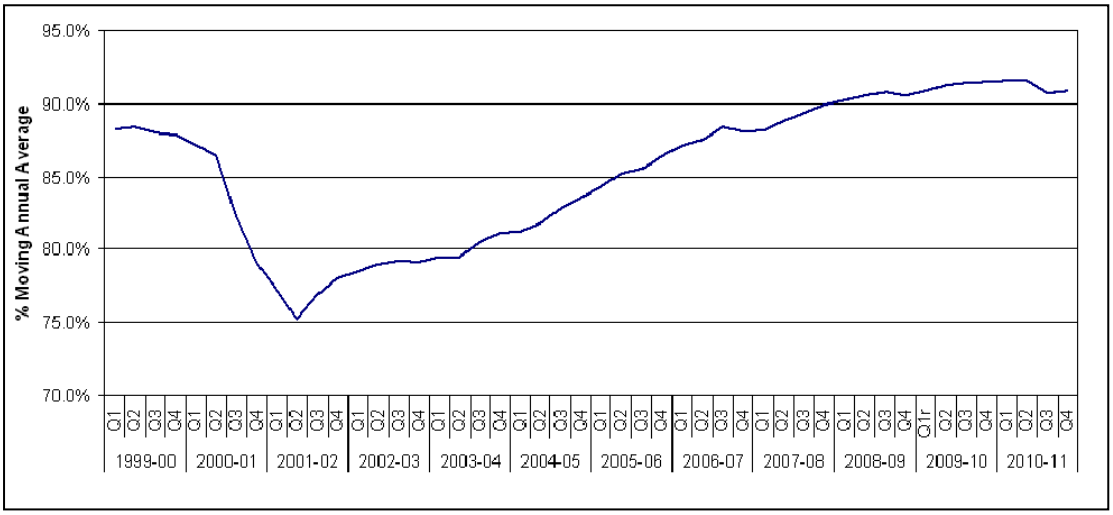
Any fatality is a tragedy and the industry strives continuously to minimise and mitigate such incidents. A key focus for the industry is to continually improve its safety culture and the way safety is managed in the workplace, developing the attitudes, beliefs, perceptions and values that employees share in relation to safety when doing their job. A strong safety culture is key to moving the industry and the organisations within it beyond a compliance driven approach. Network Rail has embarked on a major leadership and culture change programme in recognition of this. As part of this initiative Network Rail has adopted the Rail Management Maturity Model to help identify and evaluate the effectiveness of its approach to safety management.

The Passenger Safety Indicator is currently well ahead of target and Network Rail is on course to meet its CP4 target. The Fatalities and Weighted Injuries measure, which measures workforce safety, is currently behind target, although it is now improving. Issues relating to Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR) reporting highlighted last year acted as a reminder of the importance of a constant focus on safety and the importance of the safety culture of an organisation. Since last year, Network Rail has been working with ORR to develop a joint understanding of the improvements needed to achieve excellence in safety management. The industry is developing a safety leadership and culture change programme, which will be led by a cross-industry team. The aim is to develop an environment of zero harm, developing a safety culture through focusing on the psychological, behavioural and situational aspects of safety.

Punctuality and reliability

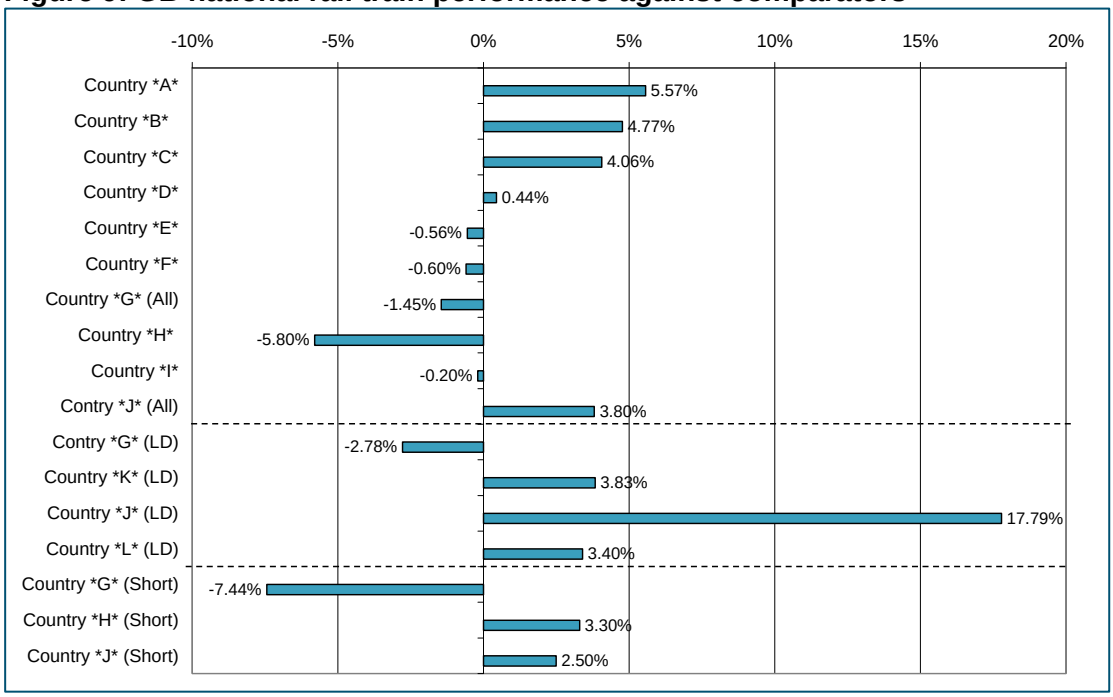
Figure 8 illustrates the significant improvement in train punctuality and reliability over the last decade.

Figure 8: Public Performance Measure (network) 1999-2011



In 2009 Network Rail participated in the "Perform" project. The objective was to benchmark train punctuality of European railways including France, Italy, Switzerland, Germany, the Netherlands, Belgium, Finland and Sweden. Figure 9 displays British train performance for 2009 under each individual comparator's regime plus how this compares to what the comparator achieved itself.

Figure 9: GB national rail train performance against comparators



Of the 11 countries participating in the study British train performance was better than 7, more or less the same as 2 and worse than 2, highlighting that the British rail network performs relatively well against international comparators.

Following an initial period of excellent delivery at the start of CP4, train performance has been challenging over the last two years. The major impact on performance has been the exceptionally severe conditions in the winters of 2009/10 and 2010/11. During both these seasons, low temperatures over an extended period and much higher levels of snowfall than seasonal norms resulted in significant disruption on the network and a number of days when it was not possible to deliver fully the timetable. The industry has identified and is implementing proposals to improve infrastructure and systems reliability through infrastructure / component design and also improving how the industry prepares for and responds to periods of extreme weather in order to minimise future disruption.

More generally, there has been a stalling of improvement in underlying performance and an increase in delay caused by external factors, especially problems due to cable theft. Beyond this there has been a general rise in delay per incident following a number of years of stability in this area. Understanding the cause of this change in delay per incident is complex and is thought to be affected by the combined effect of more trains (producing an increasingly congested network), more passengers (making train cancellation less available as a service management tool) and reduced levels of contingent resources.

Overall, in first years of CP4, some of the regulatory targets have not been met with the targets for Scotland, London and South East Cancellations and Significant Lateness (CaSL) and for freight services (delay per 100 train kilometres) being missed in the last two years.

Achieving the regulatory obligations for the rest of CP4 remains a key challenge for Network Rail and the industry. Plans have been implemented to tackle the major problems of cable theft and delivery during challenging weather conditions. More detailed analysis is underway into the causes of delay per incident change and other fundamental elements of good performance. At a wider level, Network Rail has initiated a more formal, cross-industry review of performance for passenger operators in 2011/12. The objective of this review is to recover and stabilise performance in 2011/12, but then to quickly use this as a base to develop a plan to bring more certainty to achieving the targets for the remaining years of CP4. This plan is expected to develop further more strategic capability to tackle the barriers to good performance, including:

- further focus on cable theft and fatality reduction through taking a wider, cross-industry approach (and including government and external authorities) to management;
- driving a reduction in asset failures (to mitigate the impact of delay per incident) through increased implementation of remote condition monitoring;
- focus on control and service management during disruption including better use of contingent timetables; and
- bringing forward initiatives currently planned for delivery in CP5 where there is a key benefit through early implementation.

For freight services, Network Rail and its freight customers are reviewing the appropriateness of the current measure in addition to increasing focus on freight performance planning to address the specific needs of the freight market, for example the increasing need for short term planned timetabling responding to market change.

For the purposes of CP5 planning, it is assumed that the industry will develop further improvement plans which enable it achieve the regulatory output targets at sector level for CP4. On the basis of this assumption, the vision for performance in CP5 is based on the following rationale:

- the achievement of target performance at the end of CP4 will be largely sufficient to deliver high levels of customer satisfaction, sufficient that no broad based further improvement is proposed for the overall level of performance;
- there are, however, still likely to be groups of services with levels of performance significantly below the average (variation around geography), and also instances of significant delay events and days of overall poor performance (bad days) which cause dissatisfaction and for which there is a business case to take improvement action;
- the focus of performance will be to:
  - stabilise overall performance broadly at the levels planned for the end of CP4; and
  - take action to address these poorer performing services (raising them closer to the current average) and improve the resilience of the network and incident response to reduce the number of significant delay events and bad days;
- specific action will consider the criticality of the routes affected, with particular attention to heavily used routes which are significant drivers of overall customer (dis)satisfaction; and
- such actions should deliver significant local improvements, which in the context of maintaining the performance of other services (whilst accounting for demand and traffic growth) will produce a more marginal increase in the overall average level of performance.

Performance forecasts have been developed which reflect this logic, however the actual level of performance will be sensitive to the detailed plans to be developed at route level in preparation for the Strategic Business Plan (SBP) which will be published in 2013. The current sector level forecasts are described in Chapters 4 to 7 of the IIP.

The vision will be delivered to a large extent by matching asset reliability outputs to the required level of performance on a route by route basis. In developing the SBP a performance specification will be developed for each route and groups of services, and Route Asset Management Plans will be refined to be consistent with these specifications. It is intended that the asset reliability elements of the plan will be deliverable within the funding requirement for the core asset plans, which will be owned and managed at Operating Route level.

It is proposed that an industry performance fund is made available to address matters which arise during the control period, but which could not have been foreseen when developing the initial plans. In this way, it should add resilience to the performance management plan through enabling targeted investment in key mitigation or improvement plans in coordination with wider asset (and other) spending. Part of the CP4 performance fund has been used in this way, to provide mitigation against the effects of severe weather and cable theft. This fund would be managed centrally at an industry level, and appropriate governance arrangements and investment criteria would be put in place. At present it is assumed that this fund would have a similar value to the CP4 performance fund. This assumption will be

refined as the risks to the delivery of the CP5 outputs are assessed and reflected in the SBP.

The industry also recognises the importance of good quality and timely information for passengers particularly during disruptions to service. The rail industry is examining ways to use the significant changes in communications technology to continue to improve information delivery to its customers. The industry recognises the current level of dissatisfaction with passenger information during disruption must be addressed as a priority.

Network availability

The possession disruption index for passenger services (PDI-P) measures the level of disruption to services weighted by passenger volumes and values of time based on when possessions take place. The possessions disruption index for freight (PDI-F) is a similar measure, weighted by the number of freight movements.

The end CP4 targets for network availability are a 37 per cent improvement in the Possession Disruption Index for passenger services against the 2007/08 base, with PDI-P reducing from 1.0 to 0.63. The index for freight services (PDI-F) must not increase above 1.0. The table below sets out the CP4 regulatory targets.

Table 3: Possession Disruption Index targets for CP4

Possessions disruption index	2009/10	2010/11	2011/12	2012/13	2013/14
Passenger	1.02	0.91	0.83	0.68	0.63
Freight	1.00	1.00	1.00	1.00	1.00

In addition to the PDI indicators, Network Rail has developed a number of supporting network availability measures to help manage delivery of the PDI outputs. A Possession Indicator Report is produced and circulated to the industry every period.

In addition to the regulated outputs, industry discussions at the start of CP4 led to the development of the route categorisation principles. A number of key passenger and freight flows have been prioritised for extra focus, and passengers will not be transferred to buses on these designated routes except in exceptional circumstances. For identified freight flows a fit for purpose alternative route is to be available, unless there is no practical alternative (correct gauge, suitable route availability and journey time).

Train and freight customers and Network Rail's nine operational routes are the focus for delivery of network availability improvements and Joint Network Availability Plans (JNAPs) have been developed to support local delivery. A single national freight JNAP has been produced, with the support of freight operators, and focused on the strategic freight flows that were identified through route categorisation. The purpose of JNAPs is to inform the development of future access plans. They identify specific plans for improving network availability for customers. Importantly, they enable Network Rail to check that it has a current view of the needs and aspirations of customers.

Network Rail has been outperforming the regulated targets for PDI-P and PDI-F. As at the end of July 2011, the PDI-P stood at 0.45 against the CP4 end target of 0.63, and the PDI-F stood at 0.89, against a target of 1.0.

Figure 10: Possessions Disruption Index (Passenger)

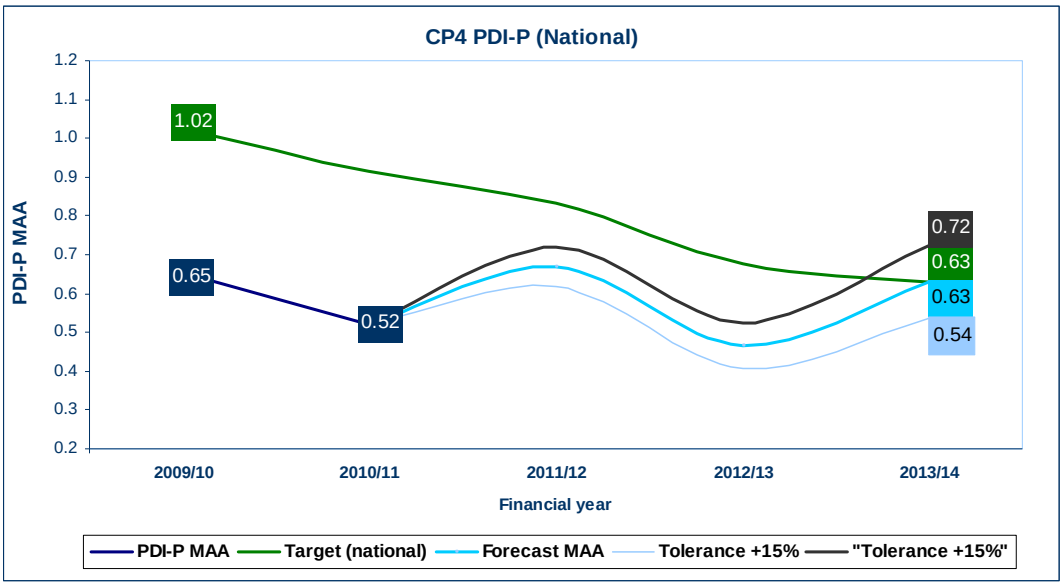
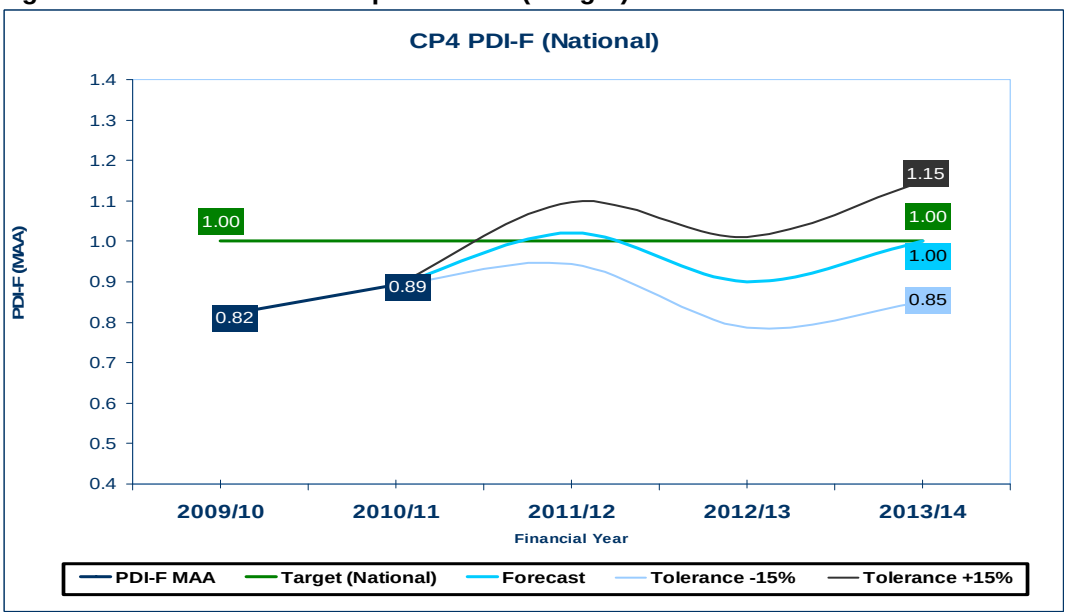


Figure 11: Possessions Disruption Index (Freight)



The results for the PDIs to date reflect both a reduction in the amount of disruptive access and the effects of re-profiling renewals and enhancement activity to the later years of CP4. Network Rail still expects to meet the regulated outputs at the end of CP4.

Plans for Control Period 5

The industry is developing access plans for CP5 based on the following principles:

- aligning demand for train services and access strategies: Where demand for rail services can be demonstrated to be suppressed or latent as a result of the patterns of access used to maintain or renew the infrastructure the industry shall seek to efficiently and effectively improve delivery methods and patterns;

- investing in technology: Investment in technological solutions to underpin the moves towards less disruption to passengers and freight end users, providing a robust business case is made; and
- delivering major enhancements: Where major enhancements are undertaken the development of access strategies will be determined through balancing the continued provision of services to customers during construction, the timeliness of implementation and the cost of delivery.

Route Network Availability Strategies

In line with the devolution of Network Rail, a Route Network Availability Strategy (RNAS) will be developed jointly with train operators on each route. Each RNAS will:

- identify key traffic flows for freight and passenger customers: These key flows will build on the route categorisation approach adopted in CP4 and be tailored to meet the business needs of the routes' train operators;
- the planning of availability of the network on the key routes will be specified so as to best meet the market need on that route. This may include, but should not be limited to the rules adopted by route categorisation:
  - unless no reasonable alternative exists flows will be kept on rail, on their primary route; and
  - where necessary reasonable diversionary options will be identified.
- define further availability improvements: Where a business case exists further commitments to reduce the duration of standard maintenance and renewals activities during CP5 will be made. This will enable train operators to exploit further market opportunities where the benefits of doing so exceed any costs necessary to facilitate the improvement; and
- define significant exceptions: The strategy will show those programmes of major work that will require significant disruptive access durations in CP5. Examples of works that may require such access are network enhancements, bridge reconstructions and complex switch and crossing renewals.

Other non standard locations will also be identified where the balance between industry costs and train operator requirements is such that an alternative approach to availability is appropriate e.g. an annual, week long blockade of a branch line to facilitate all works requiring disruptive access.

A national availability strategy will also be developed to provide assurance that inter-route flows are protected e.g. freight flows, Anglo-Scottish traffic and cross country services.

Proposals for joint working between routes and train operators

Each of the devolved routes will develop their RNAS through workshops with their train operators. These strategies will be aligned with the Route Asset Management Plans and work delivery methods. It is anticipated that any additional costs for work delivery arising from the RNAS will be included in Network Rail's Strategic Business Plan.

Joint Network Availability Plans (JNAPs) will then be agreed with individual train operators on an annual basis to support the detailed implementation of the RNAS. JNAPs should be a central feature of how the industry plans access and delivers improvement in network availability for train operators during CP5.

Capacity

Responding to growth in the market, a significant amount of investment has taken place during CP4 with significant investment committed into CP5.

The overall level of peak passenger capacity delivered by existing commitments in the base plan has been assessed for central London, plus the large regional cities included in DfT's CP4 High Level Output Specification (HLOS).

This assessment measures average train loadings during the weekday morning peak between 07:00 and 10:00, plus a separate assessment of the busier peak hour between 08:00 and 09:00.

Train loadings are calculated as the number of passengers (measured at the most heavily loaded point on a train's inwards journey), divided by the amount of capacity provided (measured as the number of seats provided plus a further allowance for standing on short trips of less than 20 minutes only).

The strategies proposed by the industry to accommodate the anticipated increase in demand are developed at a detailed level of planning, often by examining loads on individual train services. However, for presentational purposes the overall assessment of train loadings presented in the IIP has been aggregated into large urban areas.

This aggregation will mask incidences of crowding. For example, by the end of CP5 existing commitments in the base plan deliver average train loadings of 77 per cent across central London in the high peak hour. This does not mean that there is 23 per cent spare capacity, because:

- one of the consequences of the flexible 'turn up and go' nature of rail services is that uniform 100 per cent train loadings are unachievable. In practice, some services will be at or over capacity when average train loadings reach 75 per cent to 80 per cent;
- the aggregation will combine a number of routes with different load factors. For example, by the end of CP5 central London will be served by a number of routes with sufficient capacity to accommodate growth (for example, the Thameslink route after completion of Key Output 2), and other routes where further interventions will still be necessary to relieve incidences of crowding;
- on routes where spare capacity does exist, this is generally not transferrable to other routes; and
- the assessment of central London also reflects the anticipated purchase of 'high density' rolling stock (designed with a relatively high standing to seating ratio for short distance trips) for the Crossrail and Thameslink programmes.

Table 4: Three hour weekday morning peak load factors delivered by the current railway (07:00 to 10:00) [9]

City Region	Forecast end CP5 passengers	End CP5 capacity	Forecast end CP5 average load factor
Birmingham	40,600	70,950	57 %
Bristol	10,300	18,400	56 %
Cardiff	12,700	28,550	44 %
Leeds	32,700	38,800	84 %
Leicester	6,900	13,500	51 %
Liverpool	24,100	33,700	72 %
London	632,700	1,022,750	62 %
Manchester	36,800	53,050	69 %
Newcastle	3,900	9,500	41 %
Nottingham	4,300	9,350	46 %
Sheffield	8,500	14,800	57 %

Table 5: One hour weekday morning peak load factors delivered by the current railway (08:00 to 09:00)

City Region	Forecast end CP5 passengers	End CP5 capacity	Forecast end CP5 average load factor
Birmingham	21,300	28,400	75 %
Bristol	4,500	6,200	73 %
Cardiff	6,800	11,150	61 %
Leeds	16,100	18,350	88 %
Leicester	3,400	4,900	69 %
Liverpool	12,000	13,650	88 %
London	315,500	409,800	77 %
Manchester	18,800	23,550	80 %
Newcastle	1,800	3,800	47 %
Nottingham	2,300	4,100	56 %
Sheffield	3,800	5,300	72 %

Overall, the current railway delivers a 40 per cent increase in central London peak capacity by the end of CP5 relative to today's level of service[10]. Much of this extra capacity is provided by the Crossrail and Thameslink Programmes (together with the subsequent cascade of rolling stock which these two schemes enable allowing longer and in some cases more trains to operate elsewhere on the network). However, a large part of this extra capacity arises from the procurement of high density new trains for Thameslink and Crossrail services. The overall level of additional capacity delivered by the current railway in London is much lower if measured by the number of seats.

There will remain corridors in London and the South East where, even following the significant expansion of overall capacity, incidences of crowding will occur by the end of CP5. The IIP includes interventions to address crowding on these corridors.

[9] The figures presented in tables 4 and 5 are not directly comparable to previous High Level Output Statement 1 (HLOS1) capacity metrics. This is because (a) the number of passengers in the IIP are counted at the most heavily loaded point on each train's journey, which is not necessarily the terminating station (b) capacity is now defined to include a standing allowance only for shorter journeys of 20 minutes or less; and (c) Passengers on Merseyrail services are now included in the overall total for Liverpool. Overall, the metrics used in tables 4 and 5 of the IIP better reflect average train loadings experienced by passengers during peak hours, principally as demand is now measured at the most heavily loaded point

[10] Defined as the capacity provided by the December 2009 timetable

Across the large regional cities considered, the current railway delivers a 7 per cent increase in peak capacity by the end of CP5 relative to today's level of service.

Carbon

As can be seen from the table below, rail is already a low carbon transport mode.

Passenger Mode	gCO_2 per passenger km
National Rail	53
Underground	73
Light rail / tram	71
Cars	127
Bus	148
Coach	30
Domestic Aviation	163

Freight mode	gCO_2 per tonne km
Rail	29
HGVs	127
Light Van	537
Domestic Aviation	1,738

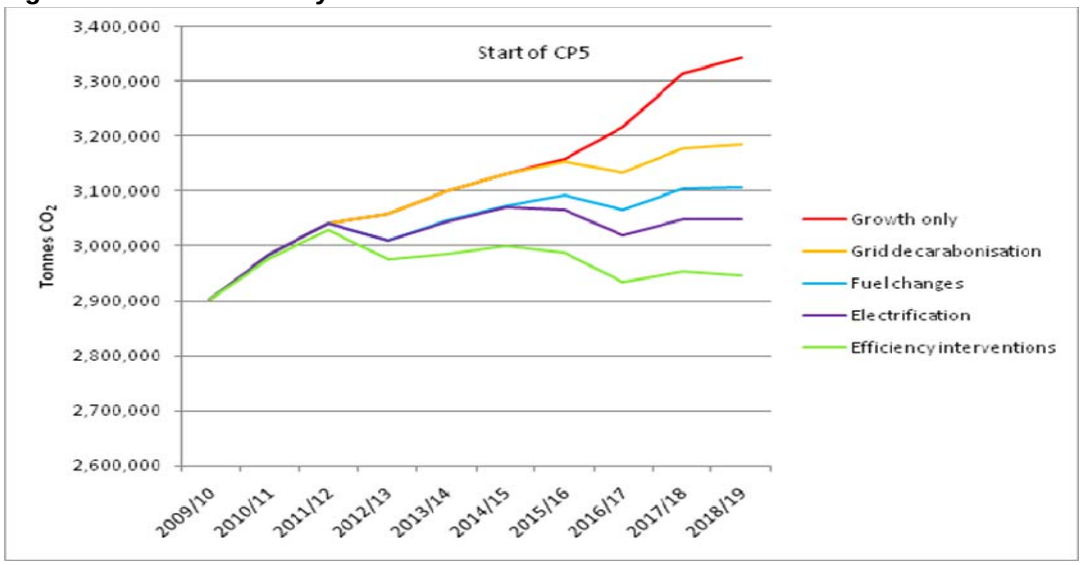
From August 2011 Guidelines to Defra/DECC's Greenhouse Gas Conversion Factors for Company Reporting. Emission factors quoted are 'Direct CO_2' for comparison with forecasts. Figure for cars adjusted for an average occupancy rate of 1.6 based on Transport Statistics Great Britain 2010. These figures reflect UK; figures in the remainder of the document reflect England and Wales

The Government has a target to reduce UK carbon emissions from 1990 levels by 80 per cent by 2050 and transport as a whole is a major, and growing, contributor to UK's carbon footprint. Expected increases in energy prices over CP5 and beyond makes improving carbon efficiency increasingly important from a financial as well as environmental perspective. Currently energy accounts for 4 per cent of overall industry costs. Using the Department for Energy and Climate Change's (DECC) central price scenario and assuming no further progress on energy efficiency, meeting demand for rail services could result in an increase of nearly £300 million per annum (up 45 per cent) on traction energy alone by the end of CP5. Industry consumption of energy for non-traction purposes, though less well understood as a whole, could also account for a significant additional cost.

Traction carbon

Figure 12 illustrates the expected trajectory in traction carbon emissions from rail services through to the end of CP5 for the current railway.

Figure 12: Current railway traction carbon emissions



N.B. Impact of various drivers of carbon emissions modelled incrementally – thus 'efficiency interventions' is the forecasted trajectory. Growth only is the impact of more traffic without any further improvement in carbon efficiency.

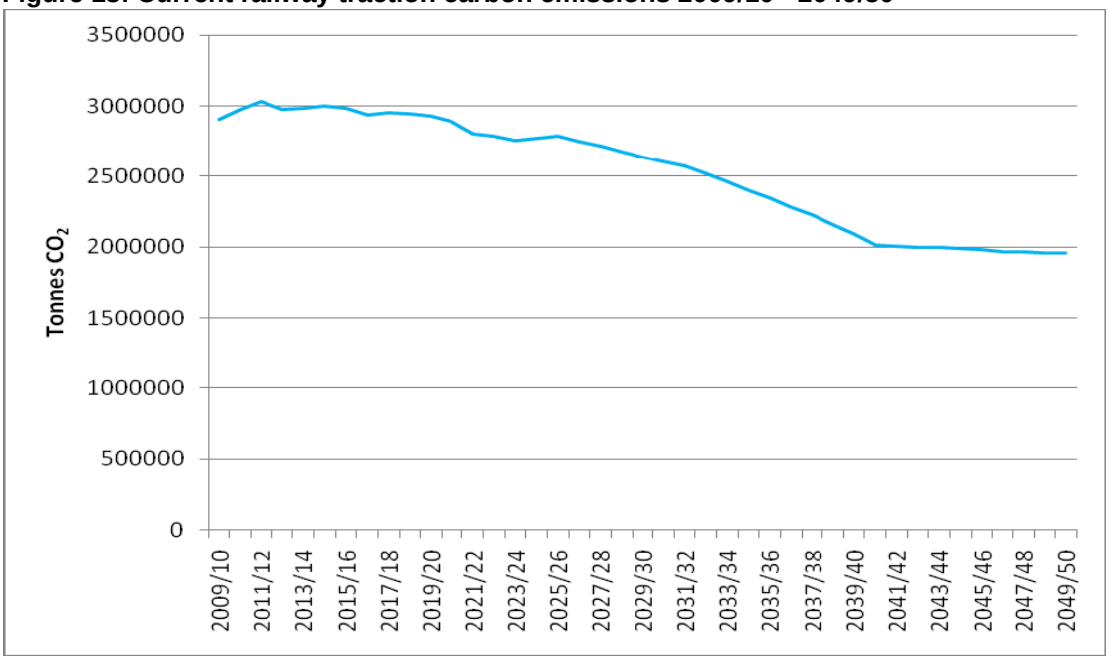
The railway can deliver significant carbon efficiencies. Though emissions are expected to rise slightly (up 1.5 per cent) by the end of CP5, this is in the context of significant growth in traffic. As a result, carbon efficiency improves from 50.1 to 38.4gCO_2 per passenger kilometre and 27.1 to 25.7 gCO_2 per net freight tonne kilometre.

This is in part reliant on improvements outside the control of the rail industry. In particular the expected reduction in the carbon intensity of UK grid electricity, as well as reductions in the carbon intensity of diesel used by rail industry, deliver over half the expected improvements beyond the business as usual trajectory.

The industry is also committed to delivering significant improvements through its own actions. In particular, plans to electrify parts of the network including the Great Western Main Line and schemes in the north west of England, will reduce carbon emissions and deliver increasing benefits as grid electricity becomes less carbon intensive in the future.

There are significant opportunities for financially positive energy efficiency measures to be taken across the network. A conservative view of these is included in this trajectory. Delivering on these initiatives will reduce the overall energy bill of the industry as well as its carbon footprint. The graph below illustrates the expected trajectory in traction carbon emissions from rail services to 2050 in the current railway scenario.

Figure 13: Current railway traction carbon emissions 2009/10 - 2049/50



N.B. Industry growth predictions are capped at the end of CP8.

In this longer term view substantial carbon emission reductions are expected to reduce traction emissions by about 33 per cent. Much of this is driven by the transition to lower carbon electricity generation. We are clear that greater improvement is likely to be required and proposals for a rolling programme of

electrification, combined with continued focus on energy and carbon efficiency are outlined later in this document.

Non-traction carbon

Non-traction carbon accounts for around 20 per cent of rail's direct carbon footprint. Stations, depots and train control systems are the main contributors to these emissions. Non-traction energy faces similar rises in energy prices, with an additional levy for many rail industry organisations through the Carbon Reduction Commitment Energy Efficiency Scheme.

This is currently an area in which understanding around current performance, accountabilities, drivers of change, and the potential for improvement is limited. The industry Carbon Management Framework (see Chapter 8.2.6) will facilitate improvements required. Further, as a substantial proportion of the key assets fall within Network Rail's operational responsibilities, Network Rail is clear this is an area for particular focus for them.

Noise

Mitigation of noise issues is an ongoing part of the day to day management of the railway and is also considered when any changes, enhancements or upgrades are made. In CP5 the industry will have to respond to the requirements of the EU Environmental Noise Directive. The Directive uses strategic mapping to identify where there may be potential environmental noise issues. Where issues do exist, and require mandatory remedial intervention, action plans must be developed to address them. Although the data given to the industry is currently incomplete, an initial estimate has been made of the cost of meeting the regulation. This totals £10-22 million over the course of CP5, with a further £200,000 per annum to ensure that proper assessment and resource allocation can be made. Further analysis is required to validate this figure and establish if this cost is fully incremental to the current activities and costs forecast in the IIP.

The industry will be working with DEFRA and the devolved administrations for Wales and Scotland to more closely define the potential scope of railway noise mitigation measures during the second round of noise mapping that government organisations will be undertaking in 2012. This may result in amendments to infrastructure asset plans for example if rail damping systems are considered the preferred mitigation measure then this will need to be factored into track renewals work.

2.5.5 Choices and trade offs

The IIP presents the industry's view of the outputs and costs of maintaining the current railway (including the completion of committed CP4 projects) and offers funders a range of choices which support the desired outcomes. This section summarises the areas where choices exist to funders, and highlights where relationships and trade offs exist.

Outcomes

The plan is based on the delivery of a range of outcomes which are consistent with the delivery of government objectives and end user needs. Broadly, these outcomes fall within the categories of improved affordability, supporting continued economic growth, meeting customer needs and a low carbon economy

The outcomes of supporting economic growth and meeting customers' needs are supported by investment options, some of which would have a negative impact on overall affordability (i.e. they are not self-financing) so at a high level there is an

option to trade these outcomes against a lower industry net cost. The IIP recognises that the industry will need to prioritise overall affordability and the delivery of value for money when taking forward its plans.

Policy choices

Subsidy and fares

The IIP forecasts show that if the industry can deliver the costs savings proposed and the demand growth materialises as forecast, then the result is that the industry could break even by 2024 and beyond that generate a surplus. This scenario assumes that fares will be increased at an annual rate of RPI +1 per cent, after three initial years of RPI + 3 per cent. However there is a clear policy choice for funders as to whether improvements in efficiency are reflected in lower subsidy, or lower fares.

Fares and demand management

The IIP proposes investments which provide capacity to meet forecast levels of passenger demand. Demand forecasts are based around assumptions that the existing fares structure and demand management techniques remain broadly as at present.

With the industry resource base and level of capability scaled towards accommodating the commuter peak, there may be opportunities at the margin to manage peak demand more pro-actively than at present, and incentivise some of the demand away from the cost peak train services into London and the other urban centres. This would require changes to fares policy, and possibly the introduction of new technology to allow more sophisticated pricing methods, should it be demonstrated to improve the overall industry financial position.

Industry reform

The Department for Transport (DfT) has outlined its future approach to franchising of passenger services. The industry believes reform in this area is essential to the unlocking of the train operator productivity gains identified in the RVfM study, and choices around the freedom of franchisees to deliver a better value for money service.

Outputs

The industry has examined the relationships between output areas, particularly train service performance, journey time and capacity, to understand where there might be potential to trade outputs. It was found that the relationships vary significantly by route, depending on factors such as infrastructure capability, service level commitments, service patterns and traffic mix. Overall, there is not a simple relationship between these outputs, and opportunities need to be investigated as part of a holistic review of the Rules of The Route, including timetable allowances and pathing constraints in the context of diverse operator requirements. Deeper relationships between Network Rail and train operators will incentivise the industry to optimise these trade offs to improve value for money.

Some outputs can be traded against cost. For example, the network availability output has a relationship to the cost of maintaining and renewing the network, with higher levels of availability generally leading to relatively greater costs of undertaking engineering work in constrained timescales. There are other areas (for example journey time) where output improvements can deliver operational cost savings due to improved resource utilisation.

Investments

The IIP presents investment options which support the outcomes and offer financial and socio-economic benefits (to users and non-users). Each of these interventions represents a choice in its own right, within the following broad categories:

- investments to reduce total industry costs;
- further electrification;
- capacity enhancements in the London and South East sector;
- capacity enhancements for other urban centres;
- journey time and connectivity improvements (including the Northern Hub);
- strategic freight network; and
- investments to reduce risk at level crossings.

The case for each of these investments is summarised in Chapter 9.

3 Value for money

3.1 Introduction

The Rail Value for Money (RVfM) study laid down a challenge to the industry to reduce its costs by 20-30 per cent from a 2009 base year by 2019. Improving the efficiency of the rail industry in Great Britain will give the funders and stakeholders of the industry the confidence to invest in its future and enable the industry to embrace the growth potential set out in the market analysis in the following chapters.

The industry is determined to take up the challenge posed by the RVfM study to improve cost efficiency. It is already developing proposals to tackle costs and develop greater partnerships between train operators, Network Rail and their supply chains. The Rail Delivery Group (RDG) will take ownership of key cross-industry initiatives that cannot be delivered without collective action across the industry. This Initial Industry Plan (IIP) identifies the impact of such cost savings on industry affordability and what action is required from funders and ORR to enable this. Change and collaboration is required by all parties involved in the specification and delivery of the rail system.

The IIP explains how the different parts of the industry are embracing the need to improve the efficiency of the railway and describes the priorities and plans of the RDG. The IIP shows the quantum of savings that the industry hopes to achieve and the dependencies and enablers necessary to achieve those savings.

There are a number of enablers to change that need to be put in place by those outside the industry, especially government. The IIP sets out these enablers and highlights the priorities which RDG has indentified for addressing cross-industry barriers to improved value for money.

3.2 The efficiency opportunity

The publication of the RVfM study report was a timely reminder that despite the significant growth enjoyed by Britain's railways the industry needs constantly to be focused on reducing its costs. The report highlighted many achievements of the railway including growth in passenger and freight markets, continued improvement in safety, increasing customer satisfaction, improved operational performance and significant investment.

Despite these successes the study concluded that the cost of Britain's railway was higher than European counterparts and also higher than might have been expected if the railway industry had matched the performance of other regulated and privatised industries. The study acknowledged that some of the differences in cost might be systemic and not capable of elimination but still made the point that efficiency improvement of 30 per cent by the end of Control Period 5 (CP5) in 2019 should be achievable.

The RVfM study reported that the cost of the GB rail industry in 2009/10 (at 2009/10 prices) was £12.7 billion as shown in Table 6.

Table 6: Total money flows in GB rail 2009/10[11]

Organisation	Cost (£ billion)
Network Rail	5.6
Franchised train operators (own costs)	4.4
Rolling stock companies (ROSCO) charges	1.4
Freight operators	0.7
Projects	0.5
Regulation and administration	0.1
Total	**12.7**

3.2.1 The 'should cost' exercise

The RVfM study produced a high and low estimate of the realisable efficiency potential in the rail industry based on its assessment of what the industry should cost.

In the low efficiency scenario the study assessed that £2.5 billion of efficiency savings could be achieved of which £1.8 billion would be secured by Network Rail – already taken account of in the CP4 settlement and provisional savings for CP5 – and £0.7 billion by train operators and Rolling Stock Companies (ROSCOs). The results are shown in Table 7.

Table 7: Low estimate efficiency gap[12]

£ billion (2008/9 prices)	Train operators and ROSCOs	Network Rail	Total
Low estimate of efficiency gap	0.7	1.8	2.5
Deduct Network Rail savings committed for CP4		(1.2)	(1.2)
Deduct Network Rail savings provisionally indicated by ORR for CP5		(0.6)	(0.6)
Remaining efficiency gap	**0.7**	**0.0**	**0.7**

The study also provided a high estimate of the efficiency potential of £3.5 billion. In this scenario the study expected Network Rail to save £2.3 billion of which CP4 and CP5 commitments and expectations amounted to £1.8 billion leaving an efficiency gap of £0.5 billion.

Train operators and ROSCOs efficiency potential in this scenario was £1.2 billion, none of which has been committed thus leaving a £1.2 billion efficiency gap in the high efficiency scenario. Combining this to Network Rail's efficiency gap produces a total gap of £1.7billion. This is illustrated in Table 8.

Table 8: High estimate efficiency gap[13]

£ billion (2008/9 prices)	train operators and ROSCOs	Network Rail	Total
Low estimate of efficiency gap	1.2	2.3	3.5
Deduct Network Rail savings committed for CP4		(1.2)	(1.2)
Deduct Network Rail savings provisionally indicated by ORR for CP5		(0.6)	(0.6)
Remaining efficiency gap	**1.2**	**0.5**	**1.7**

[11] Realising the potential of GB Rail, Final Independent Report of the Rail Value for Money study, Detailed Report, Table 3.1, DfT and ORR, May 2011
[12] Ibid
[13] Realising the potential of GB Rail, Final Independent Report of the Rail Value for Money study, Detailed Report, Table 4.3, DfT and ORR, May 2011

Applying the low and high efficiency savings to the industry cost base (in this case the costs in 2008/9) produced revised industry costs of between £8.5 billion and £9.5 billion as shown in Table 9.

Table 9: Impact on industry costs of 'should cost' exercise (2008/9 prices) [14]

£ billion (2008/9 prices)	Low savings	High savings
Total industry expenditure (2008/9 actual)	12.0	12.0
Effect of closing the total efficiency gap	(2.5)	(3.5)
Resultant reduced industry costs (using 2008/9 base)	**9.5**	**8.5**

These savings were calculated on an expenditure basis - that is before accounting adjustments were made to recognise that capital expenditure is charged to Network Rail's Regulatory Asset Base. In calculating the savings from the individual areas of research the RVfM study converted expenditure based savings to funding based savings. This involved a funding adjustment in which capital expenditure savings were removed and replaced with an avoided cost of capital. The RVfM study identified that savings in 2018/19 compared with 2008/9 (at 2009/10 prices) would be between £740 million and £1,050 million as shown in Table 10. These are the headline figures quoted in the RVfM Summary report.

Table 10: RVfM efficiency savings (funding basis) in 2018/19 by area of study (£ million) (2009/10 prices) [15]

Study area	*Subject*	*Low case*	*High case*
A	Objectives, strategy and outputs	90	110
B & C	Leadership, structures and incentives	40	130
D	Revenue	90	90
E1 & F	Asset and supply chain management	230	580
E2	Programme management	40	100
G	Safety, standards and innovation	190	190
H	People	260	260
Less	Double counts	(200)	(410)
Net funding savings		**740**	**1050**

In addition to the efficiencies that had been researched in detail by the RVfM study the report also suggested that additional savings may be available from improved train utilisation. The RVfM study suggested that if train utilisation was improved by 5 per cent the industry could save between £500 million and £700 million from the cost of future growth (calculated as five per cent of total industry costs).

3.3 Network Rail's plans to improve value for money

By the end of Control Period 3 (March 2009) Network Rail had achieved overall savings of 27 per cent in the context of increased traffic on the network. The savings over the control period came from a number of sources, including bringing maintenance work in house, re-structuring, introducing new technology for improved asset inspection, re-negotiating contracts and investing in new plant and machinery.

Network Rail has committed to reducing its annual costs by 23 per cent by 2014, or £800 million each year, to achieve £4 billion savings. Significant effort is underway to develop a greater understanding of Network Rail's comparative efficiency, particularly with its European counterparts. This benchmarking is discussed in more detail in Chapter 2.

[14] Ibid
[15] Realising the potential of GB Rail, Final Independent Report of the Rail Value for Money study, Detailed Report, Table 4.5, DfT and ORR, May 2011

3.3.1 Changing Network Rail

Network Rail is undertaking cultural and structural change to meet the needs of its customers and offer better value for money. The change programme includes creating devolved business units that are better aligned to the needs of its customers, developing deeper partnerships with customers and suppliers and introducing greater contestability into how it delivers projects.

Devolution

Network Rail is undertaking a major programme to devolve decision making and management accountability towards more local geographic route based organisations. This is intended to drive improvements in efficiency, building on the progress made by the company over the last few years. It is also intended to improve Network Rail's responsiveness to the needs of customers, and to enable greater effectiveness and efficiency to be delivered through collaboration and partnership with train operators.

Network Rail will interact with train operators and suppliers at a local level wherever possible. Customers will deal with fewer people, who will have control and influence over the full range of activities and decisions that are relevant to delivering a high quality and responsive service. Network Rail routes will be empowered to interact with their customers in the most effective way to deliver outputs at the lowest possible whole life, whole system cost.

Devolved route organisations will bring together, under the leadership of the Route Managing Director, accountability for operations and maintenance activities, along with the development of asset plans, the delivery of small and medium size projects, and accountability for delivery of outputs. This will enable the balance of activities and related resource utilisation and expenditure to be managed according to local circumstances and customer needs. The creation of devolved organisations is also designed to stimulate innovation and facilitate benchmarking across routes to identify and share best practice.

Some Network Rail activities will remain centralised, particularly where these enable broader network benefits, or where economies of scale and standardisation can be achieved. Devolution provides the opportunity to be more transparent about the cost, value and quality of activities which the central business support functions - finance, human resources and information management - provide as services to the devolved routes.

The devolved route organisations will be based on the geographic areas of the ten existing Network Rail operational routes. Two routes, Scotland and Wessex, were devolved in May 2011. By November 2011, all of the Network Rail routes will be operating under devolved management arrangements.

Supporting the organisational changes driven by devolution, a project is under way to co-locate many activities, which will remain at the centre, in purpose built office accommodation in Milton Keynes - "The Quadrant" is due to open in summer 2012.

Alliancing

Network Rail and a number of operators are negotiating co-operative agreements that align behaviours through shared incentives to work more closely together – the creation of alliances. In this context an alliance is a relationship between Network Rail and one or more train operators, and involving the sharing of complementary

disciplines, technology, products, services, organizational structures, marketing, and financial resources.

Improving value for money will be achieved by unlocking the costs inherent in the contractual interfaces and encouraging behaviours that are consistent with 'one team' rather than two contractual counterparties. Barriers and duplication between organisations will be removed creating new incentives to outperform operating, passenger, asset and financial targets. The multilateral nature of the network means multilateral decision making is a fundamental principle in the industry, and any alliance will work entirely within this environment.

A universal approach to stronger partnerships is unlikely to be successful and experience from elsewhere indicates that the parties involved need to define how a partnership should operate. Network Rail and train operators can implement these stronger partnerships themselves but only with the support of the Department for Transport (DfT) and the Office of Rail Regulation (ORR). Further examination of key enablers required to facilitate stronger partnerships is set out later in this chapter.

The opportunities for reform of franchising and stronger partnerships are clearly related. Working with incumbent train operators within existing franchises will provide an opportunity to deliver better value for money in advance of a franchise change and allow the industry to understand better the scope of opportunities ahead of any future franchise reform, the latter providing the opportunity to develop even deeper partnerships.

Network Rail is also exploring the possibility of letting one or more concessions for the management of infrastructure at a route level, with the first of these potentially starting early in CP5. The process of devolution will be a key enabler of this as it brings the accountability for the management of the infrastructure to a route level. The introduction of a concession would bring competition and benchmarking into the management of the rail infrastructure. However, it is important that the industry continues to optimise the network and therefore the industry is developing potential plans for a system operator to support both devolved routes and possible independent concessions.

Improved management and contestability in projects

Network Rail has developed proposals to reduce the cost of delivering projects and encourage greater contestability into the provision of project delivery services. This will be achieved through three initiatives:

- partnering: This will help drive down the unit cost of delivering projects by reducing man marking, introducing innovation earlier into the development process and improving construction performance through aligned risk management and integration. It will also reduce scope variations by aligning client, constructor and designer relationships earlier in the process;
- developing the client capability to define the required outputs specification earlier in the project cycle and potentially to invite competing bids from the market place; and
- creating a project delivery business that can compete and win work in an open market for UK regulated and unregulated rail business.

The creation of enhanced client capability and a new project delivery business will enable smarter innovative solutions, lower overheads and unit costs, align with the devolution strategy, and deliver lower whole life cost.

The competitive delivery model will drive down unit costs by creating greater accountability and empowerment. Network Rail intends to have established the organisations in time to start implementing the proposals in April 2012.

Improving contractual relationships

Network Rail is introducing a less prescriptive approach with its partners and withdrawing in part from some areas of activity. Examples include:

- track renewal initiatives will give suppliers the freedom and incentives to innovate and invest in rail specific plant that is more productive than the current fleet of multi purpose road rail vehicles;
- simplifying the supply chain by forming innovative and collaborative relationships as seen in Europe; for example in Switzerland the main Infrastructure Manager uses a single contractor to deliver its modular switch renewal programme;
- simplifying contractual regimes, reducing the degree of pre-qualification for tenders and reducing the contractual burden such as bonds and warranties, contract retention and damage liability;
- by in-sourcing maintenance Network Rail has gained valuable asset knowledge and delivery expertise. The asset management capability developed by Network Rail will allow it to explore the benefits of outsourcing to facilitate the introduction of innovative work practices. Both Sweden and the Netherlands indicate that considerable savings have been delivered by contracting out maintenance activity. Network Rail does not believe that totally outsourcing maintenance is appropriate at this stage but it will increase the proportion of work undertaken by parties outside Network Rail; and
- for signalling and electrification Network Rail will continue implementing “strategic partnerships” with suppliers. The supplier will be involved earlier in the design process. Signalling is the only asset for which Network Rail intends to retain an internal design capability due to the complexity of the work and the general shortage of required skills. For telecoms Network Rail plans to reduce the dependence on two key suppliers by diversifying its supplier base.

Providing better defined, stable work banks

In tandem with improving the contractual relationship with its partners, Network Rail is seeking to provide greater visibility of its future work banks and is seeking to provide its delivery partners with greater confidence as to the stability of future possible workloads. It is also seeking to smooth its requirements within and between control periods. All these measures will enable it to “smooth out” resources and allow it to plan better and subsequently to deliver at a lower price.

Scope and asset management savings

Network Rail continues to develop its asset management capability. Specific initiatives to reduce costs in CP5 that are already embedded in Network Rail’s cost projections include:

- intervening or inspecting at the optimum time based upon an improving understanding of life cycle cost;
- making more efficient “maintain versus renew” decisions based upon an improving understanding of life cycle cost;
- better targeting of the tamping workload allowing fewer poorly utilised shifts which arise from sub optimal deployment and site management. SNCF in

France currently has a system which facilitates efficient use of its maintenance tamping fleet and Network Rail is working with it to understand this better;
- better identification of the root causes of problems rather than just the symptoms such as, for example, implementing an extensive sleeper re-padding programme to prevent much more expensive damage to rail assets or pre-emptive drainage treatment to prevent extensive water contamination; and
- further deployment of risk based inspection and servicing regimes. This is currently well established for signalling assets but it will drive additional benefits for maintenance of telecoms and electrification and plant assets.

The table below summarises how planned changes in asset policies will improve the value for money of the railway. Further work on these policies is planned prior to the submission of the Strategic Business Plan (SBP).

Table 11: Asset management policy changes

Asset	The revised policy will deliver better value for money by:
Track	• Less complete renewal, more refurbishment, more preventative maintenance and more track treated for an overall reduction in whole life cost and spend in CP5
Signalling	• Targeted approach to renewal rather than full resignalling • Integration of the renewal work bank with operating strategy and ERTMS
Telecoms	• More effective obsolescence management and technology change • Greater use of partial renewal intervention where appropriate
Electrical Power & Fixed Plant	• Prioritised based on condition & criticality in terms of impact on service outputs
Drainage	• Improved drainage asset condition on high criticality routes, maintained condition elsewhere and contribution to improved track quality with consequent reduction in delay minutes • Improvements in overall track quality by reduced track maintenance interventions and savings in abortive renewal costs • Reduced flooding leading to improved safety and reduced delay minutes
Buildings	• The ability to target the required CP5 performance outcomes - less spend on major station train sheds, buildings and platforms and more spend on canopies • Key assets are managed in a sustainable manner, maintaining long term condition and thereby securing the long term functionality of the asset
Structures	• Improved consistency in managing bridge strength & critical condition risks • Increased emphasis on maintenance and minor works

A number of rail companies from around the world, including those in Holland and Japan, have achieved significant reductions in asset management costs by maximising opportunities to rationalise their infrastructure both through the design of new layouts and the removal of redundant or very lightly used existing equipment. Network Rail believes that such opportunities exist in Great Britain and will be exploring such opportunities with its industry partners.

Revising standards and operating rules

A well structured approach to standards and operating rules provides an important platform for an effective and efficient organisation. Studies of international and European practice have identified many different standards and philosophies and several different approaches to safety management, in general usually based upon individuals taking greater responsibility for their own safety.

In some other industry sectors, the movement towards performance (goal) based standards is becoming more prevalent especially in the standards developed for reference in the building and construction industries. The use of such standards, within the appropriate environment, can offer significant advantages. There is also an

increasing tendency to adopt a performance based approach to regulation in general, and there are good technical and commercial reasons for believing this approach is preferable to more prescriptive regulation.

This understanding is being used to underpin Network Rail's change in its approach to standards; moving from a regime of prescriptive standards towards a more performance related approach. This changes the emphasis in the standards from how work is to be done to what is to be achieved. It is also intended that these standards will be described more concisely, with increased used of visual aids so that the documents are more accessible and easy to understand and apply. This will also support the devolved organisation described earlier.

Network Rail is moving towards adoption of a goal based approach. The new standards will need to describe broad, over arching goals against which the safety, competence, and experience of staff can be verified at design and construction stages and during operation and maintenance. At each stage of construction, operation, and maintenance, it should be possible to demonstrate, and more importantly, to verify that the infrastructure is being managed in such a way that complies with the goal based standard requirements.

To help standards users to understand better the 'criticality' of the individual Network Rail standards, the requirements will be identified by using Red, Amber and Green (RAG) indicators. This approach helps the users to determine what the absolute, non-challengeable requirements are, where there is room for considering alternative approaches, and what information is provided for the purpose of guidance only.

The RAG initiative is currently being trialled through a number (approximately 600) of existing, mainly engineering standards that apply to Network Rail's newly devolved routes (Scotland and Wessex). Network Rail will be monitoring feedback from the standards users to help improve the application of RAG going forward.

Network Rail standards fit within a wider framework of regulatory and domestic legislation that applies to the railway industry. As part of the move to performance standards, a new framework, based on established asset management principles (PAS 55), has been developed for Network Rail company standards. The new framework will help the business to develop requirements that are designed to control and/or help mitigate against identified risks. These requirements (risk controls) will be incorporated into the asset management lifecycle stages, which in turn are described within the corresponding Network Rail standards.

All existing Network Rail standards will be reviewed and if appropriate re-written to fit into the new framework. They will be written as performance standards and will be refocused specifically on the needs of end users. All new and revised Network Rail standards will include the RAG classification.

A priority list of engineering standards has been identified and these standards will be re-written with the support and engagement of the routes including frontline standards users such as Section Managers and Track Maintenance Engineers.

To improve engagement with the wider industry, the Network Rail Company Standards Group's (CSG) membership has been widened to include representatives from the Railway Safety and Standards Board (RSSB), the Railway Industry Association (RIA) and the Rail Industry Contractors Association (RICA).

Multi-skilling and delivery

European railways utilise a flexible and multi-skilled workforce. With labour costs accounting for a significant component of Network Rail's overall maintenance and renewal expenditure the benefits of multi skilling are considerable. Network Rail is examining opportunities to remove demarcation between contractors, implement more flexible working practices and utilise multi-skilled teams rather than task specific resources. Developing the industry's people is discussed further in Chapter 8.

Reducing support costs

Network Rail has benchmarked its support activities including human resources, information management and finance. Whilst the company has improved its efficiency in these areas it is not operating at world class levels of efficiency for a private sector business of its size. Network Rail intends to deliver savings from achieving higher efficiency on a function by function basis, and reduction in the complexity of inter-functional processes.

3.3.2 Investing to reduce costs

This section outlines a number of key strategies Network Rail is implementing to deliver significant cost savings in CP5 and beyond.

Operating strategy

Network Rail has identified an opportunity to reduce its annual operating costs by an additional £250 million beyond that which current asset policies and improvement initiatives would achieve; and deliver significantly improved outputs. The operating strategy seeks to reduce the frontline operations workforce of 5,600 to less than 1,000 by migrating operational management from over 800 disparate locations to 14 modern operating centres covering both the current signalling and control functions and to deploy modern control systems to enable the rail industry to optimise the use of the current network and maximise revenue and value.

Network Rail plans to migrate roles to the new operating centres over a 15 year period in order to manage the levels of redundancies to a minimum through staff retirements, leavers and utilisation of staff at other locations where possible.

Bringing the operational roles together in a central location within the routes also provides the opportunity to build upon the benefits previously realised through the creation of the integrated control centres. Where a train operator is not currently co-located with Network Rail, the operating strategy will seek to bring together both sets of staff to enhance joint operational decision making. By doing so the industry expects to see an improved relationship with train operators becoming more attuned to their requirements and improve customer service.

Enabling elements of the operating strategy have been deployed in CP4 proving the capability to accelerate renewal investments to successfully reduce operating costs. Network Rail plans to invest £890 million (£676 million in signalling renewals and the remainder for initiatives such as operating centres and system development) in CP5 to realise an accelerated reduction of more than 1,400 Signaller, Operations Manager, Local Operations Manager and Signalling Supervising Manager posts. In 15 years the strategy aims to reduce these posts further to fewer than 1,000 operational roles, consolidating control of 89 per cent of the network into the new operating centres.

Asset information strategy

As an asset intensive business Network Rail's effectiveness is in part determined by its understanding of its asset base: What assets it owns; where they are; what condition they are in; how well they are performing; how they are being utilised and how they perform when combined as a system. Although much of this information is currently available, the number of disparate systems currently being maintained makes data integration across systems challenging. This can result in an inability to obtain a fully rounded understanding of the issues described above. To assess these challenges Network Rail has developed a comprehensive asset information strategy, primarily focussed on process change and data improvement and building on a number of existing core systems – for example Network Rail's maintenance management system (Ellipse). The strategy will commence delivering benefits in early CP5 and is designed to provide:

- improved asset information to support strategic business planning (for improved alignment of infrastructure capability supply to demand);
- improved asset information to support implementation of Network Rail's asset management strategy and support whole life cost optimisation;
- improved availability of asset information to enable a more effective response to operational incidents (reduced delay minutes and improved end customer satisfaction);
- improved asset/network capability information available to enhance operational planning and delivery, particularly during periods where infrastructure outage has reduced availability, capacity or capability;
- increased field workforce effectiveness (lower unit cost of work, safer working); and
- an ability to meet external stakeholder (including EU, ORR and RDG requirements and recommendations) demand for improved quality of asset information.

The project is currently expected to cost around £180 million in CP5 and £40 million in Control Period 6 (CP6, 2019 – 2024) with financial benefits of around £270 million achievable in CP5. By the start of CP6 annual benefits of the order of £130 million are expected to be delivered by this initiative.

Intelligent infrastructure

Network Rail has successfully implemented a regime of remote condition monitoring in CP4, enabling it to understand better the drivers for asset degradation/failure and intervene before individual assets fail. Network Rail intends to continue with this initiative in CP5 as part of a longer term strategy to improve asset performance and maintenance efficiency. Incremental benefit will be delivered through savings in maintenance operating costs and reduced delays. These benefits will be delivered in part by allowing for a migration from a frequency based scheduled maintenance regime to maintaining assets based on their condition as measured by remote condition monitoring devices. The programme includes equipment that is located on rolling stock to measure the condition of fixed infrastructure, and vice versa.

Electrification

Further electrification of the network meets many industry objectives. Industry costs will be reduced particularly if electrification is carried out in conjunction with a programme of phased rolling stock replacement.

There are a number of generic changes to costs which apply when electrification permits a change of traction of a service from diesel to electric. The potential savings

can be categorised as reductions in rolling stock operating costs (including fuel), infrastructure operating costs, increases in rolling stock availability rates, extensions to vehicle life and reduction in the capital costs of new vehicles.

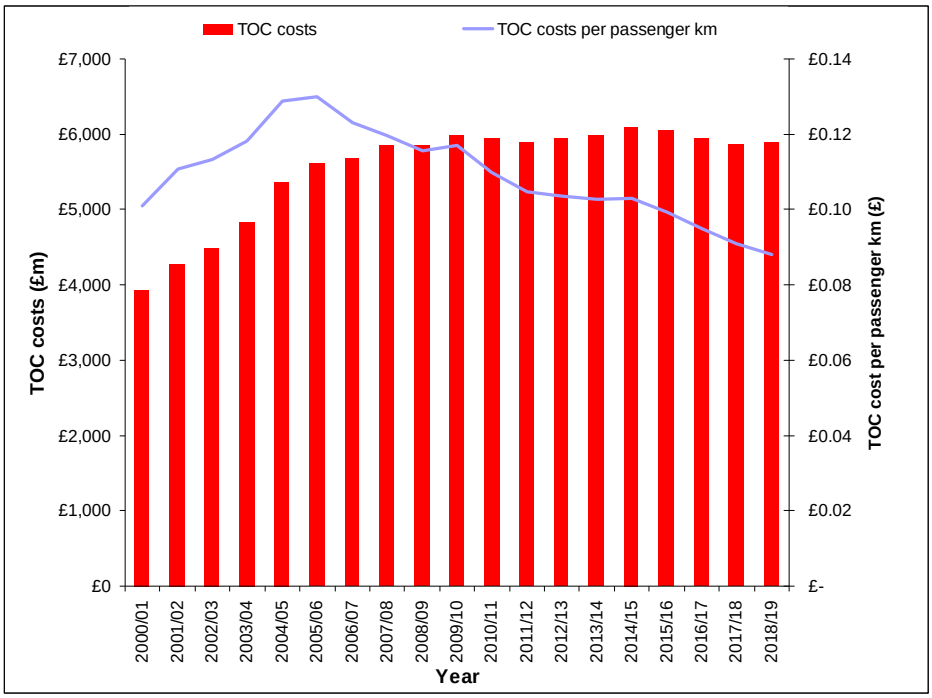
Electrification will improve the product offered to customers, increase revenue, accommodate growth, provide a more environmentally friendly product, reduce reliance on potentially insecure energy sources and comply with changing environmental legislation.

3.4 Passenger train operator's plans to improve value for money

Funders drive value for money from passenger train operators primarily through franchising - a highly competitive process which has attracted the involvement of companies with strong track records in cost efficiency (such as bus operations). Within the constraints of structural, commercial and policy framework for rail, bidders demonstrate value against specifications set out by the tendering authority.

Train operator costs per passenger kilometre (excluding access charges) have overall fallen slightly since privatisation, and have declined in real terms since 2005/06. [16] In addition, train utilisation (average loading calculated as passenger kilometres per train kilometre) has risen by 24 per cent[17]. Benchmarking indicates that train operator costs per train kilometre are slightly lower than those of comparator railways in other European countries[18]. Continued train operator led RVfM improvement (both cost and revenue) against clients' specifications is already embedded in existing franchise commitments (reflected in train operator payment lines to/from DfT). This can be seen in forecast trends of train operators' costs and costs per passenger kilometre to 2013/14.

Figure 10: train operator costs – actual and projected



[16] ATOC operator analysis

[17] Realising the potential of GB Rail, Final Independent Report of the Rail Value for Money study, Detailed Report, Pages 13 - 19, DfT and ORR, May 2011

[18] Realising the potential of GB Rail, Final Independent Report of the Rail Value for Money study, Detailed Report, Page 38, DfT and ORR, May 2011

At the point of franchising, train operator premium or subsidy lines take into account the best view available of the potential to drive value for money through innovation, business development and efficiency. Over the duration of franchises, there will be further potential opportunities to derive additional benefit from a number of areas, including industry reform and closer working with Network Rail, better techniques for energy efficiency, improved approaches to revenue protection and yield management and responding to new demand. These need to be properly incentivised, while recognising that their cumulative impact on overall industry affordability is likely to be incremental rather than a discrete step change.

Additional value from such initiatives to the taxpayer (i.e. through less subsidy or more premium) will be captured at franchise re-let. Seven franchises are firmly planned by DfT to re-start by July 2014 (i.e. start of CP5) – West Coast, Greater Western, East Coast, Essex Thameside, South Eastern, Thameslink (short) and Greater Anglia (long). Re-lets are also an opportunity to capture train operator/ROSCO savings in areas highlighted by the RVfM study, discussed below.

The work underpinning the RVfM study assumed that, out of the study's estimate of total indicative industry savings which could be realised by 2018/19, train operators/ROSCOs could account for £573 million (low case estimate of savings) to £666 million (high case estimate of savings). It is understood that this was based on savings in the following areas:

- delivering franchise outputs through changes to franchising parameters such as longer franchises with residual value mechanisms and changes to the revenue sharing regime;
- staff efficiencies, including;
  - wider implementation of Driver Only Operation (DOO);
  - changes to ticket retailing involving greater use of automation and, where appropriate, reduced ticket office hours or available windows;
  - reducing station staff dispatch through automated train doors and other operational improvements; and
  - greater flexibility in staff terms and conditions to improve efficiency of operation.
- standards and innovation including the development of lighter, more track friendly trains and changes to rolling stock procurement; and
- revenue generation through investment in car parking facilities at stations and additional ticket gates.

In addition to these areas of potential savings, the RVfM study highlighted that train utilisation (defined as passenger kilometres per train kilometre) is lower than for the comparator railways in the RVfM study. In practice this reflects a range of factors concerning the size and shape of railway in Great Britain, including highly directional peak services and more frequent trains. The latter point was recognised by the RVfM study, which reports the Passenger Focus 2009 report showing that "most of Britain's passengers seem better served than other European passengers by the number and times of trains available". Nevertheless, the RVfM study estimates that "a 5 per cent improvement in train utilisation could represent a productivity improvement which the report estimated might be worth some £500 –700 million annually against costs of future growth."[19] As noted above, train utilisation has already improved very

[19] Realising the potential of GB Rail, Final Independent Report of the Rail Value for Money study, Detailed Report, Page 45, DfT and ORR, May 2011

significantly since privatisation (a 24 per cent increase in passenger km per train km) and the potential further improvement needs to be viewed in this context.

Further work is needed to validate more precisely these indicative estimates of train operator and ROSCO savings and to identify specific measures to realise the gains. The separate RVfM study suggestion concerning train utilisation particularly needs to be examined carefully, which RDG is already pursuing, including in particular the cost saving estimated to arise from it.

It should also be noted that some of the proposals in the IIP have the potential to build in additional elements of costs, particularly initially, albeit for desirable objectives sought by funders. An example of this is the customer information strategy, set out in Chapter 8, which focuses on delivering improved information, particularly during service disruption. However, this initiative, together with several other proposals relating to, for example, station improvements and asset management strategies to reduce whole life costs, will support the growth of the industry and facilitate the long term reduction of unit costs. The start up costs of these initiatives need to be taken into account in assessing the feasibility of achieving the RVfM study forecasts.

The nature of the savings identified by the RVfM study are such that even the RVfM study's indicative low end estimate of £573 million from train operators/ROSCOs by 2018/19 is heavily dependent on decisions which are for DfT to make and which could change the regulatory and commercial framework in which train companies operate. These include measures to deliver:

- deep and wide implementation of franchise reform on "horses for courses" basis, including:
  - longer franchises, strengthening both the ability and incentives to pursue staff productivity gains (Area H of the RVfM Study), build strong train operator relationships with suppliers (Areas E1 & F), and build up train operator capacity to play an enhanced role in strategy and projects (Areas A, B, C and E2);
  - more flexible franchises with less detailed prescription of the service specification and how this is delivered allowing service levels to be better tailored to demand and encourage more innovation at bid stage (Areas A, D, E1 +2 and F);
  - improved risk sharing (e.g. ending the cap and collar regime), helping to improve incentives to train operators to grow revenue (Area D); and
  - National Rail Franchise Terms changes (e.g. on force majeure) supporting other reforms to help pursue staff productivity gains (Area H).
- a more conducive environment for Network Rail / train operator alliancing: for example an improved incentive regime (such as efficiency benefit sharing as proposed by ORR) has important role to play here (Areas B, C, E1 and F);
- fares regulation: A satisfactory outcome to the DfT review both of future fares regulation (considering both the RPI+X regime in general and specific issues such as treatment of long distance off peak tickets) and of smart ticketing opportunities, which together are key to revenue generation and asset management (Areas D and E1); and
- The Regulatory Agreement on Fares and Ticketing (RAFT): The opportunity to replace an out of date Ticketing and Settlement Agreement key to realising savings in retail costs (Area H).

Facilitating the RVfM study changes will be further helped by:

- government adopting best practice approaches to the procurement of franchises that fully reflect quality and bidder proposed alternatives, and not simply up front cost. Such a broader approach to procurement, involving early supplier involvement, was recommended in the RVfM study and is also very much in line with RIA members' recommended approach; and
- improved mechanisms for variations in the terms of franchise agreements to allow operators to adapt to circumstances and to introduce improvements to the way in which services are delivered. Such an approach would facilitate train operators to develop cost efficient, revenue generative and innovative solutions for the delivering a better railway at reduced cost to the taxpayer. Owner groups remain ready to work with DfT in this area.

For the purposes of IIP, it has been assumed that the DfT makes the decisions outlined above to create an environment which enables train operators to contribute towards industry cost savings consistent with the RVfM study low indicative estimate.

3.5 Rail freight

There are opportunities, as indentified in the RVfM study, to improve the value for money of the rail freight sector. The industry will examine opportunities including:

- reviewing operating flexibility in the context of rigid passenger timetables;
- reviewing operations during the periods of peak passenger operation around London;
- maximising the length of each train so as to move a given volume of freight in the least number of network paths;
- relinquishing unused paths, although the RVfM study acknowledges the need for strategic freight capacity and flexibility in freight path provision to accommodate the diversions required by engineering work and the volatile nature of the freight market;
- supporting reform of industry processes to accelerate changes to capacity allocation and network capability;
- amending operating practices to minimise the impact of freight trains on low volume/low maintenance branch lines; and
- agreeing to the removal of freight capability on some route where there is no prospect of freight activity and which can be downgraded to accommodate light weight passenger trains with commensurate savings in track maintenance and renewal costs.

3.6 The supply industry

The rail industry supply chain plays an important role in delivering improved value for money and will continue to do so in the future. In addition to much of the material used in managing and renewing fixed infrastructure and rolling stock, a great deal of technology and expertise is provided by the industry's suppliers. The rail industry is committed to working with its suppliers to seek out further opportunities to improve the value of the rail services provided.

In 2008, following the publication of the Network Rail Strategic Business Plan (SBP), the Railway Industry Association (RIA) carried out an intensive series of discussions across the industry concerning the content and direction of this plan. Issues considered included Network Rail's efficiency assumptions and the deliverability considerations of Network Rail's plan and input price assumptions.

For CP5 additional benefit can be delivered if the process is brought forward. At a joint Network Rail / RIA conference held in July 2011 key messages from suppliers present included:

- the need to embrace more fundamentally the concept of identifying and implementing minimum whole life cost solutions. Opportunities identified included changes to tender assessment methodologies, a relaxation of tender and project specifications to improve innovation opportunities, and ensuring that minimum whole life cost considerations are embedded in remits during the early project development stages;
- the considerable benefits arising from workload continuity (including across control periods, where hiatus has occurred in the past) and visibility in helping drive down costs; and
- the rail industry should accelerate the introduction of standard products and processes and increase use of best practice from elsewhere. Although rail has its complexities it is perhaps not as different from other industries as has been the view from within the industry in the past.

Network Rail welcomed and accepted these challenges and acknowledged that there are opportunities to improve how each of these issues is currently addressed. Network Rail and RIA are building on this workshop through a variety of mechanisms to provide an input to the SBP, using in part the framework adopted for the CP4 exercise and with particular reference to the points raised at this workshop, including:

- asset based supplier working groups to be convened later in 2011, with Network Rail participation as required;
- a joint steering committee with representatives from across the supply chain to provide inputs to these groups, producing a non-exhaustive list of questions for each working group to address, and providing consistency but without preventing individual groups from considering other issues which may be important to their asset; and
- encouraging bilateral dialogue between Network Rail and individual suppliers where commercial confidentiality considerations dictate.

Supply chain representatives have emphasised the better outcomes which they believe will result from suppliers being given the opportunity to provide an early input into the planning process rather than, as in the past, an opportunity to comment on plans already well developed.

3.7 The Rail Delivery Group's plans to improve Value for Money

A principal recommendation from the RVfM study was that the rail industry should create a Rail Delivery Group (RDG) to provide leadership to the industry. Following its creation in May 2011 the RDG, comprising the Chief Executives of the passenger and freight train owning groups and Network Rail published its terms of reference. These emphasise the role of the group in leading on cross or whole industry issues. The RDG has been reviewing the RVfM study recommendations and has decided to pursue the following priorities.

3.7.1 Establishing leadership and credibility through behaviour, communication and demonstrating progress with other priorities.

The RDG's particular focus will be on cross-industry issues. By listening and giving guidance to the various cross-industry bodies involved in planning, technology, safety and standards RDG can harness additional resources to achieve its objectives.

The RDG enjoys a position of leadership in the rail industry by virtue of its membership. Preserving that status will be a function of engendering the confidence that comes with accomplishment. Leadership that is recognised in the wider community must be earned. The RDG believes that will be done only by delivering on its initial agenda. As the RDG pursues its initial agenda, which is largely framed by the RVfM study, the group also believes that it must articulate how its work benefits passengers, freight shippers and the public more generally.

Although the RDG will have a focus on cross-industry issues and delivering the efficiencies identified by the RVfM study it may, in time, play a wider role. The RDG will respond to the need to provide compelling leadership that inspires a unity of purpose in the industry in which the many industry parties recognise that more can be achieved acting together than acting alone.

3.7.2 Asset, programme and supply chain management

These are the areas with the greatest savings identified in the RVfM study and are consequently of highest priority in the RDG's initial efforts. Most of the savings accrue to Network Rail but the RDG's view is that many are neglected because of industry structure and focus. Although asset management, programme management and supply chain management are separate and shall have to be subdivided even further for practical analysis, too many of the shortcomings from the past involve the same issues: the absence of collaborative planning, information management, a commercial focus and capital discipline within the industry.

Although the savings associated with rolling stock are being addressed in separate work streams, rolling stock issues that affect whole industry programme management or infrastructure asset management strategy are expected to be in scope.

3.7.3 Revised form of commercial agreements to include a summary of the problems created by the existing contractual structure and the barriers to improving efficiency

A new contract between government and the rail industry is the key to a better, more affordable railway. At the heart of this approach should be a more mature commercial relationship between the key players, based on a stronger sense of trust and common purpose.

This means that government should focus on setting demanding, high level goals for the industry and creating the framework in which the key players are incentivised to achieve those goals. Industry's role should be to commit to improvements and to innovate (working closer together where appropriate) in delivering those commitments.

This contract should include two important new elements – a smarter approach to the franchises between government and train operators, and stronger partnerships between Network Rail and train operators which foster greater and more effective joint working. The industry is keen to work with government to develop and implement this changed approach.

3.7.4 Embracing technology and innovation

The RDG has observed the effect of new technology in other industries, other transport modes and other railways. The technology covers all aspects of rail activity from operations to maintenance and from control to retail. Advances in mobile communications, the use of new materials and the adoption of new systems and working techniques have all affected travel and transportation.

The RDG is examining the effect of applying new technology in the rail industry, the impact on service quality and passenger and freight shipper demand. The work will look at the blockages to implementing new technology and the consequences for existing industry structures and resources.

The industry recognises the importance of its people in delivering to its customers. The industry also recognises the relevance of people costs to the overall costs of the industry, given that they represent around one third of the industry's expenditure.

Whilst relationships with staff and their representatives is a matter for individual companies the industry does recognise that recent trends have added to the industry's people costs. In 1996/97 the industry directly employed 81,000 staff in operating the network, by 2008/09 this had increased to 92,000. Over the same period average earnings in the rail industry have risen at a faster rate than average earnings across-industry as a whole.

The industry acknowledges that the costs of the industry are driven by many factors of which the people costs are only one part. There must, however, be meaningful dialogue between employers and employees if greater efficiency is to be achieved in the people area as well as all other facets of the industry.

3.7.5 Passenger information

Improving passenger information is a key priority for the industry. RDG recognises the importance of accurate and timely passenger information and the industry describes its plans to improve this in Chapter 8.

3.7.6 Train utilisation

Significant differences in train utilisation between Great Britain and mainland Europe were identified in the work by the RVfM study. The study team believed improving train utilisation could deliver significant cost savings. Supporting analysis by the study was limited. RDG is responding to the challenge from the RVfM study to understand more about the issue and to identify whether it will generate cost saving or cost avoidance opportunities. Some initial analysis of train utilisation issues is set out in Chapter 2.

3.7.7 Tackling technical issues and standards and innovation through the possible creation of a Rail Systems Agency

One of the first actions of the RDG was to ask a small group, led by one of its Members, to undertake a quick review of the problems and solutions identified by the RVfM Study, looking specifically at the benefits of creating a Rail Systems Agency (RSA). Its initial findings are that an RSA that primarily drew on the resources of industry members but contained high calibre individuals focused on cross-industry technical issues, innovation and projects would generate significant savings.

3.7.8 Identifying the actions that others must take to enable the industry to improve efficiency

Whilst the Rail Delivery Group is focusing on specific cross-industry priorities to improve efficiency there are areas where action by government and regulatory authorities will be necessary to allow the industry to improve its efficiency. Foremost amongst these are changes to the contractual and commercial arrangements between the industry and the Government and between industry parties but there are a number of other areas for action. These include a clearer view about the responsibilities for regulation, supporting industry in embracing innovation and

providing clarity about its rail and transport policies, how different strands of policy fit together, and how the different levels of policy, objectives strategies and implementation are linked together.

3.7.9 The Rail Delivery Group approach

The RDG has decided to tackle a number of significant cross-industry issues. Neither the issues nor the solutions are simple and establishing permanent cost efficiencies is not something that will be achieved overnight. Part of the group's task will be to establish a timetable for change, assess the value of the proposed efficiencies and identify how those efficiencies will be delivered. This is a considerable task and the RDG will look to draw on all parts of industry to achieve success.

Adding RDG's efforts to those of the individual parts of the industry will enable the industry to create a more efficient and productive railway. There are many barriers to achievement and actions required by those outside the industry, especially government, to enable change. The industry is ready to deliver improvements but others will need to play their part.

3.7.10 Summary

The industry will respond to the challenge posed by the RVfM study to improve efficiency. The RDG and individual parts of the industry are developing proposals to tackle costs and develop greater partnerships between train operators, Network Rail and their supply chains. The RDG is determined to take ownership of key cross-industry initiatives that cannot be delivered without collective action across the industry. Achieving value for money in the industry is not a simple task and will require all parts of the industry, its stakeholders and funders to change. The industry has identified a range of enablers that governments and regulators, in particular, will have to put in place if the efficiency potential is to be fully realised. The industry is confident that it can achieve a level of efficiency consistent with the RVfM study in its low scenario largely through its own initiative providing key enablers are put in place. If further, but wider ranging, enablers are introduced the high efficiency scenario might be within reach but this will require a step change in the degree of cross-industry collaboration.

4 The London and the South East sector

4.1 Strategic importance

London is a leading global city with a population of almost 8 million people and an employment base of 4.7 million. London's economy is highly specialised, with high value financial and business services accounting for 1.7 million jobs, a quarter of all business services employment in the UK, and a third of the national total in financial services. The London economy is of national significance, generating over 20 per cent of the UK's total economic output.

The London and South East rail sector plays a significant role supporting London's economy. Few people live and work in central London, creating a high demand for inwards commuting. Half of all inwards journeys into central London in the morning peak use National Rail for all or part of their journey, including almost all longer distance commuters from outside the Greater London administrative boundary.

The market is therefore well aligned to rail's strengths, that is, moving large volumes of people to and from city centres, including over long distances, in a safe, quick, sustainable and efficient manner. In short, other forms of transport simply can not support the London economy in the way that rail does. For example, central London roads are heavily congested at peak times despite private vehicles having just a 10 per cent share of the inwards commuting market.

The central London economy also provides employment and trade opportunities for residents and businesses located in the towns and cities across the wider South East region (and beyond), whose economic prosperity, in part, depends upon the 'proximity' to London provided by the rail network.

Rail also has an important role to play in other markets within the South East, supporting smaller but growing commuter markets in regional towns and cities such as Chelmsford, Cambridge and Reading, and serving the major airports in and around London.

In most respects London and the South East is the largest sector within the rail industry in England and Wales. The sector accounts for 70 per cent of all rail journeys, almost half of national passenger income, and 50 per cent of passenger vehicle miles in England and Wales are operated by franchised operators within the sector, resourced by 60 per cent of the national rolling stock fleet. The franchised operators in the sector utilise over 40 per cent of the total network in England and Wales, serving over 900 stations.

In summary, this sector represents a significant operation and unsurprisingly the net cost of the sector has a significant bearing on the overall cost of the industry to the taxpayer.

This cost is, in part, determined by the size of the sector's resource base (including rolling stock), which in turn is strongly determined by the 'peakiness' of the central London commuter market. Half of all peak demand is concentrated on the busiest high peak hour, and on average, the level of demand on the fringes of the peak (say between 09:45 and 10:00) is less than a quarter of that at the busiest times.

The requirement to meet both Service Level Commitments and crowding targets is also important in understanding the dynamics and drivers of costs in the sector.

To varying degrees, the costs associated with the peak can be (and are) reduced by intelligent timetable planning, including the “bouncing back” of trains enabling them to resource several inwards journeys.

These resources required to deliver the peak are then used by operators in the sector to serve other peak and off peak markets at marginal cost, either on a commercial basis, or in pursuit of wider objectives, as well as meeting the required service level commitments.

4.2 What users want

The National Passenger Survey highlights that 83 per cent of passengers in the London and South East sector were overall satisfied with their journey (Spring 2011).

Timetable attributes – journey time, connections, and punctuality and reliability – are all rated relatively highly, along with information provision and the handling of requests by station staff. Availability of staff, dealing with delays, toilet facilities on train, facilities for car parking, and value for money received relatively low scores.

Research by Passenger Focus into London and South East passengers’ priorities for improvement consistently rate the fundamental aspects of the train service as the highest priority – a safe, punctual and reliable service, with sufficient capacity (a seat for all but the shortest of journeys), at a price which represents value for money. Some passengers expect trains to operate seven days a week and late into the evening, with replacement bus services being disliked.

The priorities of passengers are closely aligned to the needs of business, although improving access to labour and markets is achieved by improving rail connectivity and journey times.

4.3 Market analysis

The central London commuter market is mature, with 90 per cent of all peak trips made using public transport. Half of these trips use National Rail, which delivers 575,000 passengers into central London every weekday morning. Most of these, 85 per cent, are travelling to their normal place of work. A large proportion of the rest are travelling on employer’s business, a market which is particularly important to long distance main line services.

As a result, the demand for rail services is principally determined by the level of employment in central and inner London. Historically, the market has grown at an average rate of 1.5 per cent to two per cent per year, consistent with central London employment growth. Looking forwards the Mayor’s London Plan predicts longer term employment growth in central and inner London of 27 per cent to 2031, over 600,000 extra jobs, and as a result the strategy for the sector is based upon longer term rail demand growth of 1.3 per cent per year in the peak. Higher rates of commuting growth into central London are expected from areas of the South East outside Greater London, balanced by relatively low growth from within the Greater London area.

Central London is served by a number of main lines, and the spatial distribution of growth will be influenced by the pattern of housing and population development, which will be concentrated in areas including Milton Keynes, Northamptonshire, Cambridgeshire and the M11 corridor, Inner London, the Thames Gateway area, and Ashford in Kent. A further determinant of the spatial pattern of growth will be

locational decisions taken by employers in response to improvements in the transport network like the Crossrail programme.

Over half the market (in terms of passenger kilometres) in London and the South East relates to off peak travel, or commuting into regional centres. This market has historically grown more robustly relative to the central London commuter market, hence the sector as a whole grew on average at 4 per cent per year since the mid 1990s. Further growth is expected in the market, which in part will be driven by the forecast increase in Greater London's population of 1.25 million people to 2031.

Table 12 summarises longer term forecasts for the sector. In addition to external factors such as employment and population growth, these forecasts reflect future rail improvements such as the Crossrail and Thameslink Programmes, which will stimulate further growth in the market.

Table 12: Average annual growth rates in the London and South East sector

	2008/09 to 2013/14 (CP4)	2013/14 to 2018/19 (CP5)	2018/19 to 2023/24 (CP6)	2023/24 to 2028/29 (CP7)	2028/29 to 2033/34 (CP8)
London and South East sector passenger km	2.1 %	2.4 %	2.9 %	1.9 %	2.0 %
London and South East sector revenue (real)	4.1 %	3.9 %	3.8 %	2.8 %	3.0 %

4.4 The current railway

In this section analysis is provided of the outputs of the "current railway". Where the Initial Industry Plan (IIP) refers to the current railway, it is examining a scenario that assumes committed changes to today's railway. In particularl it examines the outputs and costs of a railway that assumes the delivery of Network Rail's Control Period 4 (CP4) enhancements programme, plus the Thameslink and Crossrail programmes, Reading remodelling, committed electrification schemes and the Intercity Express Programme are delivered to planned timescales during Control Period 5 (CP5) but that no new enhancements to the railway are delivered beyond these schemes.

4.4.1 Sector outputs

Train service specification

Train services in the sector are currently specified by the Department for Transport (DfT) through the Service Level Commitments in franchise agreements. These cover the majority of the sector and are developed taking into account the views of stakeholders including Transport for London (TfL). Other arrangements apply for some services, notably the London Overground service for mostly orbital routes which is let by TfL as a concession, and for open access operators.

Performance

Train service performance in the sector has been mixed, with some operators consistently achieving very high levels of performance, and others below average. This variation is partly due to the significant differences in the operational characteristics and traffic mix between routes. Operators on third rail electrified routes suffered from poor performance as a result of poor weather conditions in the most recent two winters, and the IIP includes actions to improve the resilience of the network to such extremes in weather.

Performance forecasts for the current railway are as follows:

	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
PPM %	92.4	92.7	93.0	93.0	93.0	93.0	93.0	93.0
CaSL %	1.9	1.8	1.7	1.8	1.8	1.8	1.8	1.8

Network availability

Industry discussions at the start of CP4 led to the development of "Route Categorisation" proposals which identified priority routes where engineering disruption would be avoided wherever possible. For passenger flows, unless exceptional circumstances make it impractical, passengers will not be transferred onto buses.

It is forecast that the regulatory output targets will be achieved by the end of CP4, and will have delivered considerable reductions in passenger disruption in the context of high volumes of work to enhance the capability of the rail network.

Capacity

The current railway includes commitments which will provide additional capacity for the central London commuter market, including the Crossrail scheme and the Thameslink Programme, together with the subsequent cascade of rolling stock which these two schemes enable allowing longer and in some cases more trains to operate elsewhere on the network. The average peak train loadings delivered by current commitments is assessed in Chapter 2 – "Context".

Despite these commitments, localised incidences of crowding remain and further interventions will be required in CP5 to maintain train loadings within planning standards.

Affordability of the sector

The affordability of the London and South East sector to the taxpayer has been assessed, assuming a simple 'allocation' of national infrastructure costs to the sector[20]. This allocation does not highlight common cost dependencies (for example, where train services within different sectors rely upon the same infrastructure), and the analysis should be interpreted in this context. This assessment also assumes that fares will be increased at an annual rate of RPI plus one per cent, after three initial years of RPI plus three per cent. However, the industry recognises the clear policy choice for funders whether improvements in efficiency are reflected in lower subsidy, or lower fares.

Relative to other sectors, the London and South East sector is starting from a high base. By the end of CP4, on this basis income will cover 87 per cent of allocated costs and the sector will require support of around £600m.

It is anticipated the sector will recover fully its allocated costs by 2017/18, driven principally by delivery of the efficiencies assumed in this plan and continuing growth in the market. By the end of CP5, the sector is expected to deliver a surplus of about £400 million.

This trajectory includes a relatively significant increase in train production costs towards the end of CP5 as a result of the increase in peak central London capacity delivered by existing commitments.

[20] The allocation of infrastructure costs to sectors uses the existing mechanism to determine the allocation of Fixed Track Access Charges

4.5 Strategic options

4.5.1 Fares and pricing

The IIP reflects the decision that regulated fares should rise by of RPI+3 per cent between 2012 – 2014. Beyond that time, improvement in rail industry finances will increase the options open to government, including that of moving from the RPI +1 per cent built into this forecasts to RPI if the industry is successful in delivering the scale of savings identified in the RVfM study.

4.5.2 Growth

The capability of the network and the level of resources in the London and South East sector are defined by the size of the central London peak, a market which is set to continue growing over the longer term. The London and South East Route Utilisation Strategy (RUS) identifies a longer term strategy, covering the period to 2031, to accommodate the anticipated growth.

In aggregate approximately 40 per cent extra peak capacity, if standing space for short trips is included, will be added by existing commitments, providing sufficient capacity for longer term growth on many routes. This capacity is not, however, evenly distributed; for example, one third of the total committed capacity is delivered by the Crossrail scheme on the suburban stopping services into Liverpool Street and Paddington. Furthermore, if only seated capacity is included, the aggregate increase in capacity across the capital is less than 20 per cent, as much of the committed capacity arises as a result of the procurement of high density new trains for the Thameslink and Crossrail programmes.

Taking existing commitments into account, the London and South East RUS identifies a number of further steps which are required to accommodate longer term growth. Some of these further steps (listed below) will require funding in CP5 in order to maintain peak train loadings within planning standards. In aggregate, these steps deliver a further 5 per cent increase in capacity for the central London commuter market. Some of this capacity can be delivered without further capital investment in network capability.

- a new local service running between Stratford and Brimsdown on the West Anglia Lea Valley route;
- additional peak services to Liverpool Street on the Great Eastern route;
- lengthening of peak Southern services to 8 car on the West London Line;
- additional peak services between Redhill / Reigate and Victoria with lengthening to 12 car on this route;
- additional services on the King's Lynn line;
- lengthening of peak services between Caterham, Tattenham Corner and Victoria;
- lengthening of peak services on the London Bridge to Uckfield line;
- lengthening of peak services on the Waterloo to Reading line;
- lengthening of peak services on routes in south east London; and
- lengthening peak services on the Thameside route into Fenchurch Street to 12 car.

Investment in further capacity often has a very strong business case in terms of user and non-user benefits, and the direct contribution to the economy. Even so, these investments are not generally commercially viable without some form of public subsidy.

As demand grows passenger handling capacity constraints at strategic London stations will become more prevalent. The IIP has identified investment choices to deliver congestion relief at important interchange stations in London, namely London Fenchurch Street, Clapham Junction, London Charing Cross, London Victoria, and Wimbledon.

Waterloo station is also becoming increasingly busy due to the continued growth in passenger demand. A number of small scale initiatives are currently planned to respond to this, but it is anticipated that a significant intervention will be required in CP6. The exception to this is on the low number platform side of the station where the lengthening of suburban services in CP4 will increase congestion to potentially unacceptable levels. A small scale intervention is proposed to respond to this developing issue, and it is expected that the additional retail income generated will be sufficient to fund this proposal. If this is not the case, but there is still a need for implementation, additional CP5 funding will be required.

At Heathrow Airport, the Great Western RUS has identified that the lack of rail access, particularly from the west, is a barrier to travel to this important international hub. Both the Great Western and London and South East RUSs recommend that a western rail connection to the airport should be given detailed consideration.

The London and South East RUS also identified the need to further develop schemes for potential delivery in CP6. These include capacity options for the route into London Paddington (post Crossrail), including a potential link to allow services to access the West Coast Main Line.

The London and South East RUS indicates the likely next set of interventions necessary on the North London Line (NLL) and the Gospel Oak to barking (GOB) corridor to be required in CP6, focused on lengthening 6 car services on the NLL. Recent strong growth on the London orbital corridors has prompted the examination of an interim step, lengthening to 5 car services on the NLL and selective lengthening on GOB (potentially interfacing with electrification proposals). The technical feasibility is being investigated by Transport for London and this may result in an additional option for accommodating this continued growth in CP5.

4.5.3 Journey times

The top priorities for commuters in London and the South East are for reliable services and acceptable levels of crowding. Faster journey times are a high priority, although for most passengers this is ranked below reliability and capacity.

Given the congested nature of much of the rail network around London opportunities to reduce journey time will be limited. The IIP only therefore identifies limited journey time reduction proposals in the sector, with a focus on routes where current operations are unnecessarily restrictive for the train types which are in operation. It includes a number of exemplar schemes to deliver better journey times principally on routes east of Ashford in Kent and the East Coastway route from Brighton to Ashford via Hastings.

4.5.4 Performance

The focus of performance improvement in CP5 will be to maintain the general level of performance at the end of CP4 and:

- concentrate performance improvement efforts on those services which suffer from relatively poor performance at present, to move these closer to the average; and
- undertake specific activities to improve the resilience of the network to extreme weather conditions.

5 The Long Distance sector

5.1 Strategic importance

The National Travel Survey (NTS) highlights that long distance trips account for just two per cent of all journeys made within Great Britain across all modes of transport. Despite this fact, long distance trips account for 30 per cent of the total distance travelled across Great Britain, and they therefore make a significant contribution to the external impact of transport in Great Britain.

Of all long distance trips, approximately 150 million are made by rail, suggesting (on average) a 10 per cent market share, although this masks a number of polarised sub-markets in which either rail or car tend to dominate. For example, for long distance journeys to and from central London of up to three hours' rail travel time a market share for rail in excess of 90 per cent is not uncommon.

Unsurprisingly, the long distance market is centred on London – more than one in five of all long distance trips start or finish in the capital, and for long distance commuting the proportion is almost one in three.

The Long Distance rail sector serves passengers travelling for a diverse range of reasons, including:

- long distance leisure travel (e.g. tourism, visiting friends and relatives);
- interurban business travel; and
- longer distance commuting.

Within the sector, over 60 per cent of all passengers are making trips over 50 miles in length, however the sector also provides valuable capacity for shorter distance markets, such as the commuter markets between Reading and central London or between Coventry and Birmingham. This diversity presents challenges in balancing market needs, for example in providing stopping patterns which address the commuter market, whilst offering attractive journey times to the longer distance business and leisure markets.

In respect of its role in serving the business and commuter markets, the Long Distance sector plays an important role in supporting economic growth. It provides fast, frequent connections between London and the regions, delivering benefits to both users and non-users. It also provides a more carbon efficient alternative to road and air travel for longer distance journeys.

5.2 What users want

According to the National Passenger Survey (Autumn 2010), the principal drivers of satisfaction for passengers travelling on Long Distance sector services are train service performance, train cleanliness and the ability to get a seat on the train.

Overall satisfaction in the sector is generally higher than the national average. The sector generally scores highest in most areas of passenger satisfaction, with the exceptions of the value for money, and sufficient seating/standing room, in which the sector lags behind the Regional sector.

Although train service reliability in the sector is generally lower than the London and South East and Regional sectors, measured by Public Performance Measure (PPM),

passenger satisfaction with levels of performance consistently exceed the national average. This may be driven to an extent by the fact that a delay which causes a PPM failure may represent a relatively small proportion of the overall journey time, compared with the shorter distance journeys in the Regional and London and South East sectors. Passengers making long distance journeys can be more affected by significant disruption, such as cancellations and missed connections.

5.3 Market analysis

Since 1994 passenger demand in the Long Distance sector has grown robustly at an average rate of over three per cent per year. This growth has been driven by:

- the link between income growth and the propensity to travel long distances, combined with longer term economic expansion
- train service improvements delivering more punctual, faster, and more frequent services between large cities utilising modern rolling stock
- increasing road congestion and the rising cost of motoring
- airline issues, including an increase in the cost of air travel, congestion at airports, and security related issues
- structural changes in travel patterns increasing the volume of longer distance commuting.

Demand growth in the sector was particularly strong between 2004/05 and 2007/08, during which time passenger kilometres grew by 25 per cent. Demand in the market continued to grow throughout the recession, albeit at a lower rates, before returning to higher rates of growth in 2010/11 with a 6 per cent increase in demand.

Demand is expected to continue growing, driven by economic expansion over the longer term, plus continuation of the favourable, underlying structural changes in the economy and travel markets. Further investment in the sector, including the Intercity Express Programme, will stimulate further growth in the market. The strategy for the sector in the IIP is based upon the longer term growth forecasts in Table 13.

Table 13: Average annual growth rates in the Long Distance sector

	2008/09 to 2013/14 (CP4)	2013/14 to 2018/19 (CP5)	2018/19 to 2023/24 (CP6)	2023/24 to 2028/29 (CP7)	2028/29 to 2033/34 (CP8)
Long distance sector passenger km	3.3 %	2.9 %	2.6 %	2.1 %	2.1 %
Long distance sector revenue (real)	4.0 %	4.5 %	3.6 %	3.0 %	3.0 %

5.4 The current railway

In this section analysis is provided of the outputs of the “current railway”. Where the IIP refers to the current railway, it is examining a scenario that assumes committed changes to today’s railway. In particularly it examines the outputs and costs of a railway that assumes the delivery of Network Rail’s Control Period 4 (CP4, 2009-14) enhancements programme, plus the Thameslink and Crossrail programmes, Reading remodelling, committed electrification schemes and the Intercity Express Programme are delivered to planned timescales during Control Period 5 but that no new enhancements to the railway are delivered beyond these schemes.

5.4.1 Sector outputs

Train service specification

Most train services in the sector are specified by the Department for Transport (DfT) through the service level commitments in the franchises, though some long distance operators also choose to operate additional services beyond this on a commercial basis.

All of the operators in the Long Distance sector are due to have their franchises replaced between now and the end of CP5, providing opportunities for the service specifications to be changed or relaxed as an enabler to improving the overall value for money of the service proposition.

Several open access operators also operate long distance services, principally on the East Coast Main Line.

Performance

Train service performance in the sector has been relatively poor compared with the national average, particularly on the East Coast, West Coast and Great Western main lines. Remedial plans are in place or being developed in each of these areas, with the objective of reaching a position to achieve the end CP4 sector level output targets. The baseline position for the sector is therefore to at least maintain the level of performance reached at the end of CP4.

	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
PPM %	90.9	91.2	91.6	91.2	91.4	91.6	92.0	92.2
CaSL %	4.2	4.0	3.9	4.0	3.9	3.9	3.8	3.7

Network availability

Long Distance services feature peaks which do not always align with those in commuter markets. For example high levels of demand occur on Sunday afternoons on some routes. Weekend closures of long distance main lines therefore tend to impact more on passengers than on routes primarily used by commuters.

In CP4, national regulatory output targets were created to incentivise the industry to minimise disruption to passengers at times when the network is being maintained, renewed and enhanced. Industry discussions at the start of CP4 led to the development of “Route Categorisation” proposals which identified priority routes where engineering disruption would be avoided wherever possible.

It is forecast that the regulatory output targets will be achieved at the end of CP4, having delivered considerable reductions in passenger disruption in the context of high volumes of work to enhance the capability of the rail network.

Capacity

The Long Distance sector is generally in a better position to manage capacity through demand management techniques than the other passenger sectors by offering Advance fares. There are still incidences of overcrowding on most long distance routes at certain times, in connections with peaks such as Friday evenings, special events and holiday seasons, as well as during any incidences of service disruption. The morning and evening peaks are particularly busy where the sector also provides capacity for commuter markets into urban centres such as London, Birmingham, Manchester, Leeds and Bristol.

As demand grows overcrowding on long distance services will become more common unless further interventions are implemented. A number of current

commitments will deliver additional capacity in the sector including the project to lengthen Class 390 trains, the Intercity Express Programme, and revised timetables on the East Coast Main Line, the West Coast Main Line (after completion of the current project at Stafford), and other routes.

The plan assumes that High Speed 2 (HS2) will be implemented. If HS2 does not go ahead, the industry will need to consider other interventions to increase capacity on the existing network beyond CP5.

Affordability of the sector

The affordability of the Long Distance sector to the taxpayer has been assessed, assuming a simple 'allocation' of national infrastructure costs to the sector[21]. This allocation does not highlight common cost dependencies (for example, where train services within different sectors rely upon the same infrastructure), and the analysis should be interpreted in this context. This assessment also assumes that fares will be increased at an annual rate of RPI plus one per cent, after three initial years of RPI plus three per cent. However, the industry recognises the clear policy choice for funders whether improvements in efficiency are reflected in lower subsidy, or lower fares.

Relative to other sectors, the Long Distance sector is starting from a high base. By the end of CP4, income will cover 78 per cent of allocated costs and the sector will require support of around £840 million.

By the end of CP5 the value of support required by the sector is anticipated to fall to £50 million, driven principally by delivery of the efficiencies assumed in this plan and continuing growth in the market. It is anticipated the sector will fully recover its allocated costs by 2019/20.

5.5 Strategic options

5.5.1 Fares and pricing

The IIP reflects the decision that regulated fares should rise by of RPI+3 per cent between 2012 – 2014. Beyond that time, improvement in rail industry finances will increase the options open to government, including that of moving from the RPI +1 per cent built into this forecasts to RPI if the industry is successful in delivering the scale of savings identified in the RVfM study.

Operators in the Long Distance sector have opportunities to manage demand and improve yield by using revenue management techniques similar to those used by the airline industry, and it is assumed that unregulated fares will continue to be optimised on this basis to provide maximum yield per train. Yield management is also used to balance train loadings across individual train services as well as a means of filling empty seats at times of low demand.

5.5.2 Growth

A full solution to long distance north-south capacity can only be achieved through construction of a new line, with enabling work envisaged as commencing in CP5. The schemes in the IIP are designed to maximise capacity on the existing network in advance of this, through introduction of the Intercity Express Programme trains, electrification schemes and targeted upgrades to mitigate key infrastructure

[21] The allocation of infrastructure costs to sectors uses the existing mechanism to determine the allocation of Fixed Track Access Charges

bottlenecks. These schemes only maintain crowding at broadly current levels, with new lines needed as the next step.

The IIP identifies investment choices for CP5 to accommodate the anticipated demand growth in the sector. The key choices for the sector are:

- timetabling and service development delivered through the Intercity Express Programme, including investment to mitigate against congestion at stations resulting from the programme;
- additional capacity on long distance services operating on the Midland Main Line;
- a scheme delivering additional local services between Tamworth and Birmingham to relieve current crowding on longer distance services on the route;
- further network electrification which can also be an enabler of extra capacity; and
- power supply upgrades to support the anticipated level of traffic on the network.

The Intercity Express Programme (IEP) is the DfT led programme to replace the existing fleet of long distance High Speed Trains (HSTs). Within CP4, Network Rail is funded to begin delivery of infrastructure capable of allowing Intercity Express trains up to 260 metres in length to operate on the Great Western Main Line, the East Coast Main Line (including the Kings Lynn via Cambridge route), and specified diversionary routes. This includes changing network capability in areas such as power supply, platform and station works, gauge clearance, and modifications to overhead line equipment.

In addition, DfT has an aspiration for enhanced long distance timetables to operate on the Great Western Main Line and the East Coast Main Line commencing in CP5. The proposed train service specification is still under development by DfT, although it is anticipated that it will specify additional capacity and better journey times necessitating further investment in network capability during CP5. On the Great Western Main Line this is likely to include investment in network capability in the Filton Bank area. The timetables will build upon the additional capacity provided by the remodelling of key pinch points such as Reading on the Great Western Main Line, and at Hitchin, Peterborough and on the London approaches on the East Coast Main Line.

The benefits of a proposed additional platform at Westbury are being examined, including enhanced capacity and operational flexibility. This could assist in the delivery of the proposed IEP service specification and future additional local services. This will be considered as a candidate scheme for CP5, subject to the business case and funding.

The IIP identifies investment choices to accommodate the anticipated growth in passenger demand on the Midland Main Line identified by the East Midlands RUS. Options include investing in network capability to enable longer trains up to a maximum of 11 cars in length to call at stations between London St. Pancras International and Leicester, Nottingham, Derby and Sheffield.

The IIP identifies a further investment choice for CP5 to enhance network capability in the Tamworth area in order to accommodate additional local services between Tamworth and Birmingham New Street. These in turn will relieve crowding on some longer distance services using the corridor. A turnback facility at Tamworth is required to operate these additional local services, which are proposed to link with

the existing Birmingham New Street to Worcester services providing better cross-city journey opportunities.

In the longer term providing substantial capacity increases in this sector can only realistically be achieved through the development of new lines, and the IIP includes early stages of development work on the creation of such a network.

5.5.3 Journey times and connectivity

In general, passenger demand on Long Distance services is relatively responsive to improvements in rail journey time. Schemes delivering better journey times in the sector often represent high value for money (assessed using socio-economic criteria), and are sometimes financially positive.

Some Long Distance operators have expressed a desire to reduce advertised journey times on inter urban flows to stimulate further growth in the market. Some operators have already taken the opportunity to reduce the differentials between the working timetable and the advertised timetable. This does not generally affect the actual journey time or performance of a train (other than slightly changing the performance management focus), however it does allow a shorter journey time to be advertised, albeit with additional pressure on performance.

Analysis of the working timetables on long distance routes has shown that some routes have journey times lengthened considerably by the allowances included for pathing (including junction conflicts), performance, engineering works (speed restrictions), and station dwell times (related to the rolling stock used).

This evidence suggests that there may be opportunities to improve journey times on some routes without expenditure on infrastructure enhancements, however there is no simple, formulaic relationship between reduced journey time and other outputs, and initiatives in this area will require substantial analysis of the overall timetable on a case by case basis to determine whether there are opportunities to be gained.

The IIP identifies a further investment choice for CP5 to deliver better rail connectivity on the cross country network. This choice would see network capability enhanced on the route between Leamington Spa and Coventry enabling diversion of the existing hourly service between Reading and Newcastle via the Coventry corridor. This improves the connectivity of the rail service between the North, East Midlands and Birmingham International Airport by providing direct rail services for the first time. This strategy was recommended by the West Midlands and Chiltern RUS. There is also an option to provide line speed improvements between Bristol Temple Meads and Bridgwater which would enable reduced journey times for Cross Country and Great Western services on the corridor between Bristol and Taunton.

The provision of a new western rail link to Heathrow Airport would provide better long distance journey opportunities by rail to the UK’s busiest airport.

5.5.4 Performance

The industry plans to maintain the high levels of performance of the current railway, and specifically focus on improved resilience of the network to extreme weather conditions. The Long Distance sector has, however, been the poorest performing passenger sector in recent years, both in terms of Public Performance Measure and Cancellations and Significant Lateness. There have been specific infrastructure issues, particularly on the East Coast, West Coast and Great Western Main Lines and plans are being agreed between Network Rail and operators to bring

performance back to the sector level targets in CP4. Even at this level, sector performance will still lag behind that of other operators, and the performance management focus in CP5 will be on moving the Long Distance operators closer to the average.

6 The Regional sector

6.1 Strategic importance

The Regional sector serves a number of different markets, each with different strategic objectives.

Over the last decade there has been substantial growth in the demand for rail commuter services into most regional cities. This growth is linked to the further concentration of employment and economic development in regional city centres, and changes in employment and travel markets favouring rail. Over the last decade, annual demand growth during peak periods of three to four per cent has been typical for cities such as Manchester, Leeds, Birmingham and Cardiff, despite employment levels growing at a lesser rate. The ability of the Regional rail sector to accommodate this growth into city centres is essential to the desired outcome of supporting sustainable economic development outside London.

The Regional sector also provides many interurban journey opportunities which are not provided for by the Long Distance sector (e.g. Leeds to Nottingham, Cardiff to Portsmouth), maximising the range of journey opportunities available on the network as a whole and serving growing business and leisure markets.

The sector also provides local and rural rail services, often on ‘branch lines’, which have also seen robust growth in the market over the last decade. Most of these enable local connections from longer distance services, greatly increasing the overall range of destinations accessible by rail from key cities.

6.2 What users want

According to the National Passenger Survey (Autumn 2010), passengers travelling on Regional sector services experienced a relatively high level of overall satisfaction with their journeys, higher than the national average and considerably higher than the London and South East sector. Over recent years the sector has shown considerable improvement in meeting passenger needs in a number of areas, including punctuality and reliability, provision of sufficient seating and standing room on trains, information provision, and dealing with delays.

Regional services also score higher than other sectors with regard to perceptions of value for money, although the percentage of passengers satisfied in this area remains below 65 per cent. The Regional sector compares poorly against other sectors with regard to passengers’ perceptions of the quality of connections with other transport.

6.3 Market analysis

As described above, the urban commuter rail markets away from London have experienced strong demand growth over the last decade. Even with this recent growth rail’s market share is still relatively low (roundly 5 per cent on average) with most employees (roundly 65 per cent) commuting by car. Rail’s share at the margin is far higher, potentially as high as 30 per cent, reflecting the changing nature of employment in large cities and a trend towards longer distance commuting. This suggests that further growth can be sustained over the longer term.

Between now and 2034 rail’s market share is expected to increase significantly, in the context of a growing market. This will result in a doubling of rail demand over the

period. Some regional cities, such as Sheffield, could see even higher rates of growth over this period, possibly in excess of 150 per cent, albeit from a much lower base.

The strategy for the sector is based upon the longer term growth forecasts in Table 14.

Table 14: Average annual growth rates in the regional sector

	2008/09 to 2013/14 (CP4)	2013/14 to 2018/19 (CP5)	2018/19 to 2023/24 (CP6)	2023/24 to 2028/29 (CP7)	2028/29 to 2033/34 (CP8)
Regional sector passenger km	4.0 %	3.1 %	3.7 %	2.8 %	2.8 %
Regional sector revenue (real)	5.2 %	4.7 %	4.6 %	3.7 %	3.7 %

6.4 The current railway

In this section analysis is provided of the outputs of the "current railway". Where the Initial Industry Plan (IIP) refers to the current railway, it is examining a scenario that assumes committed changes to today's railway. In particularly it examines the outputs and costs of a railway that assumes the delivery of Network Rail's Control Period 4 (CP4, 2009-14) enhancements programme, plus the Thameslink and Crossrail programmes, Reading remodelling, committed electrification schemes and the Intercity Express Programme are delivered to planned timescales during Control Period 5 (CP5) but that no new enhancements to the railway are delivered beyond these schemes.

6.4.1 Sector outputs

Train service specification

Train services in this sector are specified by the Department for Transport through the service level commitments in the franchises. Merseytravel specifies and manages the concession for train services on the electrified network in Liverpool. Passenger Transport Executives and Integrated Transport Authorities are key stakeholders in major conurbations (Greater Manchester, South Yorkshire, West Yorkshire and Tyne and Wear) and will have an important role going forward. All of the DfT franchises are due to be replaced between the publication of this plan and the end of CP5.

In general, train services are fixed for the duration of a franchise, however the franchising authorities can exercise a change mechanism to alter the service specification if necessary.

Performance

The regional sector has recently enjoyed the best level of train service performance on the network, comfortably exceeding the targets set for CP4. It is currently forecast that the regional sector output targets for CP4 will be achieved.

	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
PPM %	92.3	93.0	93.1	93.0	93.1	93.2	93.4	93.5
CaSL %	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2

Network availability

Joint Network Availability plans have been agreed between Network Rail and regional operators, with the objective of addressing the access needs of operators who have a less significant influence on the national network availability metric than those which serve London. CP4 has seen a range of initiatives to change access

planning arrangements and engineering working practices to improve overall network availability, and these have been applied to some of the routes served by operators in the regional sector.

Capacity

The significant growth in the commuter markets served by the regional sector has required the provision of additional capacity, particularly in the northern centres. To date this has mainly been provided by the lengthening of trains often using cascaded rolling stock.

Affordability of the sector

The affordability of the Regional sector in England and Wales to the taxpayer has been assessed, assuming a simple 'allocation' of national infrastructure costs to the sector[22]. This allocation does not highlight common cost dependencies (for example, where train services within different sectors rely upon the same infrastructure), and the analysis should be interpreted in this context. This assessment also assumes that fares will be increased at an annual rate of RPI plus one per cent, after three initial years of RPI plus three per cent. However, the industry recognises the clear policy choice for funders whether improvements in efficiency are reflected in lower subsidy, or lower fares.

Relative to other sectors, the Regional sector in England and Wales is highly subsidised. By the end of CP4, income will cover 36 per cent of allocated costs and the sector will require support of around £1,680 million, about 50 per cent of all rail subsidies in England and Wales.

By the end of CP5 the value of support required by the sector is anticipated to fall to £1,350 million, driven principally by delivery of the efficiencies assumed in this plan and continuing growth in the market.

6.5 Strategic options

6.5.1 Asset utilisation

The Rail Value for Money (RVfM) study presented evidence suggesting that the average number of passengers carried per train on the UK network is relatively low compared with other European railways. In the regional sector there are some rural routes with relatively low load factors, however the train length is normally optimised for the level of traffic carried, with significant usage of one and two car trains on rural services. The main driver of rolling stock costs are the peak flows into the urban centres. The franchising process has encouraged operators to make the most efficient use of rolling stock and train crew resources to deliver the service level commitment. More effective use of resources may be possible if service level commitments were changed or reformulated in future franchise competitions.

The industry plans to undertake further work to better understand the extent to which services (or frequency of services) in the sector are commercially viable, or provide value for money when assessed against wider objectives.

6.5.2 Fares and pricing

The IIP reflects the decision that regulated fares should rise by of RPI+3 per cent between 2012 – 2014. Beyond that time, improvement in rail industry finances will increase the options open to government, including that of moving from the RPI +1

[22] The allocation of infrastructure costs to sectors uses the existing mechanism to determine the allocation of Fixed Track Access Charges

per cent built into this forecasts to RPI if the industry is successful in delivering the scale of savings identified in the RVfM study.

Passenger revenue per passenger kilometre is somewhat lower in the Regional sector than the Long Distance and London and South East sectors, and there may be scope to review fare levels to reduce the subsidy requirement in certain parts of the network, and support the development of business cases for changes to service provision, for example the provision of additional rolling stock where required

6.5.3 Growth

The IIP offers investment choices for CP5 to accommodate the anticipated peak demand growth in the sector. The overall package of capacity proposed for the sector delivers well targeted increases in capacity across regional cities including Birmingham, Leeds, Liverpool, Manchester and Sheffield, plus investment to relieve congestion at Liverpool Central station.

6.5.4 Journey times and connectivity

The IIP proposes investment during CP5 to deliver the Northern Hub. The scheme delivers a significant increase in the number of trains across the north – about 700 extra services every weekday. This improvement will provide quicker and more frequent connections between cities including Leeds, Liverpool, Manchester, Newcastle and Sheffield, supporting and stimulating economic growth across the north, which in turn will support local jobs and businesses. The Northern Hub also delivers major restoration of Manchester Victoria station, creating a modern interchange station for travel across the north.

The IIP also identifies electrification of the North Trans-Pennine route from Manchester to York via Leeds as a strategic investment choice for CP5, a scheme which will contribute to improving rail services across the north. Similarly, electrification of the Cardiff Valleys routes could deliver a step change in rail services.

The desire for improvements in journey times varies significantly between the markets served by the sector. Shorter distance commuters tend to value service frequency over end to end journey time, however there is a potential to provide more attractive journey times on medium distance interurban flows. For example, some key flows in the north of England have relatively uncompetitive journey times compared with road travel, especially in the off peak.

Journey times could be reduced in certain areas by undertaking infrastructure enhancements to increase line speeds or improve the capability of the network by removing junction conflicts or capacity pinch points. Our plan includes options to enable these improvements in those areas where a business case exists. There is also the potential to reduce journey times by considering the opportunities within the existing train plan. This might involve reviewing the allowances including in the timetable planning rules, or consideration of timetable recast to optimise journey times on priority flows. In either case, the potential implications in terms of performance and capacity utilisation would need to be studied in detail so that decisions can be made as to the optimum balance between journey time, performance and network capacity. Chapter 8 describes the line speed improvement schemes which could be captured as journey time reductions for interurban services in the sector.

The IIP identifies two exemplar schemes to deliver journey time improvements between regional cities. Both have been identified through the RUS process in

response to stakeholder concerns. The two schemes cover the routes between Birmingham New Street and Stansted Airport, and between Nottingham and Leeds.

6.5.5 Performance

The industry plans to maintain the high levels of performance of the current railway, and specifically focus on improved resilience of the network to extreme weather conditions.

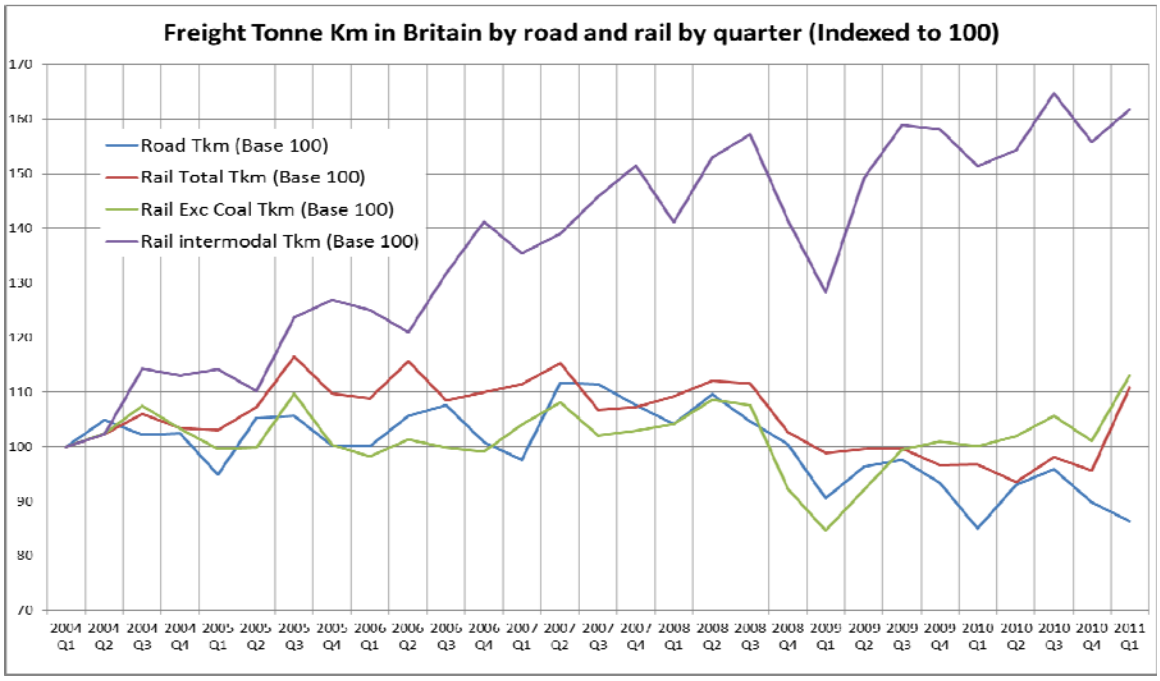
7 The Rail Freight Sector

7.1 Strategic importance

The rail freight industry delivers significant economic and environmental benefits to the British economy. Each year, it directly contributes £870 million to the national output (of which £299 million is attributable to profits and wages), but when indirect and induced effects are taken into account, the total contribution is estimated to be £5,900 million[23]. This supports nearly 67,000 jobs.

Its strategic importance to the national economy is significant:

- around 25 per cent of the electricity consumed in the UK is generated by coal that has been moved by rail. 16 per cent is generated by nuclear power, the spent products from which depend on rail for safe disposal;
- rail moves aggregates and cement into major conurbations to enable developments that in turn enable the economy to grow. In London, over 40 per cent of such raw materials are delivered by rail;
- 28 per cent of all deep sea containers that arrive or depart from the major ports are transported by rail carrying goods including food, clothes, electronic and white goods, raw materials, and chemicals for retailers and manufacturers;
- the rail freight industry has itself invested over £1.5 billion since 1995; and
- whilst the total tonne-kilometres of freight transported by road has declined since 2004, rail freight tonne-kilometres (and intermodal rail freight in particular) have grown as demonstrated in the chart below (source: MDS Transmodal, September 2011).



[23] Source: 'Value and Importance of Rail Freight', Network Rail, July 2010, and quoted in 'Realising the Potential of GB Rail: Final Independent Report of the RVfM study'

In 2010/11 some 19.230 billion tonne kilometres were accounted for by rail freight, representing growth of 48 per cent since the time of rail privatisation in 1994/95. Just prior to the recent recession, rail tonne kilometres reached a total 21,900 billion (2006/07), an increase of 68 per cent since 1994/95. Growth by rail in the intermodal sector has been even stronger with growth of 61 per cent since 2003/4 while road fell by 14 per cent, implying that in mode share terms, intermodal by rail is growing 3.6 per cent per annum faster than road.

On average, the removal of one mile of road freight (a 'lorry mile') generates £0.44 of benefit, taking into account the costs of congestion, accidents, and environmental factors, and net of taxation and rail/water externalities[24].

Rail freight has a vital role to play in tackling climate change and helping the Government to meet its climate change commitments. Transport currently contributes 21 per cent of carbon emissions of which 7 per cent originates from lorries. Given that rail freight produces 76 per cent less carbon dioxide than road freight, it is clear that every tonne of cargo carried by rail rather than road makes a positive contribution towards reaching the targets.

Fewer emissions which directly impact upon people's health are generated by rail freight – for example, less than a tenth of the nitrogen oxide and fine particulates per tonne produced by road transport.

The rail freight industry is making active strides to increase its own environmental credentials still further, through measures such as efficient driving techniques, reducing empty running and longer trains. The latest locomotives introduced over the last couple of years are 10 per cent more efficient than their predecessors. Whilst the currently committed plans for further electrification of the network are unlikely to encourage operators to purchase new electric locomotives, that position is expected to change if a rolling programme of electrification enables more end to end electrification over a greater network of routes used by freight. Electrification of the route between Gospel Oak and Barking (with associated works on the Thameshaven branch and Ripple Lane sidings), the Midland Main Line and, in later control periods, the cross-country route between Felixstowe and Nuneaton would encourage a switch to more electrically hauled freight.

The environmental benefits of such a switch are considerable, reducing emissions by around a further 30 per cent assuming that the energy mix for producing electricity is also decarbonised.

7.2 What customers and potential customers want

In most markets rail operators are competing directly with road operators to move goods around Great Britain. In order to compete, rail must offer a logistics package that can satisfy the individual needs of customers - but at a level of price and service quality at least equal to the road offering.

The users of rail freight range from industrial users such as power station and quarry owners, through steel and car manufacturers, to shipping lines and (increasingly) logistics companies and retailers. The requirements for each customer are different, but all customers want a competitive price together with a reliable and consistent service. Increasingly, as society changes, customers are seeking train services which run across six or seven days a week. The road network is available 24 hours a day,

[24] Source: 'Mode Shift Benefit Values: Technical Report', DfT, April 2009

seven days a week, and lorries can access it at all times. To be able to compete fully, rail must be able to offer an equivalent service.

In order for rail freight to continue to grow, therefore, the rail freight offering must continue to improve. Road's inherent flexibility, coupled with assets that have a shorter life (which in turn enables new technologies to be adopted more easily and quickly) means rail has to become ever more efficient in order to compete effectively.

The RVfM study concluded that rail freight operators had achieved a 32 per cent improvement in staff productivity since 1998/99, and had achieved growth with half the locomotives and two thirds of the wagons employed in the mid-1990s. Going forward, however, even more efficiencies must be achieved.

The needs of users can be divided into strategic requirements and day to day performance requirements, as described below.

7.2.1 Strategic requirements

In July 2007, the then Government published its Rail White Paper 'Delivering a Sustainable Railway'. This document acknowledged the importance to the economy of an efficient and successful rail freight industry, and proposed the establishment of a Strategic Freight Network (SFN) defined as "a core network of trunk freight routes, capable of accommodating more and longer freight trains, with a selective ability to handle wagons with higher axle loads and greater loading gauge, integrated with and complementing the UK's existing mixed traffic network."

This policy was taken forward in the High Level Output Specification (HLOS) accompanying the White Paper with funding of £233 million to be invested in Control Period 4 (CP4 – 2009-2014). In addition to the SFN funding stream, £152 million funding was also allocated for freight schemes in CP4 from the Transport Innovation Fund. This enabled a further £72 million to be leveraged from other sources.

Commitment to the continuing development of the SFN was re-affirmed by the Coalition Government in December 2010, and endorsed further by the McNulty Report which concluded: "The study notes that the development of a SFN remains government policy and believes that this is aligned to the study's recommendations on freight."

The SFN is governed by an industry wide steering group, comprising representatives from the Association of Train Operating Companies (ATOC), DB Schenker, Department for Transport (DfT) , Direct rail Services (DRS), Freightliner, Freight Transport Association, GB Railfreight, Network Rail, Office for Rail Regulation (ORR), Railfreight Group, Transport for London (TfL), Transport Scotland and Welsh Government.

The objectives of the SFN were developed collaboratively by all the key parties in the rail freight industry. These were underpinned by demand forecasts for 2019 and 2030, developed by the industry in 2006, and endorsed by the wider rail freight stakeholder community. Nine core principles or objectives for the ongoing development of the freight network were established. These are set out below.

Objective I - Longer and heavier trains	To optimise path and asset utilisation, the aim is to move towards the operation of longer and/or heavier trains, with the future standard intermodal train becoming 775m long (including a locomotive).
Objective II - Efficient operating characteristics	To aim to achieve more through running of freight trains without the need for looping and recessing, thereby delivering both environmental and journey time improvements.
Objective III - 7-day and 24-hour capability	Increasingly, there is a demand to provide the ability for operators to run trains to suit the requirements of end user customers. More GB distribution networks now operate on a 24 hour, 7 day basis as retail facilities and internet retailing become 'round the clock' businesses. Rail freight aspires to meet this need by operating across more hours of the week, requiring less disruptive track maintenance policies, co-ordinated planning of engineering possessions and the provision, where justified, of diversionary routes with appropriate capability.
Objective IV - W12 loading gauge	All strategic intermodal routes identified as part of the SFN (including appropriate diversionary routes) should offer W10 and W12 loading gauge where there is an economic case to do so, in order to accommodate both short sea and deep sea high cube containers on standard wagons.
Objective V - UIC GB+ (or 'European') gauge freight link	By using HS1, the ability exists to operate European gauge traffic from the Channel Tunnel to Ripple Lane in east London. There is an operator aspiration to provide the ability to convey such traffic, without transhipment, to further destinations in the country.
Objective VI - New freight capacity	New SFN capacity, particularly on key intermodal routes, will be required to meet industry growth forecasts if this additional traffic is not to be forced onto the congested road network.
Objective VII - Electrification of freight routes	To secure diversionary and resilience benefits, and also to provide incentives for the use of electric freight traction (which provides environmental benefits, and can deliver both performance and capacity improvements), the SFN should consider selective strategic and infill electrification as part of an ongoing, rolling programme of electrification schemes.
Objective VIII - Strategic rail freight interchanges and terminals	Accommodating growth and achieving modal shift depends upon the ongoing provision of suitable terminals and interchange facilities, offering the ability to handle both longer and electrically hauled trains.
Objective IX - Strategic freight capacity initiative	The aim of the initiative is to provide a quantum of protected freight paths across the SFN where growth is forecast. Alongside this the industry will develop tighter 'use it or lose it' criteria, in order to optimise the use of capacity and to facilitate competition.

Taken as a whole, the SFN is a long term vision which takes into account predicted demand up to 2030. Some interventions will not need to be delivered until Control Period 6 (2019-2024) or Control Period 7(2024-2029). They will, however, require development, whether this be planning infrastructure changes, or commissioning research into new, more efficient and/or innovative technologies the better to exploit the existing railway. For that reason, the rail freight sector sees a requirement for an ongoing research and development (R&D) capability in CP5, to be used to plan further outputs for the SFN. In principle, such an R&D function could be a ring fenced element of any future SFN Fund for CP5.

7.2.2 Day to day performance

The industry and its customers wish to see measures which encourage improvement in the day to day performance of rail freight - not just in the existing control period, but going on into CP5 and beyond. Performance includes not just punctuality and reliability, but also measures of network availability.

The current Network Rail regulated measures are delay minutes per 100 kilometre and Possession Disruption Index – Freight (PDI-F - which measures the availability of the network by mileage). The industry is not convinced that the current suite of regulatory measures are ideal going forward into CP5 and an enhanced suite of new metrics is being developed.

The complexity of the different logistics chains involved in the various rail freight markets, together with the more directly commercial and competitive customer interface which freight train operators have, render it difficult to construct a specific customer satisfaction metric akin to the survey type measures used in the passenger railway. As a proxy, therefore, it is proposed that, once the suite of existing performance metrics are enhanced, these and other output metrics can be used as an indicator of customer satisfaction.

Rail freight is a competitive market and all rail freight customers have choice – both of rail freight provider or of other modes of transport. In the end customers can – and occasionally do – exercise that choice if the rail freight industry does not deliver the service or product they require. Competition therefore provides incentives on freight operators to maintain and improve customer satisfaction.

7.3 Demand for rail freight

The demand for rail freight has grown since privatisation. From the low point of rail freight demand in 1994/95, when 13 billion tonne kilometres were moved, the industry had grown 48 per cent by 2010/11 when a total of 19.23 billion tonne kilometres were moved. Within this aggregate growth, the mix of commodities moved has also changed. Coal for electricity generation has traditionally formed the largest commodity type moved by rail, but in 2010/11 the intermodal sector (containers) became the largest part of the market for the first time.

Industry demand forecasts have been recently verified by MDS Transmodal on behalf of the Rail Freight Group. The forecasts for 2030 are:

	Rail Tonnes in 2030	Rail Tonne-Kms in 2030
MDS Forecast	176m	43bn
SFN Forecast	179m	45bn

These figures suggest that between 2010 and 2030 there will be growth of approximately 3.5 per cent per annum in tonnes carried, and 4.3per cent in tonne-kilometres.

The rail freight market can be segmented in many different ways, but for the purposes of this document, the market has been split into four major groupings: coal for electricity supply, intermodal, construction, and other.

7.3.1 Fuel for electricity supply

The movement of coal for electricity generation continues to be a major market for rail freight. In 2010/11 it generated the largest amount of tonnes lifted and the second greatest in tonne kilometres. Improvements in coal train efficiency have been driven by operators investing in new rolling stock and running longer trains.

The demand for coal burn, and therefore the movement of coal by rail, fluctuates considerably depending on the price differential between the delivered cost of coal and other forms of power generation. This is outside the control of the rail industry and makes accurate forecasting of the actual usage of the network complex and difficult. Demand for coal burn increased between 2000 and 2006, but, between 2006 and 2011, the price differential frequently favoured other fuels and the amount of coal transported decreased. Concerns over nuclear power since the Fukushima nuclear plant accident and the high price of oil (which drives the price of gas) have since led to an increase in coal burn. The outlook for coal burn remains uncertain and is subject to volatile global influences.

The other major impact on the demand for rail will be the Government's energy policy. The current assumption is that coal power stations that have not fitted Flue Gas Desulphurisation will close by the end of CP5. A Carbon Price Floor (CPF) was announced in the 2011 Budget to provide a greater degree of certainty of carbon prices and to act as an incentive to invest in low carbon electricity generation. This is due to be introduced from April 2013. While it will probably make coal generation less competitive, it remains the case that the underlying demand for coal will be driven by the price differential between the various generating fuels. Additionally, the success of development of carbon capture storage technology (CCS) and whether it is retrofitted at existing power stations will also have an impact on demand.

Therefore the forecast for overall coal demand on rail is that it will reduce with the closure of the plants not fitted with Flue Gas Desulphurisation. Beyond 2015, given the uncertainty in the price differential and government energy policies, the tonnage of coal moved is subject to change but is most unlikely to increase.

Against this backdrop, the 'UK Renewable Energy Roadmap' published in July 2011 by Department of Environment, Food and Rural Affairs (DEFRA) sets out a strategy for accelerating the development of renewable energy sources over the next 10 years. Biomass for electricity generation has the advantage of being a predictable and non-intermittent technology. Currently, capacity is 2.5 Giga Watts (GW) but DEFRA forecast that this could rise by 9 per cent per year to reach 6 GW by 2020. Conversion of coal fuelled power stations to biomass is viewed in the report as offering significant potential and this will also have an impact on rail demand. There is also the potential for other new power stations to be fuelled with biomass and with waste products which are presently sent to landfill; some of these new facilities could be served by rail.

Whilst future energy policy represents a significant volume risk for the UK rail operators in terms of coal, the development of new generation technologies, such as biomass and 'waste to energy', offers opportunity for substitution and even growth in the sector. Generally existing coal burning power stations have sufficient scale to allow them to invest in biomass burn. If this occurs it would have a significant effect on the need for rail paths. The lower calorific value and lower density of biomass compared with coal, means that generators require about 1.5 times as much biomass

as coal to generate the same energy. It is likely that biomass would be imported through the same ports which currently import coal, and this suggests that a strategy which assumes coal or biomass requiring broadly the same capacity across CP5 as today, both in terms of volumes and routeing, is prudent.

There are currently 10 nuclear power stations across England, Scotland and Wales, providing around 16 per cent of the electricity consumed in the UK in 2010 – about 6 per cent of total UK primary energy supplies. On the basis of current plans and as the fleet of stations have grown older, all but one of the existing nuclear power stations will have shut by 2023. As a result the contribution of nuclear power to electricity generation in the UK is in decline at the moment, having produced 30 per cent of all electricity output during the 1990s. Nevertheless, the Government has stated that nuclear generation has a role to play in the national energy mix, but without public subsidy specific to the nuclear industry[25]. It can be expected, therefore, that rail freight will continue to play a part in servicing the nuclear generation sector.

7.3.2 Intermodal

Since privatisation, the intermodal sector has seen strong growth, with rail becoming more competitive over the past few years. Key to this success has been the reduction in variable track access charges in Control Periods 3 and 4, improvements to infrastructure (especially gauge clearance), and the introduction of more competition within the rail sector.

Operators have reduced their unit costs through operating longer trains and pushing other efficiencies throughout the logistics chain. Intermodal is now the largest rail freight market in terms of tonne kilometres. It continued to grow during the recession despite the overall UK freight market contracting.

The intermodal market is in fact three distinct markets: maritime containers, domestic intermodal and Channel Tunnel traffic. As each of these have different drivers of demand and operating characteristics, they are best treated individually.

Maritime

The maritime container market is the movement of containers between UK ports and inland distribution centres. The drivers of the market are a) the share obtained in competition with road haulage (which still moves around 70 per cent of containers); and b) the volume of containers moving into and out of the UK by sea (a function of UK GDP, together with trends in worldwide manufacturing and containerisation of goods).

Volumes by rail are forecast to continue to grow broadly in line with the growth trend of the last 20 years. Both the overall number of containers movements and rail market share are forecast to continue to increase, with circa 40 per cent market share a long term aim. Estimates completed before the recession predicted growth of 6 per cent per year up to 2030. The recession means that achieving the forecast volumes is likely to be delayed by 2-3 years.

Domestic

The domestic container market describes the movement of freight between UK distribution centres. Road currently dominates this market with some 98 per cent market share. At present, rail serves the longer distance flows to/from Scotland. There is an opportunity for this market to grow rapidly from a low base with interest in

[25] Source: Department of Energy and Climate Change

modal shift from the key UK retailers who are already investing in rail linked warehousing at sites such as Daventry and Castle Donington.

More rail linked warehousing (to reduce lorry journeys), the ability to offer a seven day a week service (in line with road hauliers) and paths that enable competition with road timings will all contribute to the growth. The sector was forecast to grow rapidly but the recession and uncertainties in planning policy has meant much of the investment in rail linked distribution sites has not yet commenced. When the economy resumes stronger growth, the forecast is for a return to the pre-recession demand trajectory with a growth rate of 11 per cent per annum in tonnes lifted.

Channel Tunnel

Channel Tunnel traffic is the third part of the intermodal market. The traffic competes predominantly with short sea shipping routes although there is some competition with Eurotunnel's 'Le Shuttle' service and other roll on roll off ferry services. End markets are primarily in south central and eastern Europe although there is some localised competition from ferry services where rail borne cargoes from end markets have been transhipped in Northern France or Zeebrugge.

The costs of traversing the tunnel and other institutional factors have limited the competitiveness of rail against other modes. It is recognised that if these factors are resolved, much higher growth in the market could be achieved. 2010/11 has shown the first notable growth in this traffic for some years with a 21 per cent increase in volumes. If the institutional changes are not made the growth in demand is anticipated to be more limited.

7.3.3 Construction

The tonne kilometres attributable to the movement of construction materials have grown at 4.3 per cent per annum since 2006, with strong growth into London and the South East from the large quarries in the Mendips, Midlands and the Peak Forest areas. Some, but not all, of this growth has been related to the one off impact of the Olympic Games. As a result, the growth rate actually achieved through the recession is stronger than the forecast growth rate of 1.5 per cent per annum across CP5.

If the forecast growth rate continues, by 2030 some 35 per cent more tonnage would be conveyed on the rail network. The competitiveness of rail as a mode for delivery of construction goods to city centres is likely to continue as other available sources of aggregates and cement diminish.

7.3.4 Other

The other commodities, such as metals and oil based products, are not forecast to have as much change in demand as the other markets, and tend to be very dependent on the decisions of a few major customers. While the amount moved by rail fell during the recession, there has been a recovery especially in steel products. The metal sector is forecast to recover to its pre-recession levels but is then predicted to have only modest growth until 2030 reaching 31 million tonnes lifted by that year.

There may, however, potentially be changes in the patterns of steel traffic during this period. UK producer Tata is gaining significant market share in Europe and Thyssen Krupp and Arcelor are growing their shares in the UK steel industry.

There is also a growing recognition in the petroleum sector that the inventory costs and implications of the UK pipeline network are beginning to increase the

attractiveness of rail transportation, and new rail linked fuel terminals (such as the Greenergy facility in Cardiff) have been commissioned to support the growth in sales of fuel through supermarket networks.

7.4 The current railway

In this section analysis is provided of the outputs of the "current railway". Where the Initial Industry Plan (IIP) refers to the current railway, it is examining a scenario that assumes committed changes to today's railway. In particularly it examines the outputs and costs of a railway that assumes the delivery of Network Rail's Control Period 4 (CP4, 2009-2014) enhancements programme, plus the Thameslink and Crossrail programmes, Reading remodelling, committed electrification schemes and the Intercity Express Programme are delivered to planned timescales during CP5 but that no new enhancements to the railway are delivered beyond these schemes.

7.4.1 Outputs

In 2010/11 some 89.9 million tonnes of freight was transported by rail in Great Britain, an increase of 3.1 per cent over 2009/10, requiring the operation of nearly 300,000 freight trains. Movement of freight amounted to 19.23 billion tonne kilometres in 2010/11, a 0.89 per cent increase over the previous year. In 2009/10 (the latest year for which figures are available), the conveyance of freight on rail avoided the need for just over 6½ million lorry journeys.

For the most part, freight trains share tracks with passenger trains. With growth in both these sectors, some parts of the network are becoming increasingly congested, to the point where (in the absence of any interventions to increase capacity) decisions will need to be made as to how best to allocate capacity between competing claims by the various train operators.

The current freight railway is as described in Chapter 3 of the Freight Route Utilisation Strategy[26], enhanced by the following schemes which either have been or will be delivered during the course of CP4:

-
- gauge clearance to W10 of the route from Ipswich to Nuneaton via Ely (supports objective IV of the SFN);
- gauge clearance to W10 of the route from Southampton to Nuneaton via Winchester, Oxford, Leamington Spa and Coventry (supports objective IV of the SFN)[27];
- gauge clearance of the diversionary route from Southampton to Basingstoke via Andover (supports objectives III and IV of the SFN);
- gauge clearance to W12 of the route from Water Orton to Doncaster via Burton upon Trent, Toton and Chesterfield (supports objective IV of the SFN);
- gauge clearance to W12 of the route from London to Peterborough via Hertford North (supports objective IV of the SFN);
- gauge clearance to GB+ in the Dagenham area to enable European gauge freight trains using HS1 to access Ripple Lane (supports objective V of the SFN);
- gauge clearance to W12 on the route from Temple Hirst Junction near Doncaster to Carstairs via Berwick upon Tweed (supports objectives III and IV of the SFN);

[26] Freight Route Utilisation Strategy, Network Rail, March 2007
[27] Since successful completion of this project in February 2011, the proportion of containers conveyed by rail from Southampton has increased from 30% to 36% (source: DP World, August 2011).

- gauge clearance to W10 on the GN/GE Joint Line between Werrington Junction (near Peterborough) and Doncaster Decoy North Junction via Lincoln (supports objectives II, III, IV and VI of the SFN);
- capacity enhancements on the route from Ipswich to Peterborough (supports objectives III and VI of the SFN);
- measures to enable the running of longer aggregates trains from Peak Forest to destinations in London via the Midland Main Line (supports objective I of the SFN);
- measures to enable the running of longer intermodal trains from Felixstowe to destinations via London (supports objective I of the SFN); and
- measures to enable the running of longer intermodal trains from Southampton to Nuneaton on the core route via Oxford (supports objective I of the SFN).

In addition to the CP4 schemes listed above, there are two committed schemes of benefit to freight traffic which will be fully delivered in CP5. These are:

- the Reading remodelling project, which will provide grade separation to reduce conflicts between freight and passenger trains, and allow longer freight trains to be operated (supports objectives I, II and VI of the SFN); and
- electrification of the Great Western Main Line, which if (as expected) includes connections from Acton to Willesden, will be an incremental step towards providing a trunk network of electrified freight routes (supports objective VII of the SFN).

The schemes described above are those which have a significant strategic impact. In addition to these, there have been a considerable number of localised schemes implemented across England, Scotland and Wales which have provided direct benefits to freight operations. These have used funds from sources other than the SFN.

Turning to performance outputs, the Network Rail freight minutes CP4 delay target has not yet been achieved in the first two years of CP4. Network Rail is working to get back on target including developing improvement plans with the freight operators.

On time arrivals, as measured by the Freight Performance Measure (a non-regulated metric), has been steadily improving year on year since 2005/06, albeit with a slight dip in the third and fourth quarters of 2010/11. Around 74 per cent of freight trains are recorded as arriving at destination on time.

It should be noted that this statistic is not comparable with the Public Performance Measure (PPM) used for monitoring the performance of passenger trains, primarily because the ability to achieve ‘right time’ starts for freight trains is heavily influenced by parties and factors outside the control of the rail industry itself. Network Rail and the freight operators are developing alternatives to this measure for CP5.

Network Rail has achieved the PDI-F target in the first two years of CP4 and is forecasting to continue to meet this target at the end of CP4. Network Rail and the freight operators agree that this measure has not been ideal in reflecting the actual impact of track possessions on operators and customers at a local level. All parties are currently developing plans for CP5 using the agreed Joint Network Availability Plan as a base.

7.5 Strategic options

In developing a preferred strategy for CP5, there is a range of policy options to be considered. From ‘doing nothing’ at one end of the spectrum, through making better use of existing assets, to undertaking significant investment at the other end of the spectrum, each option involves a decision about the extent to which rail should cater for the expected growth in demand for freight transport.

7.5.1 Do nothing

If no further initiatives were taken, beyond the currently committed plans, little or no further growth in the key freight markets could be accommodated on the rail network. Modal shift to rail would be halted, if not reversed, with adverse economic and environmental consequences.

7.5.2 Make best use

As acknowledged in the RVfM report, it is important that the industry jointly examines the extent to which the existing network is being efficiently exploited before considering expensive interventions to cater for increased demand.

Most rail freight operates over tracks that it shares with passenger services. Inevitably much of the freight needs to be transported to major population centres; whether this is to carry the goods that the population wish to consume, the construction materials needed for building or the waste which needs to be disposed of, this freight will compete for valuable paths on the network.

Similarly the transport of other vital commodities such as coal inevitably has to pass across the mixed use network as it moves from port or mines to power station.

As demand for both freight and passenger services grows, so do the pressures on the network. Making best and most efficient use of the network whilst accommodating growth entails a number of potential initiatives or trade offs as described below:

Maximise the length of train so as to move a given volume of freight with the fewest possible number of paths

The industry's development of the Strategic Freight Network acknowledges the need to use network capacity efficiently by operating longer and/or heavier trains to accommodate demand (objectives I and VI of SFN).

The established Route Utilisation Strategies (RUSs), including the recently published West Coast Main Line, and London and South East RUSs, have highlighted those routes where track capacity already is (or is likely to become) constrained. They emphasise that one of the first interventions, before adding capacity to the infrastructure itself, is to ensure that trains are running to their maximum practical lengths and trailing weights on the existing infrastructure – but without compromising their end to end journey times, or worsening performance. The intention is to progress towards the operation of standard 775 metre intermodal trains where it is economic to do so, by way (for the most part) of an incremental stage of 640 metre (plus locomotive) given the characteristics and capabilities of most of the current locomotive fleets.

Although generally an efficient way of increasing capacity, train lengthening is not necessarily cost free. It may require loops and sidings to be lengthened, or signal sections or terminals to be altered. Especially for heavier 775 metre trains, there may

be implications on the use of traction, such as the need for more powerful locomotives or for the double heading of trains. In extremis, if heavier trains result in longer point to point journey times, network capacity could actually be eroded.

Longer term, the use of modern electric traction would enable faster acceleration of longer and heavier trains, helping efficient capacity utilisation.

In looking at options to increase capacity for freight during CP5 and beyond, therefore, the industry will need to consider the use of longer and heavier trains, and to ensure that synergies are captured with the evolving programme of electrification. A further potential benefit of migrating towards a strategy of electric traction could be the ability to increase maximum speeds, which in turn could also contribute to maximising the use of existing track capacity. Further research into the opportunities and risks associated with such a strategy is prudent, as there are also potential downside consequences such as the aerodynamic effects on passengers at stations, longer braking distances and greater wear and tear on track.

There may also be a case to explore the potential for running heavier wagons in parts of the bulk traffics sector. At present maximum wagon payloads are determined by maximum axle weights, which in turn are governed by the strength of underline structures such as bridges and track formation.

To accommodate increased wagon payloads, therefore, there is a choice between reinforcing underline structures to accommodate heavier axle loads on the one hand, or designing wagons with more axles on the other. This may also be a subject warranting further research.

Gauge and intermodal wagon usage

Rail freight has benefited from a considerable amount of investment in recent years and it remains a core objective to extend the Strategic Freight Network further (objectives IV and V). Whilst the network of routes gauge cleared to carry 9'6" containers on standard wagons outlined within the SFN strategy is not yet complete, gauge clearance is considerably more extensive than at the beginning of CP4. Gauge clearance schemes enable rail market share to be increased. The Port of Southampton recently announced that following the completion of a gauge cleared route from the port in March 2011, rail market share has increased from 30 per cent to 36 per cent. This is prior to the completion of the gauge cleared route from Water Orton to Doncaster (an ongoing CP4 scheme) and despite the fact that not all sections of the route between Southampton and the West Coast Main Line have a gauge cleared diversionary option.

If, in the 'current railway scenario' no further investment were to be made in gauge clearance, there would be a number of routes where operators could only move containers using less efficient low platform or well wagons, and a number of key routes would lack a gauge cleared diversionary option. As a consequence rail operators would be less flexible and efficient in comparison with road operators, and the ability to accommodate growth (both exogenous and from market share) may be put at risk.

Gauge clearance can be a costly intervention, and there will be a number of flows away from the core trunk routes where the use of low floor wagons will be a cost effective alternative. When the standard wagon fleet becomes due for renewal, it will be sensible to consider whether a proportion of any replacement wagons could or should be designed as low floor vehicles if this is likely to generate a better business

case than further gauge clearance on routes where such clearance is disproportionately costly.

Extended hours of operation

This covers objectives III and VI of the SFN and relates to the operation of freight trains across more days of the week, and over more hours of the day - whilst at the same time ensuring that sufficient engineering access is maintained to provide a safe and reliable railway.

Freight operators believe that extending operations from five to six days a week would increase their ability to carry freight by up to 20 per cent, with a further increase in prospect if a seven day a week service can be achieved. The latter is seen as particularly important in the domestic intermodal market.

Extending operating hours requires a combination of a) more flexible track maintenance practices (such as greater use of single line working); b) the development, where justified by business cases, of appropriate diversionary routes offering comparable capability (gauge, Route Availability etc) to the core route; and c) the development of maintenance and renewal strategies that ensure diversionary routes are open when the core route is closed.

To achieve more weekend services, changes to terminal and port opening hours would have to be co-ordinated and agreed amongst all relevant parties in the supply chain.

Flexible use of capacity

In line with objectives VI and IX of the SFN, as demand for both freight and passenger services grows, there will be an increasing need for the industry to:

- be flexible with requirements to accommodate passenger timetables particularly during peak demand;
- continue current practice of minimising operations during periods of peak passenger operation around London. This recognises that the value of a passenger path at those times almost certainly exceeds that of a freight path;
- consider whether lightly used passenger services can be flexed to accommodate freight. Should a path taken by a lightly used passenger train be given over to a potentially more economically productive freight train? Precedent for such an approach already exists[28]. On routes where the passenger demand is small and/or of low farebox value, calculating the respective trade off values is a valid exercise, and may yield an alternative way to generate freight capacity; and
- where operators find it economic to do so, give careful consideration to alternative routeings for freight trains using highly congested parts of the network. The development of the Felixstowe to Nuneaton cross-country route as an alternative way to cater for growth on the Great Eastern, North London and West Coast Main Line routes is an example of this strategy. A possible further development would be gauge clearance of the route from Syston Junction to Crewe via Stoke-on-Trent, enabling container traffic from

[28] In order to accommodate a weekday freight service to/from Holybourne in Hampshire, a passenger service has to be sacrificed; this is a permanently timetabled plan and not an ad hoc arrangement. However, although the freight service only operates typically once a week, it can nevertheless operate on any day of the week. The passenger service therefore never runs, although it could in theory run on the other four days of the week when the freight service does not operate. However, trying to run the passenger service on non-freight days is felt to be confusing to passengers and staff, and difficult to advertise.

Felixstowe going to the north west to avoid the West Coast Main Line almost entirely.

Re-aligning capability where not needed

The freight operating companies currently have the right to bid for paths on any route on the national network within the published capability constraints. The RVfM report concludes that this may have resulted in some lines being maintained to a capability for which there is no realistic short term or medium term prospect of need. The industry is therefore discussing a list of routes which could offer opportunities for savings in infrastructure maintenance and renewal costs if, for example, they could be converted for use only by lighter weight vehicles.

As part of this workstream, stakeholders will also seek to amend operating practices on those lines where there is a low volume of freight, with a view to optimising maintenance and renewal strategies to fit the level of traffic run.

Further efficiency savings may be identified from working jointly to seek opportunities to reduce the current number of speed restrictions in place because of gauge or axle load restrictions, with the aim of reducing the number of traffic flows which are dependent on exceptional load forms (RT3973s).

Strategic freight capacity

Both objective IX of the SFN, and the RVfM report, highlight the benefits of identifying strategic freight capacity, with a process managed at a national level.

In order to give confidence to the freight operators and their customers to invest in rolling stock, equipment and terminals, and thereby to enable modal shift, there is a need to identify capacity that is available on the rail network for freight. Identifying capacity on key routes will also aid the development of off peak standard hour timetables that make the most efficient use of the capacity available.

Alongside this the industry will develop tighter ‘use it or lose it’ criteria, in order to optimise the use of capacity and to facilitate competition.

It is recognised that a national approach to capacity planning and timetabling is important to ensure a) that capacity of national importance is not surrendered in favour of capacity which meets only local needs and which may have a less strong business case; and b) that pathing is optimised to prevent excessive looping or recessing as freight services traverse different areas of the country – this will help to keep rail freight competitive in terms of both cost[29] and journey time.

7.5.3 Invest for growth

There are strong strategic and environmental arguments for accommodating rail freight growth. The alternative would be to accept the consequences of millions more lorry miles each year on Britain’s already congested road network.

The section above highlights the industry's aspiration to accommodate as much of the potential growth as possible by making the most effective use of the existing network. Nonetheless, analysis suggests that the full potential of growing the rail freight market would remain untapped unless further enhancements are made in order to cater for the demand identified in section 7.3.

[29] Approximately 45 litres of fuel is used every time a diesel freight train is stopped and re-started; keeping freight trains moving saves fuel and reduces carbon outputs.

In the next section, the industry proposes a suite of interventions it considers to be a value for money strategy in CP5.

7.6 A value for money strategy

Rail freight is a success story. It is good for the British economy and it is good for the environment. As the economy reverts to growth, and with the need to tackle the amount of carbon released into the atmosphere, the rail freight industry is both well placed and keen to play its role in helping to deliver that growth by catering for predicted demand in an environmentally friendly way.

At the same time, the rail industry as a whole must become more efficient and affordable, and offer genuine value for money to customer and taxpayer alike. To accommodate growth in rail freight, there will have to be a combination of measures: more effective use of the existing network (as described in section 7.5), coupled with targeted investments which demonstrate a robust business case.

In light of this, the Strategic Freight Network Steering Group (SFNSG) has recommended that a fund be established for CP5 similar to that which has been managed in CP4. It is proposed that the SFNSG will provide governance for the fund. It is intended that the fund will be supplemented where appropriate by European Grants as has been the case in CP4. Key candidate schemes include:

- Felixstowe to Nuneaton capacity enhancements: This provides the network capability to accommodate anticipated growth in intermodal traffic from the port facilities at Felixstowe and Bathside Bay, to terminals in the Midlands, North West, North East and Scotland. In addition, it provides the opportunity to enable diesel-hauled freight that is currently routed via London to these destinations to use the cross-country route instead. This has the potential to offer journey time savings and release capacity both on the congested Great Eastern Main Line for other rail services and also in the London area in connection with the new London Gateway port (Thameshaven). It would be beneficial for the development of freight terminals, such as at Burnaston & Etwall Common, Castle Donington, Corby, and Markham Vale. There may also be spin off benefits for passenger services, including better punctuality and reliability and opportunities to increase service frequencies. This scheme could prove especially attractive in light of the government's decision to suspend improvements to the A14 road. It should also be noted that the rail corridor is one of the priority projects of the EU's TEN-T initiative, which may be a potential source of additional funding;

- Southampton to West Coast Main Line capacity enhancements: This provides the network capability required to accommodate the forecast growth in freight traffic between the terminals at Southampton and the West Midlands/West Coast Main Line. The scheme will also analyse and develop appropriate diversionary options;

- West Coast Main Line (North of Preston) capacity enhancements: This scheme will provide the network capability to accommodate the anticipated growth in both freight and passenger traffic in CP5, over the largely two track section of the West Coast Main Line between Preston and Glasgow; and

- Great Western Main Line W12 gauge clearance: This scheme enhances the loading gauge to W12 on the Great Western Main Line between London and Bristol and Cardiff, including the connection to the West Coast Main Line at Acton, enabling the network to accommodate forecast growth in 9'6

containers on flows from the deep sea ports to the west. Gauge clearance also enables freight terminals to be developed at Colnbrook (near Heathrow Airport) and Avonmouth. An opportunity exists in CP5 to minimise disruption to rail users and deliver this scheme efficiently in conjunction with the electrification of the Great Western Main Line.

The schemes listed above are predominantly driven by the needs of rail freight. Elsewhere in this document are listed proposals for schemes with different drivers, but which nonetheless will deliver either direct or indirect benefits to freight operators.

Experience has shown that there needs to be flexibility within the Strategic Freight Network funding allowance to cater for unexpected changes in demand patterns or policy during the control period, minor research and development projects which offer potential efficiency savings and development of schemes for implementation in later control periods. It is therefore suggested that a small proportion of any funding allowance be earmarked for such purposes.

During CP4, governance of the SFN Fund was provided by the pan-industry steering group described in section 7.2. This has proved to be an effective mechanism, and it is proposed that this arrangement should continue into CP5.

This section of the IIP discusses rail freight at a strategic level. As in CP4, there will be a wide range of local issues that arise from time to time, for which other funding sources will be appropriate.

In putting forward this strategy, it is acknowledged that other stakeholders have a role to play in ensuring that growth can be delivered. These would include, for example, planning authorities and others whose input is needed, and on whom the industry depends, for plans to come to fruition. The domestic intermodal market, for example, will not reach its full potential unless a viable proportion of the proposed inland terminals actually come on stream. The railway industry recognises that it does not have full control over the logistics chain, but that it occupies a pivotal position which strongly influences the behaviour of other parties.

8 Network strategies and plans

This chapter sets out the industry's strategies and plans that apply across the network as to how the industry will improve passengers access to, and the quality of, information, the stations passengers experience, the operation of the network as a system, and its component elements of rolling stock and infrastructure, and the industry employees that will deliver all of this.

8.1 Improving the customer experience

8.1.1 Customer information strategy

Customers rightly expect high quality information before, during and after their journey. The industry recognises that particularly during service disruption the timeliness and consistency of information provision can fail to meet this expectation. The industry's Customer Information Strategy seeks to address this. The strategy is based on delivering the industry's vision for information, developed by the Passenger Information Strategy Group (PISG):

"As an industry we will provide timely, relevant, accurate and consistent information – easily understandable and accessible wherever, whenever and however required – so that all customers can make informed choices about travel plans or assist others to do so."

The strategy will be realised by implementing major changes to systems, processes and staff behaviours.

Customer requirements for information

Customers require appropriate information at each stage of their decision to travel including information in advance of travel, during the journey and after the journey. Information that customers need to plan their journeys should be available to them as far in advance as possible via all sources, including the internet, call centres, travel agents and railway stations. Customers wishing to reserve seats for their journeys, or to make advance purchase bookings, should be able to do so as far in advance as possible, based on the timetable being available 12 months in advance.

Where it is known in advance that journeys will be disrupted, information should be provided to customers proactively, so that they are in a position to re-plan. If a customer chooses to purchase a ticket from the station for travel on the same day, it is reasonable for them to be informed of any disruption and to be advised what alternative course of action might be appropriate. The principal requirement is to ensure that customers are provided with regular information on any delays or other incidents. Such information is communicated primarily by on board information systems or over the public address system, but it is also important that information communicated to passengers on board the train, or available to them, is consistent with, and as up to date as, what they may see on any mobile device.

Following the journey, the customer may have further information requirements, including onward journey information, refunds, compensation claims (if the train is delayed or another problem has occurred) or lost property. Requirements for this information will usually be for static information, but it needs to be available to the customer via all channels and across all media.

The approach

In order to meet these customer requirements a fundamental change to existing processes and systems is required. A new operating model is being developed that establishes a clear structure to the provision of timetable information and the systems that underpin this information.

Staff will be trained to focus on customer requirements. This is relevant not only to frontline staff but all staff involved in the end to end process including train planners, control staff, incident response teams, station and train staff and their managers.

Benefits

Key benefits of the strategy will be:

- customer information that is personalised to the needs of each customer;
- all information consistent across all channels and all media;
- front line staff will be better informed and more empathetic and responsive to customer needs;
- information will reflect the latest controllers' decisions on amended train services;
- real time information will be based on more accurate train location and predicted running data;
- the ability to plan and book journeys earlier, potentially up to a year in advance; and
- improved timetable quality around the 6 monthly timetable change.

Funding

The delivery of the strategy and the target operating model will require significant funding. The current customer information issues reflect a history of under-investment where customer information was largely treated as a by product of operational processes not requiring much major investment in itself.

There is much work to do in updating, replacing and interfacing operation and information systems, introducing cultural change and training programmes. The industry therefore believes that the total package of changes required is likely to require funding support in the region of £200 million to include:

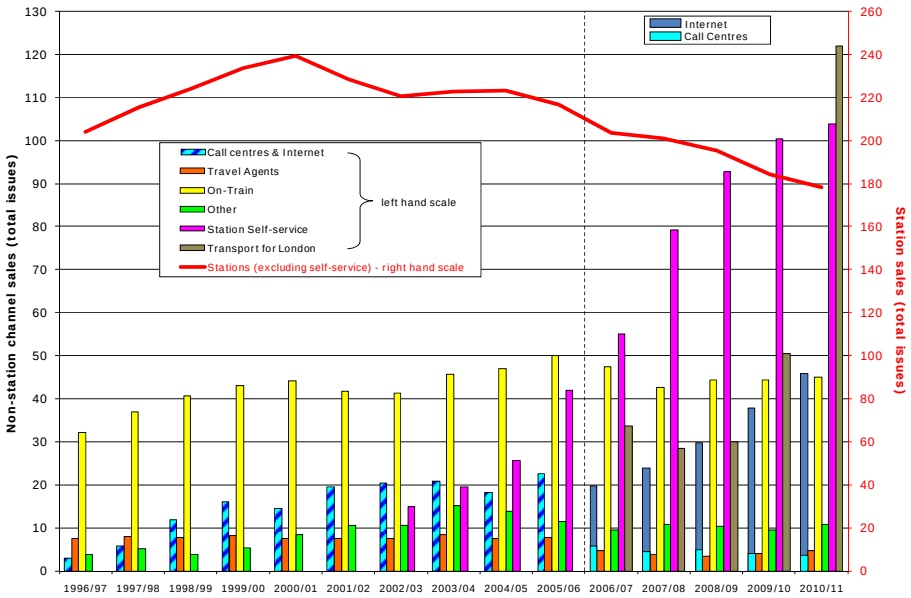
- enhanced detection and prediction of train movements to allow for more accurate and timely information to be shared with customers;
- more information, and of a better quality, on trains through aligning their information sources with the industry's emerging "one consistent source of information";
- enhancing the industry's capabilities to communicate more information about the customer's journey to empower them to make decisions to fulfil their preferences for a better journey experience, e.g. provision of on train services or the availability of seats on a train;
- equipping industry employees with the right tools and processes to communicate better to each other and to customers; and
- developing and initiating the necessary cultural changes within the industry to provide greater empathy with customers that will drive effective communication across the multitude of channels that customers want to utilise.

To ensure that the strategy is implemented successfully, the project and its funding should be delivered with cross-industry oversight and governance.

8.1.2 Ticketing and retailing

Since privatisation, the ways in which passengers buy tickets has changed very substantially, as shown by the chart below. The use of Ticket Vending Machines (TVMs) and of the internet has grown substantially and over the last eighteen months that has been a significant migration to Oyster pay as you go (PAYG) within London. In contrast, sales at stations have declined significantly in absolute terms and very significantly in relative terms. The overall cost of retailing and ticketing remains high (around £380 million per year) with station retailing being the principal cost driver.

Figure 14: Ticket issues by point of sale, excluding ticket reservations (millions), 1996/97 to 2010/11



Other technologies are in the process of being evaluated or trialled with significant potential in some cases include wider roll out of 'Print at home' tickets across the network and for a wider range of tickets, tickets to mobile phones and greater use of smartcards (EMV, ITSO, Oyster).

It is anticipated that these trends towards more automated methods of ticket purchase and provision will continue, making ticket purchasing easier for customers and reducing the cost of retailing. The latter will particularly be the case if train operators are allowed more freedom to make changes to the retailing of tickets through station booking offices, a high cost and declining sales channel. In this latter area initial estimates suggest that £60 million annual savings could be made.

New forms of ticketing may also provide opportunities for more targeted forms of pricing in urban commuting markets with possible benefits in terms of improved demand management. These opportunities are still not fully quantified and will need to be developed as technical and policy options emerge.

In the short term there is a need to focus on improvements to some retail channels, such as TVMs, where passengers and train operators continue to identify further improvements that can make them easier to use, demonstrated by the increase in take up of non-traditional retailing methods.

8.1.3 Stations

A well designed, maintained and operated station supports and enhances the passenger experience of rail services, including the interchange with other modes, encouraging additional trips and supporting shift from other modes of transport. Many stations also provide a broader contribution to the communities in which they reside, supporting economic activity in the station catchment and accessibility to jobs, and cultural and community facilities and activities.

Passenger satisfaction with many features of stations is relatively low, reflecting the fact that the quality of facilities has not kept pace with improvements in the on train environment brought about though new and refurbished rolling stock. Some stations on the network are also likely to become a constraint to growth within the next two Control Periods, as noted in the Network RUS: Stations published in 2011.

Proposals for Control Period 5

To address the passenger satisfaction issues identified in Chapter 2, the focus of station improvement programmes should focus on the general ambience of stations, including the station buildings, facilities such as toilets and signage, as well as levels of lighting and a more “open” architecture, improving personal security. Improvements are also required to parking facilities, which on many routes are a key determinant of the attractiveness of rail services. This means as well as increasing the number of spaces it includes quality improvements such as better lighting and other security measures such as CCTV, improvements to car park ticket vending and gates (building on recent initiatives such as Virgin Trains improvement of parking at several stations, including Preston, Stoke on Trent and Stafford, First Capital Connect at St Albans and National Express East Anglia at Manningtree).

Key to improving the passenger experience at station is the continuation of the National Stations Improvement Programme (NSIP) in Control Period 5 (CP5). In Control Period 4 (CP4) NSIP has targeted improvement in the passenger experience at medium sized stations and will have contributed to the improvement of passenger facilities to almost 250 stations by the end of the control period. NSIP schemes are conceived locally to meet local needs and have often provide for the introduction of waiting rooms, improved shelters and passenger information. In many cases NSIP funding has been able to attract additional third party funds to deliver an extended scope of work and provide an even greater passenger benefit.

The industry continues to work with its funding partners to address accessibility and inclusivity of the network. In CP4 the Access for All Programme has funded the installation of lifts, ramps and footbridges at some stations and is now on track for early delivery and will benefit in excess of 150 stations. The Initial Industry Plan (IIP) includes funding for the continuation of a programme of investment to improve accessibility in CP5. The industry believes that a target of providing step free access to a further five per cent of stations, similar to that being achieved in CP4, represents a sustainable move toward a more accessible and inclusive network overall. This is likely to require a similar level of funding to that provided in CP4. This builds upon the clear evidence within the report into Access for All commissioned by the Department for Transport (DfT) which indicates improved levels of satisfaction and more frequent use of rail services by disabled and non disabled users carrying luggage at these stations.

The Network RUS for stations identified that some stations will become constraints to the growth and success of the network unless specific interventions are made to alleviate the congestion that is emerging at them. Whilst the Route Utilisation

Strategies (RUSs) identified some lower cost techniques for management of congestion and crowding impacts it also identified a number of stations where investment was going to be required to increase capacity. The following stations were recommended for investigation and addressing by end of CP5 including Basingstoke, Bristol Parkway, Clapham Junction, Earlsfield, Liverpool Central, Liverpool Lime Street, London Charing Cross, London Fenchurch Street, London Victoria, Preston, Surbiton, Watford Junction and Wimbledon.

Station stewardship

Network Rail and train operators are working with ORR and the DfT on reform of station leasing arrangements for new franchises. This will progressively see franchisees become wholly responsible for the management of station assets, with the introduction of 99 year fully repairing leases for stations, simplifying the management of the maintenance and enhancement of stations. Consolidating control of stations under a single entity will place the responsibility for decision making at stations with the party closest to the passenger, remove inefficiencies in the current dual management approach and enable improvements to be delivered more quickly.

The arrangement will need to be supplemented by further measures such as a transfer scheme to preserve residual value to support the financing of station renewals and enhancements. There may also be a need to adjust the Station Stewardship Measure, the relevant regulated output, which is based currently on the whole network portfolio, to better reflect the move towards discrete, franchise based station portfolios and the likely emphasis on delivering passenger facing improvements.

8.2 Systems issues

8.2.1 Operations vision

A vision for future operation of the railway is being developed by the industry to support the long term vision for the railway described in Chapter 2. Initial industry discussions have identified key opportunities that would transform the way the railway is operated.

Network Rail has developed a 30 year operating strategy which reduces the cost of the railway through consolidation of operational control into 14 modern rail operating centres. Through centralisation of roles to the new operating centres and co-location of Network Rail and train operating staff, processes can be streamlined which in addition to operating cost benefits will achieve performance and output benefits. This builds upon the benefits already realised through the creation of the integrated control centres.

The operating strategy focuses on the capability to manage the delivery of the day to day network in both normal and disrupted conditions. The management of disruption will be significantly enhanced through the introduction of modern control system technology, improving recovery plans and creating improved communication to the travelling public. Traffic management technology is also critical to increasing spans of control and holistic train regulating decisions, which will help to minimise disruption caused to some of the poorer performing train operators.

The efficiency benefits of the strategy are explained in more detail in Chapter 3 and its financial impact is included in the assessment of the IIP in Chapter 9.

8.2.2 Innovation funding

The IIP includes funding of £150 million in CP5 for an innovation fund. This will provide industry funding to address system wide innovation opportunities which address a specific cross-industry need and is aimed at reducing costs and / or generating revenue. The RVfM study identified the need for such funding and estimated that investment in innovation could generate whole industry benefit cost ratios of between 3.1 and 5.1, with the potential to deliver in excess of £100 million per annum cost savings. It is proposed that cross-industry governance of these funds be provided by the Technical Strategy Leadership Group.

It is proposed that £100 million of the fund would be used to progress development or "demonstrator" projects on key programmes identified by Technical Strategy Leadership Group (TSLG) and £50 million for emerging schemes in CP5. A review is underway to ensure that the activities and expenditure proposed are aligned with and do not duplicate proposals elsewhere in the IIP.

8.2.3 Electrification

The industry published the Network RUS Electrification strategy[30] in 2009. This identified a programme of further network electrification that presents a major opportunity to reduce whole industry costs. Furthermore, electric trains, on average, emit 20 to 30 per cent less carbon than diesel trains, and their superior performance in terms of braking and accelerating can help reduce journey times. In addition, they provide more seats for passengers, making a greater contribution to increasing the overall capacity of the railway. Further electrification can also deliver greater operational flexibility to existing operators of electric trains.

The Department for Transport recently committed to electrify the Great Western Main Line from Maidenhead (the western limit of electrification delivered by the Crossrail programme) to Newbury, Oxford, Bristol Temple Meads and Cardiff Central. This followed a previous commitment to electrify key routes in the north west of England including routes between Liverpool Lime Street and Manchester Victoria and Piccadilly (via the Chat Moss route), Huyton and Wigan, Preston and Blackpool, and Deal Street Junction (near Manchester Victoria) to Euxton Junction.

The detailed development of these schemes is under way, and consideration is now being given to further opportunities to electrify lines of route where there is a strong business case to do so. The IIP proposes that the following electrification schemes should be prioritised for delivery in CP5.

Midland Main Line

The RUS identified the Midland Main Line as a route for which there was likely to be a strong business case for electrification. The southern end of the route (south of Bedford) is already electrified but there is a strong business case for extending the electrification to the north as far as Sheffield. The case remains strong even with High Speed 2 (HS2), giving significant benefits to travellers to and from Nottingham, Derby and Leicester. The core scheme proposes overhead electrification for the Bedford to Sheffield via Derby, Kettering to Corby and Trent Junction to Nottingham sections of route. The case to electrify other sections of the route for operational and diversionary purposes is being examined along with the rolling stock requirements for the route.

[30] http://www.networkrail.co.uk/browse per cent20documents/rus per cent20documents/route per cent20utilisation per cent20strategies/network/working per cent20group per cent204 per cent20- per cent20electrification per cent20strategy/networkrus_electrification.pdf

Gospel Oak to Barking

It has been proposed to electrify the route from Gospel Oak to Woodgrange Park Junction, allowing the London Overground service between Barking and Gospel Oak to be operated by electric trains. Electrification would also provide a new route for operation of through electric freight services from the Thameside area. The business case for this scheme is under development.

North Trans-Pennine

Consideration is being given to the case for the electrification of the North Trans-Pennine routes from Manchester to Leeds via Huddersfield, York and Hull; Temple Hirst Junction to Selby and Northallerton to Middlesbrough. This would enable conversion of North Cross-Pennine services and services from London to Hull and providing diversionary routes from the East Coast Main Line between Doncaster and Colton Junction.

Cardiff Valleys

The case is being developed for the electrification of routes from Cardiff Queen Street to Rhymney, Coryton, Merthyr Tydfil, Aberdare, Treherbert, Radyr (via Ninian Park), Penarth and Barry Island. Discussions are also ongoing with the Welsh Government and DfT regarding the inclusion of the Ebbw Vale branch, the Maesteg branch and the main line from Cardiff to Bridgend.

The case for these schemes is discussed in Chapter 9. Given the strength of the case for electrification, and increasing certainty of the unit costs of delivery from the early schemes, it is anticipated that further schemes identified within the Network RUS: Electrification Strategy as candidate schemes will be developed as part of a rolling programme. This may include schemes such as electrification of Reading to Basingstoke, Walsall to Rugeley or the Chiltern Main Line. It is anticipated that in CP6 this may include consideration of key routes from the ports of Felixstowe and Southampton which would make electric traction a more attractive option to freight operators and key schemes to promote electric traction of cross country services and local passenger services in the West Midlands.

DC to AC conversion

Network Rail is examining a proposal to convert the existing 3rd rail Direct Current (DC) traction system in the South East to Alternating Current (AC) overhead line. The rail network has many thousands more track miles of conductor rail than other countries worldwide. The key benefits could be a reduction in energy usage due to the improved transmission efficiency of overhead line, a reduction in workforce and public safety risk, improved train service performance in severe weather conditions, potential for reduced journey times and reduced track renewal and maintenance costs. If implemented, this would need cross-industry co-ordination due to the infrastructure and rolling cost implications and integration with the proposed rolling programme of electrification.

8.2.4 Interoperability

The purpose of the Interoperability Directive is to allow the safe and unrestricted movement of trains to the required level of performance. It is intended to improve the competitiveness of the EU's railways, by allowing simple and consistent processes for placing trains and infrastructure assets into use and lead over time to a more standardised network. The directive applies to the entire EU railway network, and is supported by a series of Technical Specifications for Interoperability (TSIs) for both High Speed and Conventional rail. Currently, these specifications only cover the TEN-T (Trans European Network –Transport) routes, although work is underway to

extend their scope into a set of specifications covering the entire European rail system.

The DfT is accountable for the adoption of these standards for the GB rail network and has confirmed its commitment to achieving the overall objectives of the Directive, whilst avoiding economically unjustified implementation, and so minimising cost burdens. The DfT's implementation methodology has the following core components:

- developing a business-led migration, with coordinated implementation where necessary, promoting the best return on investment, and a migration of the network infrastructure towards a more homogenous set of routes;
- outlining the approach to addressing these objectives and generating an implementation plan; and
- ongoing refinements to the plan based upon improved evidence and through further harmonisation of standards and equipment.

Once a strategy has been determined DfT will confirm a national implementation plan for either an individual or group of standards. These plans are passed to the European Commission. The first formally notified plan covered the cab radio (GSM-R) programme and the cab signalling (ERTMS) roll out – for which the Cambrian Pilot Project is the first element, see below. This was produced by the National ERTMS Programme team on behalf of the DfT.

Interoperability is most efficiently achieved or built into enhancements when a railway asset is at the design and build stages of its lifecycle. This is why the regulations are currently directed at new build and when major work is taking place. Whilst this approach may minimise the cost of delivering standardisation the timescale to achieve full compliance may be extensive.

It is expected that changes to interoperability scope and EU legislative requirements will increase the range and speed of adoption of technical standards as the rail system is renewed or upgraded, and new assets are built. Additional deadlines for the UK to meet TSI requirements (or other mandated standards through TEN-T legislation) on major routes are also anticipated.

The rail industry in Britain has been actively involved in the consideration of the TSIs and their application for some time. This has included:

- participation in representative groups engaged in drafting activity with the European Rail Agency, and lobbying of legislative elements of their management and application;
- supporting UK representatives at European RISC meetings;
- the assessment on the specification of new rolling stock; and
- issues concerning the application to network enhancements and infrastructure equipment/configuration strategies for routes.

The issues raised by this work are potentially complex, a view reinforced following detailed consideration of the content of the TSIs. In many cases the most appropriate way forward, for Britain or even for the EU as a whole, is not straightforward to determine.

It has been recognised that in some countries there are technical difficulties that would impact significantly on the ability of that country to comply with certain standards or parts of the standards. For example, in Britain the gauge of many tunnels and bridges prevents the blanket adoption of 'European Standard' Rolling Stock Gauge profiles. As a consequence a number of alternative solutions have

been identified, known as Member State-based specific cases. It should however be noted that it is not mandatory to use such specific cases.

Additionally, the directive provides for national exemptions in a limited range of circumstances, for example where there is a poor socio-economic business case for compliance when upgrading the infrastructure. Where these circumstances exist exemptions can be sought from the need to implement an aspect of the TSIs.

There are some technical issues where there is an intent to produce a common standard, but this has not yet been achieved. These are known as Open Points. There are also, naturally, issues that may come up that have not been considered in detail and where a TSI is therefore silent. These are both addressed by the Notified National Rules (some of the measures in the current Group Standard suite) which also provide for the demonstration of compatibility with the legacy (non-TSI conformant) infrastructure and vehicles.

Note that, unless already addressed by a Britain specific case, the intended industry approach in Britain is to adopt the TSIs in full – unless there is demonstrably no business case to do so. For these parts of the network an alternative approach may be proposed for each of the relevant TSI measures, and derogation sought from the European Commission.

The proposed hierarchy of route options is shown in the table below.

	Rationale	Rolling stock	Infrastructure
Fully Compliant Route (no specific case used)	The default position – unless a cost/benefit appraisal indicates that there is not a business case to achieve compliance	All authorised vehicles (i.e. which comply with the rolling stock TSI) can operate on the route.	Compliant with all aspects of the infrastructure TSIs. Compatible with existing rolling stock.
Compliant Route (utilising specific cases)	Where costs of achieving TSI compliance outweigh benefits delivered but specific cases are used.	All authorised vehicles can operate on the route provided that the relevant specific cases have been used. All existing rolling stock can operate on the route.	Infrastructure not fully compliant with all aspects of the TSIs, but specific cases used.
Partially Compliant Route	Progressive migration towards TSI compliance (or compliance utilising specific cases). Some TSIs not yet applied to the route, or some TSI measures not applied at specific locations (by derogation due to economic viability or network compatibility).	All existing and newly authorised vehicles can operate on the route.	Infrastructure-based constraints apply, such as speed restrictions at certain locations.

It is proposed that an infrastructure specification be drawn up for all routes (taking into account rolling stock plans – see below) on the network together with an

indicative timetable for compliance with the specification outlined in the above table. All future work on the route would be in line with this specification.

Network Rail is currently finalising a review of the TSIs that is designed to improve its understanding of the impact of the TSI across the network (including the derogation opportunities as a result of special conditions), compliance options and possible implementation timescales.

Work on the Network RUS: Passenger Rolling Stock Strategy, which published in September 2011, provides an important input into these considerations. The strategy concentrates on the opportunities for efficiencies which arise when purchasing new rolling stock. It considers how planning the rolling stock and infrastructure together can help facilitate a situation where rolling stock which serves a particular market sector can go anywhere on the network it is required.

The RUS recommends that the industry and its funders consider the efficiencies which could result from procurement by reducing the variety of train types that are procured. It recognises that although the reduction in the number of different train types sounds an attractive proposition in theory, it only becomes attractive in practice if the train types match the needs of the market and can operate freely on all parts of the network where they are required. Initial work has suggested that the identification of possible families of trains for various segmentations of the network provide financial benefits that are considerably in excess of the gauge and other infrastructure changes required to deliver the necessary level of operational flexibility. Although further work is required to refine this strategy the identification of high level train specifications and the parts of the network these trains may operate over provides a framework against which interoperability specification and implementation strategies can be developed across the network, in terms of the three levels of compliance identified in the table above.

As work on the TSI option assessment described above progresses it is expected that further dialogue with DfT will take place and more definitive plans for implementing the TSIs can be developed. The outcome of these discussions will be reflected in the SBP and in the Implementation Plans that will be produced for the UK on these sub-systems.

8.2.5 European Rail Traffic Management System

The European Rail Traffic Management System (ERTMS) has been successfully brought into operation on the Cambrian line between Shrewsbury and Aberystwyth and from Machynlleth to Pwllheli. This is a level 2 system which will stop the train automatically before coming into conflict with another train or exceeding a speed limit. The system in Wales includes some features which are as advanced any in the world. The National ERTMS Programme team has reviewed the issues which arose during this installation and drawn a number of conclusions to use in future projects. Further reviews are in hand, both by an internal team and the ORR reporters.

Network Rail has sought to use technology which will deliver the lowest whole life costs. ERTMS level 2 does not require lineside signals and is cheaper to install than conventional resignalling. It is also planned to use an ERTMS platform to develop automatic train operation through the Thameslink core section. Contracts for the development for this have just been let.

Network Rail has now decided that ERTMS should be chosen as one of its recommended methods of resignalling. Significant work has been carried out to demonstrate that the capital costs and the ongoing operation and maintenance costs are cheaper than conventional resignalling. This has involved comparisons with costs elsewhere in the world. The majority of ERTMS installations carried out elsewhere so

far are either on new routes or on key freight corridors, whereas retro-fitment on an existing route has been rare.

The next application of ERTMS will be on the Western Route between Paddington and Bristol. This is required to replace the obsolescent Automatic Train Protection technology and will be installed as well as conventional signals, between 2016 and 2018. It will be followed by the East Coast Main Line between Kings Cross and Doncaster in 2018 – 2020 and then the Midland Main Line between Farringdon/St Pancras and Derby in 2020 - 2022. There are also a number of small schemes to be carried out in association with the main line routes.

In order for ERTMS to operate successfully, the communications system of GSM-R needs to be upgraded so that it can handle larger quantities of data. This may involve changing GSM-R from a circuit switched network to packet switching on certain high train traffic routes.

It is understood that the new IEP, Crossrail and Thameslink trains – the bulk of those being supplied in the next few years – will be fitted with ERTMS from build. For other trains for domestic use only, it will be the buyer's choice whether new trains will be delivered equipped with ERTMS. It is envisaged that the degree of readiness for new trains will depend on the planned date for ERTMS use. For most existing cabs on routes where ERTMS is installed it will be necessary to retro fit the system. The interoperability requirement is that any manufacturers' version of on train equipment should be able to interface with any other manufacturers' version of infrastructure equipment. A suite of contractual tools are being developed to facilitate train fitment; it is likely that this will be via franchise bids and changes to contracts. The decision on the type of on train equipment to fit and how it is done needs to involve both vehicle owners and train operators. The plans for wider national rollout are being developed consistent with a targeted renewal policy and Network Rail's operational strategy and recognising the limitations of fleet fitment in terms of costs and timescales.

8.2.6 Carbon reduction and energy management

Rail is already a low carbon transport mode, offering significant savings over road and aviation for many types of passenger and freight journeys. The industry recognises that there is significant scope to reduce carbon emissions further.

Electrification, combined with Government plans to decarbonise electricity generation, will have a fundamental impact on the carbon intensity of rail services. Further, the proposals under consideration to convert parts of the DC network (3rd rail) to AC (overhead line) may deliver substantial energy efficiency and therefore carbon benefits.

Beyond this the industry needs to focus on becoming more energy and carbon efficient. Key barriers to achieving this include:

- a poor understanding of energy/carbon saving potential and the financial viability of interventions, in part due to slow progress with traction electricity metering and a lack of robust measurement of energy use;
- costs and benefits do not always sit within a single organisation, with cooperation and sharing mechanisms unclear or inefficient;
- carbon and energy having inadequate consideration within the strategic and operational decision making processes; and
- insufficient inclusion of energy and carbon, within approaches to minimise industry whole life costs.

Industry carbon management framework

This framework has been developed by industry and a detailed implementation plan is to be developed. This will unlock the industry's potential to deliver improvements beyond the base plan outlined in this document.

- energy efficiency, hence cost reductions, should be included in franchise contracts, alongside robust measurement and reporting
- an increase in the metering of traction energy by CP5 should be incentivised, through EC4T, to ensure that operators pay for what they use and reap the benefits of efficiency savings
- Network Rail should be incentivised through appropriate financial mechanisms, to reduce electrification system losses efficiently, according to its relative ability to manage the risk
- Whole life energy and cost savings should be included as criteria in investment decisions and project criteria, applied across organisational and franchise boundaries. This suggests we need to explore different project financing assessment models that better take into account consideration of whole life whole system impacts
- a more robust approach to measuring and monitoring carbon emissions should be implemented, covering both traction and non-traction

Metering in particular is a key enabler to achieving greater energy efficiency as it drives energy efficiency at the point of use. A particular focus for the industry is the implementation of on train metering solutions for electric rolling stock, as most train operators currently pay for estimated electricity usage. Network Rail is using a new billing solution that uses operators' metered consumption (taking up this option up so far are Virgin and London Midland). At the current rate of installing meters on trains, the cost of fully rolling out on train meters for all electric rolling stock is estimated to be around £5 million in CP4 and around £15 million in CP5, and there is a fund of approximately £8 million available to part fund installation programmes in CP4. Installing meters on trains is likely to yield a 5 -10 per cent saving in traction electricity consumption from changes in driver behaviour. The current annual bill for traction electricity is about £250 million, which indicates an annual industry saving of between £12 and £25 million. The industry's ambition is to meter as much of the GB fleet as possible by the end of CP5 to realise the potentially significant cost savings.

Supporting energy efficiency

The Carbon Management Framework will help incentivise the industry to efficiently manage its energy use. However a wide range of action needs to be identified, developed and implemented by the industry to deliver the associated benefits. As the owner and operator of railway infrastructure in Great Britain, in particular the electrical supply infrastructure for traction power, and signalling and control systems, Network Rail recognises that it has a critical role to play in facilitating the delivery of energy efficiency.

Network Rail is seeking to develop its role in supporting efficient management and reporting of energy through: providing robust measurement systems for utility

consumption, developing intelligent tools and processes for better analysis of usage; playing its part in delivering energy efficiency improvements; and offering wider energy purchasing services. It will also work with the industry to encourage innovations with the potential to play a critical role in how the industry generates and uses energy in the future.

The prospective implementation and outcome of these proposals will be reflected in the Strategic Business Plan.

8.3 Rolling stock

The passenger network is currently operated by more than 12,000 vehicles, divided into 64 different rolling stock classes. There have been more than 5,000 new vehicles introduced since 1996, and substantial new orders for IEP, Thameslink and Crossrail vehicles are expected in the near future. A large proportion of the fleet, however, is considerably older and a significant priority over coming years is to improve these to help deliver the kind of service quality that industry plans, such as last year's Planning Ahead publication, have identified as a long term aspiration.

The cost of new trains has risen considerably in recent years, reflecting issues such as rapidly increasing commodity costs, higher specifications and the fall in the value of the pound, and these increases seem unlikely to be fully reversed soon although improvements in procurement approach can help partially mitigate them. Passenger rolling stock costs experienced by TOCs, including purchase, leasing and maintenance, are currently in the order of £1.8 billion per year. This represents around 15 per cent of the annual costs of operating the railway as a whole.

Whilst new build vehicles have typically cost between £0.8-1 million per vehicle on average between 1994 and 2007 (and lease prices reflect this), prices are reported now to be in the range of £1 - 2 million per vehicle, depending on specification, and financing costs have risen as well as a result of turbulence in the financial markets. Increases of this size inevitably affect the decision between life extension and new build.

The manufacturers represented by RIA suggest that up to 20 per cent of procurement costs could have been saved between 1988 and 2010 if there had been continuity of orders. In a commercial environment, there is inevitably tension between the manufacturers' aspirations of continuity of orders and procurers' aspirations to maintain competitive tension between suppliers, to reduce costs, itself leading to efficiencies. Nonetheless, the cost savings of continuity of production clearly need to be considered by procurers as part of this process.

8.3.1 Long term strategy

The industry has taken a long term view of future passenger rolling stock and the infrastructure it operates over to establish whether there is potential to plan the interface more effectively. The resulting strategy, The Network RUS Passenger Rolling Stock strategy, is published alongside this document.

Information provided by a number of train manufacturers through RIA, suggests that there are considerable economies of scale to be had from reducing the variety of different rolling stock designs. Based on this information, it is estimated that in the region of £75 million, or eight per cent, of the average procurement cost is spent on non-recurring costs including research and development of bespoke rolling stock. To realise such cost savings the RUS strategy is based on the following key principles:

- move towards a whole industry whole life cost approach in which rolling stock and infrastructure are planned together;
- exploit the economies of scale in procurement wherever feasible;
- meet the needs of each market sector when ordering rolling stock;
- consider those infrastructure works needed to allow the rolling stock to be inter-operable within the market sector it serves; and
- consider the phasing of future rolling stock procurement and infrastructure planning, including the potential for extending the life of existing vehicles where, following market testing, this is the most economic option – particularly in relation to refranchising which will be a key instrument for procuring new vehicles.

Whilst a reduction in the number of train types is attractive in theory, it only becomes attractive in practice if the train types procured match the needs of the market and can operate freely on the network where they are required. With this in mind, the RUS Working Group considered the passenger and operational needs of the main market sectors and concluded that it is sensible to consider five broad categories of train:

- **Type 1 & Type 2:** long distance high speed with a tilt variant;
- **Type 3:** interurban and outer suburban;
- **Type 4:** regional and rural; and
- **Type 5:** inner suburban.

Where train designs within each broad type share common characteristics, such as length and height, they would potentially enable economies of scale to be obtained in the procurement process. Each category could be provided by two or more manufacturers to provide competition, since a significant means of securing value in rolling stock procurement is to encourage manufacturers to compete for orders.

The strategy identifies the infrastructure works that are required to enable inter-operability within a market sector. It looks at where trains of each sector might be expected to operate. Having identified the routes on which the rolling stock will operate, it considers what gauge, platform length, route availability and platform stepping distance issues would need to be considered to ensure inter-operability. It recommends that a gauge is developed which would enable inter-operability between routes, that is to enable trains which serve a particular market to go where required unimpeded by such infrastructure constraints. It takes the current procurement processes for the Intercity Express Programme (IEP), Thameslink and Crossrail as a starting point and concentrates on the remainder of the network.

Whole life and whole system approaches have a key role to play and the industry needs to work to find improved ways of implementing these; this is a key theme in the Network RUS: Passenger Rolling Stock Strategy. There are particularly important opportunities, for example, to:

- review train weight and lateral forces when trains are designed, so as to reduce spending on track renewal where this is the best whole system outcome;
- plan the electrical needs of EMUs, particularly on the 3rd rail system, to ensure that adequate electrical supply is available. This is often a very complex task, not least because of the need to plan grid reinforcement as well; and
- anticipate depot and stabling requirements early on, because these often drive service planning. The need for clear arrangements for funding depot and stabling is covered later on.

Provision of adequate rolling stock of a quantum and quality to suit market demands is a key part of the bidding and operation of a franchise, and franchise reform is potentially a significant way to realise the efficiencies identified in the RUS. This requires that the benefits of planning rolling stock and infrastructure together and the potential economies of scale in rolling stock procurement are considered at an early stage in refranchising. Similarly such benefits should be considered when planning major infrastructure enhancement programmes and in detailed plans for infrastructure asset management.

8.3.2 Control Period 5

This section looks at the specific rolling stock issues for CP5. In addressing this, the approach we have taken is to:

- acknowledge the need to provide Network Rail, manufacturers, suppliers and financiers with a good sense of the long term direction of the industry and possible scale of capital spend, to help guide their own business planning;
- develop an initial view of the allowances that might need to be made in the SOFAs to facilitate this, on the assumption that vehicles continue to be bought and life extended through ROSCOs or, in the case of new builds, similar private sector structures, and
- identify options that promote the normal competitive pressure on ROSCOs and others to offer the best possible terms for life extension, re-leasing or new build, as the case may be.

It is fundamental to securing value for money that train operators, rather than the public sector funders, wherever possible should be in the lead for procuring new trains as they have the commercial skills to buy trains through the procurement process that deliver passenger requirements and secure timely delivery. The precise number and type of vehicles bought, cascaded and refurbished in CP5 as a result of the HLOS should be determined by customer demand, the technical ability to extend rolling stock life at appropriate quality and commercial negotiations led by train operators. A key part of franchise reform should be to open the provision of rolling stock to the competitive tension of the franchising process, to negotiate the best balance between life extension, cascade and new build in each franchise area

Possible fleet numbers

If average fleet age is to be maintained, assuming notional technical lives of 30-35 years, would imply that around 3 per cent of the fleet or 350 to 400 vehicles would be replaced per annum. Amongst the vehicle types potentially falling due for replacement on grounds of age are DMU Class 14x and 150, EMU Classes 313, 314, 315, 317, 318, 507 and 508, and remaining HST and Mark III vehicles, which are in use on a number of long distance routes.

The rate of renewal during CP4 has been lower than this, partly because it has proved possible to operate trains beyond their notional lives and partly because of substantial changes in fleet strategy that have followed the decision to begin an electrification programme.

Although life extension and refurbishment can sometimes be cost effective (with reported capital costs in the range of 5 to 20 per cent of new build costs), this option needs to be set against other factors:

- technical life cannot be extended indefinitely;
- obsolescence of key systems such as IT and control equipment (much of which on new trains is not necessarily designed to last 30-35 years);

- the opportunity that new build offers for maintenance and energy cost saving (particularly from being able to use more modern diesel engines, better transmissions, and modern electric motors/traction packages, the latter offering the opportunity to regenerate electricity which can offer 20 per cent savings on electricity costs);
- new trains can more easily be designed to accelerate faster than older fleets, an increasingly important factor given the push for better journey times and, on busy routes, to use fleets with homogenous technical characteristics in order to maximise capacity;
- the opportunity that new build offers to develop better service patterns or fleet deployments as opposed to simply 'like for like' replacement. For example, new electric trains on the Birmingham and Manchester to Scotland services will release high-acceleration diesels for use elsewhere and provide more capacity;
- the need to progressively equip the fleet with ERTMS equipment, it being cheaper to fit ERTMS when trains are being built than to retrofit it later;
- tightening environmental legislation for diesel engines (especially current EU emissions requirements); and
- the need to make the existing fleet compatible with accessibility requirements PRM-TSI by 2020, which might tip the balance towards faster replacements of older rolling stock.

The industry's electrification plans for CP4 and CP5 are a major catalyst. Electrification of TPE, for example, could enable an early start to be made on Pacer replacement from a cascade of electric stock displaced through the major London schemes as well as regional electrifications such as Cardiff Valleys and the Manchester triangle.

Vehicles for growth

The industry has indentified the quantum of new vehicles potentially required to support the interventions proposed in the IIP, including options for train lengthening that do not require additional infrastructure. The estimates below are over and above the 1000 vehicles for Thameslink, 550 vehicles for IEP and 600 vehicles for Crossrail to which the DfT is committed to.

Table 15: Possible growth builds during CP5

Item	Number
London and South East	150 electric vehicles, split between Great Western, Great Northern Inners, c2c and London Midland Outer Suburban trains. Capacity gaps on Kent Metro, Sussex Coast and South West Main Line might be resourced from further cascades within the Southern Region area, subject to agreement of satisfactory leasing terms. ***Subtotal: approximately 150 vehicles***
Long distance/InterCity	Fleet increments needed for growth on a number of routes. As a planning guideline: • West Coast: 30-40 new vehicles for the C390 fleet and possible adaptation of C350s for higher speed running. • East Coast: growth and post-2018 timetable requiring further c.30-40 vehicles • Possible c.30 electric vehicles to convert the Birmingham-Manchester route (which is already electrified) to full electric operation • Midland Main Line electrification might be resourced either by modification of the C222s, new build or other cascades of suitable stock, depending on commercial negotiations under the next East Midlands franchise ***Subtotal: approximately 100 vehicles***
Regional	180-250 vehicles from existing RUS recommendations, for capacity into all main regional cities 70 diesels (smaller number if TPE electrified) for interurban growth eg. on TransPennine/Cross Country, Manchester-Chester, and Manchester – Cardiff. Precise numbers depend on availability of EMUs from London area and their lease terms and extent of electrification. 36 electric vehicles for EGIP 32 diesels for service enhancements eg. Aberdeen commuter, Highland Main Line frequency ***Subtotal: 320-390 vehicles***
Total	**570-640 vehicles**

It is assumed that the IEP programme will not replace all existing HST vehicles and it is expected that further refurbishment will take place for some of them. The use of Mark 3 trailers and LHCS beyond 2020 will depend upon PRM-TSI application.

Key rolling stock initiatives in Control Period 5

The main CP5 fleet planning initiatives in CP5 are:

- EMU cascades following completion of the Thameslink and Crossrail orders – including potential life extensions where justified commercially. Current plans are that cascaded EMUs will be used on the newly electrified routes in the North West and Cardiff, subject to agreement of satisfactory terms for this;
- interurban EMUs for MML and TPE electrification. These might be sourced either by conversion of Meridians (in the case of MML), new build and/or cascade of other high spec trains from other intercity routes, depending on progress on IEP and/or fleet options for East and West Coasts;
- Pacer replacement: cascades of DMUs following TPE electrification, providing that that satisfactory terms can be negotiated;
- possible life extension of stock reaching the end of its design life, where this is the most economic alternative;
- some growth build for intercity routes, over and above the current IEP commitment. This might be either further IEP trains, derivatives of existing trains or adaptations of other trains designed primarily for the mainland European network;
- the start of plans to group older vehicles into areas that will be converted to ERTMS last; and

- growth builds of EMUs , principally in London but also Manchester/ Birmingham. The DC fleet is not likely to alter significantly, but there may be further options available for redeployments if a business case can be made for AC conversion on main routes south of the Thames, options for which are being examined.

Procurement issues

Recent experience bears out that lease finance terms are generally available which allow the substantial initial cost of trains to be amortised over reasonable periods of time. The lease finance market is a significant one and experience suggests that it is often very competitive. The financial forecasts behind the IIP assume that new vehicles will continue to be financed in this way, rather than being paid for directly through DfT and that this done through leases similar to today's structures. The effect of this is that the capital cost is amortised over time and public sector funders only have to make allowance in CP5 for any increases in capital rentals, net of cost savings and revenue gains, that may result from new build.

Depot provision

Progress on HLOS implementation in CP4 was hindered by lack of clarity on funding for depot provision and the industry seeks a clearer starting point for CP5, as follows.

In relation to depot and stabling provision in CP5, the industry is assuming that for the DfT 'major projects', ie. Thameslink, IEP and Crossrail, new depot and stabling provision remains a DfT responsibility. In the case of Thameslink and IEP the contracts with preferred bidders already include depot provision.

For all other replacement or 'growth' rolling stock, i.e. train operator sponsored orders, funding for depots and stabling required will be sought by franchisees from DfT. For the purposes of this plan, this has been assumed to be financed through leasing, using approaches widely used in recent procurements.

Network Rail's expenditure plans currently include the cost of maintaining the current depot portfolio and capabilities on a minimum whole life cost basis. Revising the capability of depots to optimise them for the rolling stock they maintain can produce efficiency benefits as well as improved train reliability and presentation. The industry will explore the most cost effective way to maintain and enhance the capability of its depots including the most appropriate allocation of responsibilities and associated funding between Network Rail, train operators and train manufacturers and maintainers in managing the depot assets.

Changes to standards

The industry assumes that DfT will continue to apply Rail Vehicle Accessibility (Interoperable Rail System) Regulation (RVAR) pragmatically. The Regulation, which in principle implements the relevant TSI, also requires older vehicles (to which the TSI did not apply) to be made accessible to the same standard by 2020. It does, however, give DfT some flexibility in its application and this is now happening. The majority of pre-1998 vehicles (for which the 2020 date has the main impact) have been assessed by DfT for compliance works.

Nevertheless a substantial programme of, in particular, toilet refitment needs to be managed and financed during CP5. The lengths of current franchises are too short to be able to underwrite RVAR work (only two franchises currently extend beyond 2020) and a pragmatic way forward is needed to help phase the conversion work between now and 2020. Although there would be considerable savings from

dropping RVAR altogether, refurbishment work is already starting on some fleets and has synergies with the overall programme of improving access for stations under 'Access for All'. In addition, it is possible that continued pragmatic application of the Regulation by DfT will see these costs reduce further.

It is assumed for the moment that there are no other changes in standards, eg. any requirement to fit closed emission toilets, further tightening of emissions requirements, changes to crashworthiness, less onerous specifications on rural lines, new safety requirements etc. that might force a faster rate of replacement than through natural life expiry. The proposed tram train project could come on stream in CP5, but would have very little impact on the national numbers presented here. The situation in respect of emissions from toilets is a concern of the Environment Agency and DEFRA, who have asked the industry to consider developing a code of practice on the issue.

8.4 Network Rail's approach to asset management

Network Rail is one of the largest asset management organisations in Britain, with a diverse portfolio of assets, including 30,000 bridges and tunnels, around 2,500 stations and over 20,000 miles of track. The effective management of these assets requires a robust understanding of their behaviour and the most appropriate actions to mitigate asset degradation or failure. Network Rail's overall approach to asset management policy is based on a set of core principles:

- to prevent an increase in the overall risk to passengers, workers and members of the public from the degradation or failure of infrastructure and to reduce it where reasonably practicable;
- to develop asset management strategies that define the most appropriate approach to maintenance, inspection and renewal necessary to deliver the required outputs for the minimum whole life, whole system cost;
- to manage the infrastructure in a sustainable manner, minimising the consumption and wastage of natural resources as far as reasonably and economically practicable;
- to optimise the trade off between efficiency of work through longer possessions with access to the network for the delivery of the timetable; and
- for all activity to be carried out in compliance with relevant legislative and statutory requirements.

Working with the independent reporter a comprehensive improvement programme is being implemented, and progress against this plan is shared with ORR on a regular basis. Key improvement areas include:

- asset planning has traditionally been by asset discipline, for example signalling, and by function, for example maintenance. The approach taken in each area has generally been robust and systematic. However, the plans are less integrated than they could be and do not come together to link to the outputs required by customers. To overcome these limitations Network Rail has moved to a route based approach to planning. The network has been divided into around 300 route sections, each containing an average of 100 kilometres of track with generally homogeneous traffic levels. Each section has its own detailed asset management plan, with these plans being shared with train operators;
- asset information is critical to maintenance and renewal decision making. Currently, asset information is held in a number of systems supported by a range of data maintenance and assurance procedures. The strategy to

address these limitations has both short term and long term components. The short term component is focussed on ensuring the availability of the asset information necessary to support today's business and as an input to the periodic review process for CP5. The second component involves a fundamental and comprehensive review of business processes described earlier in this plan, and the information required to support these. As part of this exercise Network Rail is assessing the experiences of other companies who have successfully implemented such strategies on a similar scale;

- the implementation of an asset management regime presents organisations with additional challenges that require new knowledge, abilities and behaviours. Network Rail is using the Institute of Asset Management's competency framework to identify competence requirements, assess gaps and implement training and development programmes;
- benchmarking is a critical component of the asset management strategy. A number of companies have attained best practice in some key asset management areas. Network Rail is eager to learn from such organisations; and
- Network Rail's asset policies specify the inspection, maintenance and renewal interventions for each asset discipline, and a critical initiative in this improvement plan has been a thorough review of these policies.

At present the asset management activity, expenditure and delivered outputs derived from the application of these policies is based primarily on forecasts from top down models. A major piece of work scheduled by Network Rail for completion prior to the publication of the SBP will be to produce route based plans for CP5. These plans will be built up by bringing together the asset management policies and a detailed understanding of route assets and their maintenance and performance history. The 300 or so route sections described above provide the building block for this analysis.

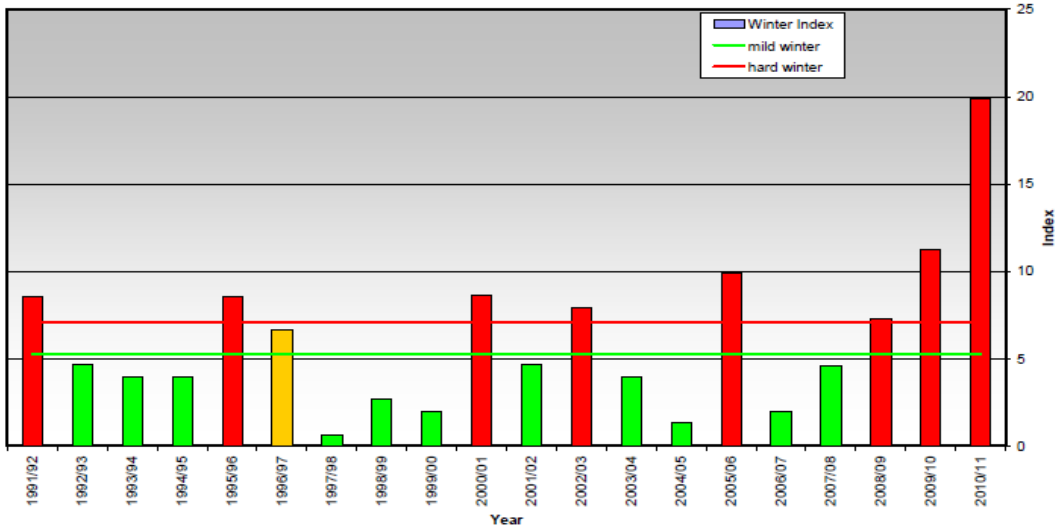
One of the most significant implications of this work will be to improve the alignment between actual asset management costs and the broader value (to train operators and others) of delivering different levels of asset reliability, and hence train service reliability. An improved understanding of leverage opportunities (i.e. where the value of improved reliability is disproportionately better than the cost of delivering it) is an important part of the industry's strategy for improving value for money. The route asset management plans provide the platform for this improved understanding and devolution provides the process by which Network Rail and train operators can work together to improve value for money and deliver sustainable performance.

8.4.1 Weather resilience

As with rail networks throughout the world the operation of Britain's rail network can be affected by adverse weather conditions. Ice, snow, heavy rain, lightning and high winds can all lead to asset system failure or degraded operation. At the other extreme, periods of drought can lead to embankment deterioration and high temperatures increase the risk of track buckling: both of which may result in the requirement to impose temporary speed restrictions. Analysis indicates that under most weather conditions (i.e. where temperatures are between around 0^{o}C and 24^{o}C, and where wind speeds or rainfall is not excessive) the network has become increasingly reliable, with a high probability of Public Performance Measure in excess of 92 per cent. During these weather conditions instances when this level of reliability is not achieved are usually due to one off incidents that have caused significant disruption, for example an overhead line failure or major lineside fire. However, on the relatively small numbers of days per year when the weather conditions are outside of these parameters infrastructure reliability deteriorates, with a

corresponding impact on train service reliability. The winters of 2009/10 and 2010/11 provide examples of this after several years of relatively benign winters, see figure below.

Figure 15: Winter Index 20 year trend (days below -3°C)



Low temperatures over an extended period and much higher levels of snowfall than seasonal norms resulted in significant disruption on the network and a number of days when it was not possible to deliver the working timetable. This caused considerable disruption and inconvenience to rail passengers and freight customers. Disruption was not limited to the rail network, with roads and airports also suffering major loss of service. Significant disruption was also experienced on rail networks across Europe, including a number of countries for whom extensive snowfall and extended periods of below zero temperatures are experienced on a regular basis.

Although some service disruption during such extreme weather conditions is perhaps inevitable, the level of disruption experienced by some rail users warranted further consideration of the factors that led to this and the exploration of opportunities to reduce the future impact by improving the weather resilience of the network.

Network Rail has had extensive discussions with European rail operators, particularly those such as Sweden and Finland who have considerable experience of operating during severe adverse weather conditions. The discussions have proved fruitful and have helped inform a number of initiatives currently underway or recently implemented.

Part of this work has been addressing infrastructure/component design to improve reliability during periods of extreme weather conditions. In effect this is identifying opportunities to expand the reliability window; the range of weather conditions where Network Rail has high expectations of being able to deliver committed levels of service reliability. Initiatives progressed or being progressed include:

- re-design of points heating;
- extension of third rail heating;
- deployment of “ice phobic” materials on trains and fixed infrastructure;
- fitting of weather protection covers to more vulnerable equipment;
- assessment of all bridges, coastal and estuarine defences, and earthworks for vulnerability to water (e.g. scour, water pressure);
- improved de-icing techniques, improvements to the design of mobile plant;
- the use of heat reflective paint to reduce disruption during hot weather;

- opportunities to improve heat resilience of non-track assets; and
- improving management systems and reporting for hot weather preparations and risk management.

As it is impossible to eradicate completely infrastructure failure or degraded performance during periods of extreme weather, Network Rail has also progressed a series of initiatives that are designed to minimise the impact of infrastructure failure on service performance. These include:

- improved cross-industry response to identify appropriate levels of service and improve coordination of all activities during periods of expected disruption;
- nomination of a single person to lead local cross-industry response during periods of adverse weather;
- creating best practice hot weather guides for use by front line teams; and
- helping maintain workforce productivity during very demanding conditions, including improved personal protection equipment, better shelter and improved availability of provisions.

Expenditure associated with these initiatives is included in the expenditure forecasts for CP5.

Network Rail is also undertaking a more strategic review of the system. At present there is no clear understanding across the industry of the existing operating capability of the railway – the range of conditions under which there would be a high probability of being able to deliver the working timetable. Network Rail is addressing this by:

- reviewing weather patterns to gain an improved understanding of the likelihood of weather conditions being experienced under which service disruption might be expected;
- reviewing past performance during adverse weather and the key causes of service disruption; and
- examining component and system specifications to understand better their potential resilience.

As part of this initiative Network Rail has explored a number of options to improve both the resilience of the infrastructure (by changes to design or installation specifications) and its ability to mitigate the impact on service disruption during periods of degraded infrastructure operation. A primary aim of this work is to identify opportunities to make a step change in the resilience of the network and to discuss the affordability of these options with funders.

Snow and ice form the major challenge to the delivery of the working timetable during the winter. Following extensive discussions with European rail infrastructure managers and a review of infrastructure failure modes in Britain during such adverse conditions has identified a number of opportunities, as follows:

- the installation of circa 4,000 heavy duty switch heaters;
- the purchase of an additional 24 winter trains with snow ploughs, hot air blowers and steam lances;
- fitting points heater insulation to 18,000 point ends;
- fitting covers to protect cranks on back drives to all points operating equipment with point machines;
- the installation of 2,000 weather stations to provide early warning of adverse weather conditions, giving real time information in order to make better informed operational decisions;and
- fitting heated shoes to trains operating on the DC network as an alternative to extending third rail heating.

Network Rail believes that these initiatives would deliver a step change improvement in the resilience of the network during severe winter conditions and provide a network that should enable a full (or near full) service to operate reliably in all but the more extreme weather conditions. The current assessment would indicate that the cost of these infrastructure changes is £300 million to £350 million. Further work is underway to improve the industry's understanding of the change in system resilience that would be delivered by these initiatives and to improve significantly the understanding of the likely costs and benefits.

It should be recognised, however, that the effective operation of rail services is affected by a complex series of internal and external factors. For example, the robustness of the electricity grid and the ability of rail staff (e.g. maintenance teams, train drivers, station staff) to reach their work locations where they rely on the road network may also have an impact on service reliability. Further work is required to understand these issues more fully and ensure that effective system solutions are identified, valued and costed.

In addition Network Rail is considering the benefits that could be realised by the construction of a purpose built climate chamber in which full size points, overhead lines and train carriages can be subject to research as a complete systems rather than individual components in different weather conditions. The cost of this is likely to be in the region of £20 to £30 million. Due to the extensive programme of environmental testing required, it is considered more economical to build new test facilities, which would give Network Rail an improved ability to develop a more reliable and resilient network. It is expected that income would be generated through offering use of this facility to suppliers to verify their products.

8.4.2 Climate change adaptation

Weather resilience issues will be exacerbated by climate change. Although it is difficult to predict the precise changes with any certainty, there is sufficient evidence to suggest that there will be an increase in the range of weather related factors that the system will need to be able to respond to. Ongoing research suggests that, while the general consequence of climate change is an increase in average UK temperatures, weather variability is such that the UK will still experience cold winter conditions and changing rainfall patterns. Indeed, it is entirely possible that the UK may experience cold winters more regularly than it has done in recent years. The challenge for the industry, as for all organisations with assets that are vulnerable to weather issues, is to develop cost effective strategies to accommodate climate change and implement these strategies in a timely manner to avoid an unacceptable drop in overall system reliability or undeliverable downstream mitigation strategies.

Network Rail's Climate Adaptation Report has recently been reviewed by DEFRA's adaptation team who concluded that the organisation "clearly considers climate change to be a key issue for long term planning and it is excellent to see that consideration of these issues is being embedded into the organisation's business practices. The good quality report produced by Network Rail clearly demonstrates actions being taken to prepare both rail infrastructure and operations"[31].

The focus for the IIP has been on initiatives that need to be implemented in CP5. For the majority of assets their relatively short life (in climate change terms) means that no additional investment in CP5 is required to address the issue of climate change.

[31] Letter from Lord Henley to Network Rail, 21 August 2011.

However, for some of the assets (in particular bridges) work carried out on the infrastructure during CP4 will be expected to accommodate climate change over a 30 to 40 year period. As a consequence of this work Network Rail has identified that £70 million of additional expenditure is required during CP5 to accommodate climate change.

While the industry is planning against a core set of scenarios, the scientific understanding of climate change is evolving rapidly. The developing position is that, on a global basis, carbon emissions are increasing faster than the extreme scenarios used as the basis for established likely climate change outcomes, such as those promulgated under UKCIP09 which inform government policy and planning. This means that any projections must be probabilistic and therefore subject to change within the CP5 period, which in turn may require reassessment of what Network Rail considers to be reasonable levels of planning and preparation for the consequences of climate change.

8.4.3 Sustainability of Network Rail's production process

Network Rail is regarded as being amongst the leaders in defining and delivering more sustainable business practices within Great Britain's corporate community, having participated in the Business in the Community Corporate Responsibility Index for the last 4 years and progressed to rank of gold in the last 2 years.

Network Rail has identified six key impact areas round which to drive substantial sustainability improvements in CP5 and beyond. These are waste, carbon, land use, biodiversity and ecology, diversity, accessibility and climate change adaptation. Detailed strategies and plans will be reflected in the SBP.

To facilitate and embed the delivery of improvements with clear accountabilities, Network Rail has identified five key enablers. For CP5 Network Rail plans to:

- implement a sustainability data collection management and reporting system;
- develop and publish a strategy for Sustainable Design, Construction, Operation, Maintenance and Decommissioning (DCOD) ;
- integrate sustainability considerations into our procurement processes;
- develop and deliver a business wide framework for education, engagement and behaviour change on sustainability issues; and
- engage with internal and external stakeholders on industry wide and global sustainability issues.

8.5 People strategy

8.5.1 Investing in people

In an industry that employs over 92,000 people directly, and nearly 200,000 including the supply chain, and spends a third of its costs on staff it is as important to have a plan for improving and enhancing the skills of its staff as it is to have a plan for upgrading infrastructure and rolling stock. The RVfM study examined a range of issues relating to people including the need for training and development. Amongst the study's comments and recommendations were:

- a greater use of technology to deliver training, reduce training time, minimise the need for in situ learning and improve efficiency;
- a fundamental review of training techniques and the time needed to train specific work groups;
- the true benefit of effective training is a better equipped, more flexible and productive workforce;

- graduate development should be co-ordinated across the industry and a core introduction course should be developed to provide a wider overview of the business requirements of the industry's various sectors and to establish the desired industry cultures and networks from the beginning of future managers' rail careers; and
- the industry's employers should continue to encourage a more flexible and diverse workforce and, in particular, provide opportunities for more women to be part of the industry.

The industry is already considering a number of training and development opportunities and sees the RVfM study as a catalyst for improvement.

The link between a high competence in asset management and good overall business performance is universally recognised. Reflecting this understanding Network Rail has made a commitment that by the end of the current control period (March 2014) it will have developed capabilities in asset management that are demonstrably comparable with best practice elsewhere in Britain. Over the following five years Network Rail is committed to improving its capabilities further, so that it can provide the benchmark against which organisations throughout the world assess their own asset management capabilities.

8.5.2 Industry leadership development

At a senior level, there are opportunities for the industry to leverage the existing academic programs already facilitated by Network Rail. This would allow the industry to share economies of scale, improve the perspective of its each company's own courses, and develop cultures through learning to accommodate wider industry participation in activities.

Network Rail's University of Warwick delivered leadership program could be easily adapted to deliver shared learning and development for middle and senior managers from the across the industry. Setting accredited course activities around joint activities would further encourage alliances across the industry.

Post-modular assignments could include inter-organisational contrasts and comparisons, encouraging participants to research the interfaces between companies and identify opportunities for improved collaborative working.

8.5.3 Engineering

At an engineering technical level, the industry has, quite recently, moved to fill the skills gap. The creation of National Skills Academy for Railway Engineering (NSARE) shows a recognition by over 60 companies of the importance of attracting the right people into the industry and ensuring that the right people are being brought on to fill highly skilled technical roles in the future.

NSARE commenced work in 2011, but there remain other area of activity where greater coordination would be desirable to achieved efficient cost delivery of training, where new graduate recruits could be given an industry wide perspective before their horizons are drawn within their own companies, and where the future leaders of the industry could be introduced into collaborative learning and development environments to create the culture change the industry is seeking to promote.

8.5.4 Technical Training

There are opportunities in the provision of technical training for the supplier community and in the area of industry leadership development. Greater use could be made of Network Rail's national training facilities for supplier community training.

Network Rail is already engaged in the development of a small number of new technical/vocational centres and consolidated larger Workforce Development Centres (supported by satellite facilities) to unite a range of technical training activities and provide facilities to support 'higher technical' project management and engineering training.

These Workforce Development Centres are anticipated to become 'hubs' of development activity, and believe that they would offer suitable environments to offer workforce technical training to the supplier community at efficient levels.

8.5.5 Graduate training

The industry recognises the benefits that will be derived from graduates sharing common training experiences, having a better understanding of the individual parts of the industry and obtaining an appreciation of the benefits of closer working.

The introduction of collaborative development and training activities within the industry will help achieve the desire of cross-industry focus on increased co-operation and alliancing between Network Rail, train operators and their delivery partners will provide the industry with better skilled staff able to exploit new technologies.

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9 Assessment of the plan

9.1 Introduction

This chapter sets out the strategic case and funding implications of the interventions proposed in the Initial Industry Plan (IIP). The industry recognises that it needs to make a compelling case for investment in rail given the absolute constraint on funding and the competing priorities for this funding. In this chapter the industry seeks to inform government and other funders as to possible options in terms of outcomes, outputs and interventions and the value for money and affordability implications of these choices.

Within the sector strategies (chapters 4 to 7) the IIP highlights a number of strategic choices and trade offs to inform the specification of railway outputs in England and Wales. These strategies outline a number of investment choices to enhance the output of the railway, delivering better outcomes in areas such as safety, efficiency, economic growth, rail user satisfaction, and carbon. The choices have been informed by the programme of Route Utilisation Strategies (RUSs) and their relevant stakeholder management groups, route based discussions through the Route Investment Review Groups (RIRGs), and bilateral discussions between Network Rail and train operators.

9.2 Assessment of investment choices

Enhancement cost estimates

The IIP includes a portfolio of enhancements designed to achieve specific outcomes in a cost effective way. Aside from the committed schemes in the base plan, for example the Thameslink programme, the interventions proposed are primarily in GRIP[32] stages 1 and 2 of development. The overall strategies for each route and the scope of specific interventions will continue to evolve as discussions continue with train operators and with funders. The publication of the High Level Output Specifications (HLOSs) is a key milestone in being able to confirm the overall portfolio of schemes and develop more robust cost estimates for individual projects.

The IIP includes a range as to the possible costs of the individual projects and the overall portfolio reflecting a range of risks and opportunities. These include:

- uncertainty of outputs: Agreement with train operators and funders of firm outputs is iterative as operational assessments and economic appraisals are refined through the development process;
- scope definition: selection of a preferred single option usually occurs at GRIP stage 3. For the purpose of developing a forecast for the IIP Network Rail has selected a most likely scope of works for schemes in GRIP stage 2 but this will need to be validated in due course through the option selection process;
- optimism bias: There is well accepted research that reveals a systemic optimism bias in estimating the cost of projects compared to their outturn costs. A review specifically of Network Rail's projects revealed that the degree of bias can be sensitive to the type of project and asset mix. There is therefore a choice to be made as to the level of risk to be included in the overall project estimate and at early GRIP stages this is a qualitative judgement;

[32] Governance for Railway Investment Projects" (GRIP) describes how Network Rail manages and controls projects that enhance or renew the national rail network.

- efficiency opportunities: As with other elements of cost forecasting in the IIP consideration needs to be given to the potential efficiencies that could be delivered including the impact of initiatives such as our efficient infrastructure delivery proposals, the impact of devolution, alliancing and the impact of our plans to encourage greater contestability of project delivery;
- portfolio risk benefits: There are risks that are low probability but high impact than can materially impact of the estimate of any single project but when delivering a portfolio of projects this risk can be spread across the portfolio such that costing the projects as a portfolio is less than the sum of the individual projects; and
- other portfolio benefits: Potential sources of efficiency include the benefits of delivering a portfolio of projects providing economies of scale in the market place and synergies in how projects are packaged.

Given the early stages of development of the proposed interventions it is not possible to be precise about the impact of each of these factors. Network Rail has provided a range as to the funding required at both a project and a portfolio level. This range takes into account the level of development and therefore the range of uncertainty in the individual project estimates and the risks and opportunities across the entire portfolio. At a portfolio level the range around the projects estimates is summarised below along the expenditure forecasts for the committed projects, which are more robust reflecting the maturity of the projects, and also the provision for funds being sought.

In this context, Network Rail has appraised the business case for schemes within the overall portfolio. These appraisals are presented in chapter 9.4. Network Rail has also made a preliminary assessment of associated power supply costs, which are included in enhancement cost forecasts below. Although we have yet to factor in an allocation of the overall power supply costs into individual scheme appraisals, the likely impact of these costs on the business case was considered during the selection of schemes. Where necessary, Network Rail plans to update the appraisals over the forthcoming months to include an allocation of overall power supply costs.

Table 16: Enhancement cost forecasts

£ million 2011/12 prices	Control Period 5 expenditure forecast
Committed programme Includes the Thameslink Programme, Crossrail Programme and Reading remodelling, committed electrification schemes, the Intercity Express Project (IEP) and West Coast Main Line schemes	4,544
Proposed interventions For full details see the supporting enhancements document	2,067 – 2,342
Funds Includes Strategic Freight Network, IEP related interventions, level crossings, Network Rail Discretionary Fund, journey time improvement fund, performance, station improvement, accessibility, and customer information	2,514
Total	**9,125 – 9,400**

A breakdown of the forecasts by individual projects and funds is set out in the supporting document, Definition of Proposed CP5 Enhancements, which also includes a statement of scope and outputs for each intervention.

The industry recognises that the overall expenditure implied by these proposed interventions is significant and the industry must demonstrate the value for money and affordability of the individual interventions and the overall portfolio. Network Rail will continue to develop the definition and cost estimates for individual projects and

programmes, prioritising those that are most likely to be supported by funders and train operators.

Network Rail has set itself the ambition to deliver a major output change on the network without the need for significant infrastructure investment. It is examining opportunities to do this through improved utilisation of the infrastructure, involving the potential re-planning of the timetable on key routes. The train operators are very supportive of this ambition. Examination of such opportunities is intended to reduce the funding sought in CP5. Specific examples of where such an opportunity presents itself will be included in the Strategic Business Plan (SBP).

Context and strategic intent

In 2009/10 the rail industry in Great Britain received roundly £5 billion of support from the taxpayer, a figure which funders and the industry acknowledge as unsustainable in the longer term despite the considerable value that rail generates for the economy, its users, and society in general. In addition, the urgent need to repair the UK's fiscal position means there is now significant focus on challenging the efficiency of all areas of public spending, including transport. Network Rail argued in "*Prioritising investment to support our economy*[33]" that delivering efficiency is about more than simply challenging "what things cost". It is also about challenging "what is bought in the first place", and demonstrating these are the choices which generate the greatest economic value. In the current context, Network Rail argued economic value should be measured primarily in jobs, productivity growth, and tax revenues.

The IIP addresses both of these fundamental aspects of efficiency, through (a) delivering the railway more efficiently, and (b) identifying further investment choices for CP5 which focus on the outputs which generate the greatest economic value.

There are also other significant challenges including the need to move towards a more environmentally sustainable economy, and delivering open and transparent public services. These challenges are also reflected by the investment choices identified in the plan.

Taking this into account, the strategic intent of the IIP is to deliver better outcomes in the following areas:

- reducing safety risk;
- investing to reduce costs and promote efficiency;
- investing to support and stimulate sustainable economic growth; and
- investing to meet the needs of rail users, both passengers and freight.

The plan identifies a further set of choices (consistent with the strategic intent) which take advantage of 'once in a generation' opportunities within CP5, for example, where network capability can be enhanced efficiently in conjunction with the planned renewal of life expired assets.

9.3 Approach to delivering better outcomes

In most cases the IIP specifies investment choices to deliver the outcomes targeted by the plan. For example, the plan identifies a package of well targeted investments which increase passenger capacity, supporting economic growth in our cities.

[33] Network Rail, September 2010

The industry proposes that some outcomes are best achieved by an investment fund approach, with industry wide governance, whereby investment expenditure in CP5 is allocated and ring fenced to deliver as yet unspecified schemes. This approach has several benefits, including:

- providing industry with the flexibility and agility to respond to tactical opportunities as and when they arise;
- delivering outcomes efficiently by leveraging private sector and third party investment; and
- providing a focus on small to medium sized schemes. The Eddington Transport study[34] highlighted that economic returns from smaller schemes are typically greater than for larger schemes. This conclusion is supported by a review of NRDF expenditure over Control Periods 3 and 4, which found that the fund has achieved returns consistent with a benefit cost ratio[35] of almost five. Impressively, a quarter of NRDF investments have a financially positive business case.

A fund approach is also consistent with wider policy, including:

- devolution of funding and specification away from central government; and
- enabling Train Operating Company (TOC) led investment; an industry wide fund is one mechanism by which TOCs are already empowered to invest in schemes which pay back beyond the end of their franchise term.

Pan-industry governance arrangements must ensure funds are well targeted and administered efficiently, whilst at the same time providing industry with sufficient freedom to specify the most appropriate way of delivering the outcomes.

9.4 The case for investing in better outcomes

9.4.1 Reducing safety risk at level crossings

The IIP proposes a fund for CP5 to improve safety at level crossings, recognising both the need to continually improve safety, and stakeholder concerns over this type of risk in particular. The objective is to deliver the following by the end of CP5:

- a reduction in level crossing risk by a minimum of 50 per cent;
- a reduced number of incidents and accidents;
- improved stakeholder confidence;
- improved awareness of level crossing safety risk; and
- the fund could also deliver benefits to road users.

This will be achieved by adopting a more interventionist approach to reducing risk and improving safety, focussing on closures, enforcement and innovation. Network Rail also plans for a more collaborative approach between it and operators, including joint assessments and inspections, and sharing responsibilities where this best improves safety.

Programme development is currently in the early stages, so a fund approach is deemed the most appropriate means to deliver the outcomes.

[34] "The Eddington Transport study: The Case for Action", December 2006
[35] Socio-economic benefit cost ratio

9.4.2 Investing to reduce operating costs

Investing to reduce longer term operating costs (whilst maintaining outputs) must represent 'business as usual' activity in an efficient railway. The Rail Value for Money (RvFM) study merely served to bring this into sharper focus.

Further network electrification

The Network RUS: Electrification Strategy identified that further network electrification presents a major opportunity to reduce whole industry operating costs. Relative to diesel services, electric trains are typically cheaper to lease and maintain, are more fuel efficient, have greater availability rates, and are more reliable in service.

Further electrification of the network will also deliver other outcomes consistent with the strategic intent of the IIP. These include lower carbon emissions (a benefit which will increase as the generation of electricity is decarbonised), and economic benefits arising from improvements in capacity, journey times and connectivity. Electrification of further routes in CP5 will be the next stage to a more electrified network that would enable freight operators to purchase new electric traction (noting that further electrification will be needed to make a step change).

Electrification is delivered most efficiently as a rolling programme, minimising capital costs by avoiding the peaks and troughs of past investments. Therefore, an opportunity exists in CP5 (and beyond) to electrify further parts of the network efficiently by extending the committed programme of works. Further network electrification should be co-ordinated with a rolling stock strategy which identifies an effective use for displaced diesel vehicles which are not life expired.

The IIP identifies investment choices in CP5 to extend the network electrification programme in England and Wales to deliver (or begin to deliver) electrification of:

- the Midland Main Line from Bedford to Corby, Nottingham, and Sheffield via Derby;
- Gospel Oak to Barking and the associated Thameside Branch and Ripple Lane sidings;
- the North Trans-Pennine route via Diggle (between Guide Bridge and Leeds, and between Leeds and Colton Junction connecting to the East Coast Main Line for York); and
- the Cardiff Valley lines.

The capital costs for these schemes are at an early stage of development, but are higher than had been anticipated by the Network RUS: Electrification Strategy. Ways of reducing these costs are currently being explored, including greater contestability of procurement both within and outside Network Rail, alliancing between industry partners, earlier engagement with suppliers, exploring the efficiencies of a committed rolling programme, and ensuring all possible synergies between projects are exploited. Network Rail is also in the process of benchmarking costs. As a result of all of this the existing costs are expected to reduce. At the same time, the benefits delivered by electrification are being reviewed, particularly in light of the increasing overall costs of diesel powered rolling stock. This review will also take into account recent changes to investment appraisal criteria announced by the Department for Transport (DfT) in April 2011, which include changes to the valuation of carbon emissions and indirect taxation impacts, both of which strengthen the case for further electrification.

Business cases for the Midland Main Line, Gospel Oak to Barking and North Trans-Pennine routes will be refreshed over the forthcoming months, although it is noted that the Network RUS: Electrification Strategy identified positive business cases for all of these routes. The business case for electrification of the Cardiff Valleys route is currently being led by the Welsh Government in collaboration with DfT and Network Rail.

Investing in rolling stock efficiency

The IIP proposes a package of choices for CP5 to enable industry to make more efficient use of rolling stock and other operational resources, by investing in turnback facilities and other measures promoting operational flexibility. The components of this package are:

- improved operational flexibility in the Hereford station area;
- provision of turnback facilities (at Stevenage and Gordon Hill) for train services on the Hertford loop; and
- improved operational flexibility in the Norwood Junction station area.

This investment choice has a financially positive case, and will therefore pay for itself over the longer term (Table 17).

Table 17: Whole industry financial appraisal of investment choices delivering improved rolling stock efficiency

	Present Value £ million
Revenue	0.3
Capital costs*	-17.6
Operating cost savings	36.2
Net Present Value (NPV)	18.9
Internal rate of return (IRR)	11%
Notes: 30 to 40 year appraisals (varies by component of package) at current Network Rail discount rate of 4.75% All benefits are positive, costs are negative Present Values (PVs) are in 2011/12 factor prices and discounted to 2011 *Capital costs exclude Regulatory Asset Base (RAB) finance costs and optimism bias The benefits delivered by the Norwood Junction station scheme are currently being reviewed. The scheme is therefore currently excluded from the overall assessment	

9.4.3 Investing to support & stimulate sustainable economic growth

The UK's economy relies upon rail to transport passengers and goods safely, quickly, reliably, efficiently and sustainably. One billion of the 1.4 billion annual journeys made by rail are made by commuters and business travellers.

Passenger demand has grown by almost 80 per cent since the mid 1990s. The demand for rail freight grew by around 70 per cent between the mid 1990s and 2006 before softening during the recession. Some of this growth is simply a reflection of longer term economic expansion and population growth, whilst some has been stimulated by investing in industry outputs. Over this period growth has also been supported by underlying structural changes in the economy, employment and travel markets favouring rail. The strength of these underlying trends was most evident during the recession when national passenger demand (measured by passenger kilometres) continued to grow, albeit at a reduced rate, despite national economic output contracting by over six per cent.

These favourable, underlying structural trends are set to continue, and coupled with a return to longer term trend rates of economic expansion will drive further growth in both passenger and freight markets. Growth is forecast in almost all of rail's markets, and in particular on the key networks identified by the Eddington Transport study as being crucial in supporting the economy, and in which many of the most productive parts of the economy are located, namely:

- urban areas and their catchments;
- key interurban corridors; and
- connections to international gateways, both passenger and freight.

Rail is ideally and best placed to respond to this growth, as economic and environmental priorities and trends in the market play to rail's core strength, that is, moving large volumes of goods and passengers over long distances, and between and into city centres.

Eddington also rightly identified that congestion on key networks has a substantial effect on economic performance, and that addressing this should also be a priority, first by getting the best out of the existing infrastructure, and then, if necessary, by investment.

Choosing to invest in rail capacity to accommodate longer term growth does not imply a policy of "predict and provide". This term is now commonly associated with an approach whereby extra resource led capacity is the default solution to growth. This is not the case in the planning of rail services. Existing processes, including the RUSs or the need to submit best value franchise bids, collectively incentivise industry to explore the entire range of capacity solutions, of which investment in resource led capacity is generally the last to be considered. For example, the franchising process has resulted in additional capacity being delivered using only the existing resource base and network through better timetabling, by trading journey time for capacity, or by reconfiguring existing rolling stock.

Indeed, the anticipated longer term growth in demand for passenger rail services is a natural consequence of national and regional planning decisions already taken. For example, the need for additional capacity on the West Anglia route was effectively embedded by the decision to make South Cambridgeshire and the M11 corridor a focal point for population growth and development. Alternatively, the recent robust growth in regional markets including Leeds and Liverpool is a consequence of decisions already taken to regenerate city regions, making them a focus for economic activity.

New and emerging technology may enable the rail industry to accommodate growth in different and better ways in the future, for example, through the use of smart ticketing. These new solutions will naturally be considered by industry as part of the existing planning process.

Despite rail being best placed to respond to economic and environmental priorities and trends in the market, Network Rail argued in "*Prioritising investment to support our economy*[36]" that the case for rail must highlight the contribution it makes to the 'real' economy. In this context, jobs, productivity growth and tax revenues are the most appropriate measures.

[36] Network Rail, September 2010

Network Rail argued that this type of assessment could complement the existing welfare based appraisal process, and where this has been done it is difficult to escape the conclusion that the true value of rail investment to the 'real economy' is not fully captured by current appraisal methods. There is now further evidence to support this conclusion:

- the inclusion of "wider economic benefits" in the appraisal of the Northern Hub and draft Merseyside Long Term Rail Planning strategies increased the benefit cost ratios from 3.2 to 4.1, and 2.3 to 2.6 (respectively), an increase of 20 per cent to 30 per cent in the overall value of benefits; and
- research[37] undertaken for Network Rail into the draft Merseyside Long Term Rail Planning Strategy concluded that the consequence of choosing not to invest in sufficient capacity to accommodate growth would be to forgo local economic activity valued at £1.8 billion[38], along with the loss of 30 per cent of the forecast increase in employment over 30 years, over 6,000 jobs. Although these figures do not wholly represent the net national impact (as some locally suppressed economic activity may simply be displaced elsewhere) the effectiveness of the circa £200 million strategy is compelling.

These conclusions relate to investment in rail capacity, but extrapolate to rail journey time and connectivity improvements, and highlight the substantial contribution to local economic growth which well targeted investments in rail can generate.

Investment in station capacity is also important, given their role in enhancing the experience of passengers thereby encouraging modal shift. Investing in stations also provides an ideal opportunity to further develop commercial and retail activities in an efficient manner, activities which have been growing robustly defying the difficult trading environment on the high street. In the first six months of 2011, like for like retail sales at Network Rail's major stations grew by over four per cent (in part a reflection of growing footfall at stations), compared to flat retail sales on the high street as reported by the British Retail Consortium. Investing in stations can also act as a catalyst for local regeneration.

The sector strategies (chapters 4 to 7 of the IIP) outline a series of investment choices for funders which support and stimulate economic growth by:

- addressing existing congestion on key rail networks, and responding to longer term trends in the market by providing sufficient capacity to accommodate anticipated growth; and
- providing well targeted improvements in journey times and connectivity.

These choices, summarised in Table 18, have been identified, developed and consulted upon through the industry's long term planning process, including the RUSs, and represent established strategies for delivering the outcomes.

As well as supporting and stimulating sustainable economic growth, these schemes will help deliver improved passenger satisfaction.

[37] "Removing the constraints on economic growth in Merseyside - Economic Analysis of the Merseyside Long Term Rail Planning Strategy" KPMG May 2011
[38] Present Value over 60 years in £2002 prices

Table 18: Investment choices to support and stimulate sustainable economic growth

Investment Choice	Better Journey Opportunities	Better Journey Times	Increased Capacity
The Northern Hub	✓	✓	✓
Journey time improvements – Journey time improvement fund – Exemplar schemes	✓	✓	
Outputs related to the Intercity Express Programme (IEP) – East Coast Main Line package – Great Western Main Line package		✓	✓
London commuter market capacity			✓
Congestion relief at strategic London stations		✓	✓
City region commuter market capacity			✓
Midland Main Line long distance capacity			✓
Cross country train service connectivity	✓	✓	
Western access to London Heathrow Airport	✓	✓	✓
Birmingham New Street to Tamworth corridor capacity	✓	✓	✓

The Northern Hub

The Northern Hub delivers a significant increase in the number of trains across the north – about 700 extra services every weekday. This improvement will provide faster and more frequent connections between cities including Leeds, Liverpool, Manchester, Newcastle and Sheffield, supporting and stimulating economic growth across the north, which in turn will support local jobs and businesses.

Table 19: Socio-economic appraisal of the Northern Hub

	Present Value £ million
Net cost to Government (broad transport budget)	735
Net benefits to consumers and private sector*	3,022
Net Present Value (NPV)	2,287
Benefit Cost Ratio to Government	4.1
Notes: 60 year appraisal using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002 *Benefits include an assessment of "Wider Economic Benefits"	

Better journey times

It is proposed that a fund is allocated to deliver well targeted improvements in rail journey times and connectivity in England and Wales during CP5. Programme development is still in the early stages, and a fund approach is deemed the most appropriate way to deliver the outcomes. Scheme selection could prioritise rail connectivity between urban areas where some of the most productive parts of the economy are located, or alternatively, choices could be influenced by exploiting relatively low cost opportunities arising within CP5. A few candidate schemes have already been identified including opportunities on the Midland Main Line, Maidstone East line, Hastings line, Portsmouth line, West of England line, the North and South Cotswolds lines, and on the line between London Liverpool Street and Norwich.

In addition to the fund, the sector strategies identify six exemplar schemes to deliver better journey times, which have all been identified and developed through the RUS process in response to stakeholder concerns. These schemes are.

- London St Pancras International to Ramsgate;
- Bristol Temple Meads to Bridgwater;

- the East Coastway route (between Ashford (Kent) and Brighton);
- the West Croydon area;
- Birmingham New Street to Stansted Airport; and
- the Wakefield Kirkgate area.

Table 20: Socio-economic appraisal of exemplar journey time improvement schemes

	Present Value £ million
Net cost to Government (broad transport budget)	42.9
Net benefits to consumers and private sector	81.5
Net Present Value (NPV)	38.6
Benefit Cost Ratio to Government	1.9
Notes: 25 to 35 year appraisal (varies by component scheme) using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

The West Croydon scheme (which is included in the value for money appraisal in Table 20) is also expected to improve the punctuality of services in the area, the benefits of which are yet to be reflected in the business case.

A major opportunity exists to deliver the Bristol Temple Meads to Bridgwater scheme efficiently in CP5 in conjunction with the planned renewal of signalling and track assets. We are currently reviewing the cost of the scheme to ensure all possible efficiencies are reflected in the estimate. As a result of all of this, the business case is expected to improve.

Outputs related to the Intercity Express Programme

The Intercity Express Programme (IEP) is the DfT led programme to replace the existing fleet of long distance High Speed Trains (HSTs). As described in chapter 5 DfT has aspirations for further timetable enhancements during CP5, in addition to those associated solely with rolling stock replacement. This is likely to necessitate further investment in network capability during CP5, including work at Filton Bank. The case for this investment should be considered as part of the wider business case for the IEP programme, which is currently being led by DfT.

London commuter market capacity

Chapter 4 of the IIP identifies investment choices which deliver additional, well targeted rail capacity for central London, relieving current incidences of crowing and providing capacity to accommodate the anticipated growth in demand where this is not addressed by existing commitments.

The longer term strategy for London has been developed through the London and South East RUS. The components of this strategy proposed for CP5 (in addition to existing commitments) focus on the routes into London Cannon Street, London Charing Cross, London Bridge, London Fenchurch Street, London Liverpool Street (via both the West Anglia and Great Eastern routes), London Victoria, London Waterloo and via Shepherds Bush, where in the absence of further intervention, incidences of crowding exceeding acceptable standards are anticipated to occur.

The package proposed for CP5 delivers the following outputs, some of which can be provided without changing the capability of the network:

- a new local service running between Stratford and Brimsdown on the West Anglia Lea Valley route;
- additional peak services to London Liverpool Street on the Great Eastern route;
- lengthening of peak Southern services to 8 car on the West London Line;
- additional peak services between Redhill / Reigate and London Victoria with lengthening to 12 car on this route;
- lengthening of peak services between Caterham, Tattenham Corner and London Victoria;
- lengthening of peak services on the London Bridge to Uckfield line;
- lengthening of peak services on the London Waterloo to Reading line;
- lengthening of peak services on routes in south east London; and
- lengthening peak services on the Thameside route into London Fenchurch Street to 12 car.

The overall package of capacity measures for London represents high value for money, an overall benefit cost ratio of roundly 11. Whilst almost all of the individual components of the package provide a benefit cost ratio in excess of 2.0, some components offer exceptional value for money. These include a low cost infrastructure solution for the West Anglia line, and three further interventions which require no further investment in network capability.

Table 21: Socio-economic appraisal of London commuter market capacity package[39]

	Present Value £ million
Net cost to Government (broad transport budget)	226
Net benefits to consumers and private sector	2,503
Net Present Value (NPV)	2,277
Benefit Cost Ratio to Government	11.1
Notes: 30 to 60 year appraisal (varies by component scheme) using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

Congestion relief at strategic London stations

Chapter 4 of the IIP identifies investment choices delivering congestion relief at the strategically important interchange stations in London where work is not already committed or has not been undertaken recently, namely London Fenchurch Street, Clapham Junction, London Charing Cross, London Victoria, London Waterloo and Wimbledon. These particular stations have been identified through industry's planning processes, including the Network RUS: Stations Strategy, as priorities for investment to reduce levels of peak congestion in CP5.

Network Rail will further develop the options and business case for investment over the forthcoming months. This will include the use of detailed pedestrian modelling, although the IIP appraisal supporting documents does include a 'static analysis' of congestion.

[39] The business case presented in Table 21 includes all components of the London commuter market package except the Thameside route. The platform lengthening required to accommodate longer trains on this route is being delivered by Network Rail in CP4

City region commuter market capacity & congestion relief at strategic city region stations

Chapter 6 of the IIP identifies a package of investment choices which deliver additional well targeted capacity for commuter markets across regional cities and their catchments, relieving current incidences of crowing and providing capacity to accommodate the anticipated growth in passenger demand. The overall longer term strategy was developed by the suite of first generation RUSs covering the regional cities, and updated by the second generation Northern RUS.

The components of the overall strategy proposed for CP5 provide a particular focus on routes into Leeds, Liverpool, Manchester and Sheffield where, on average, train loadings are currently high during peak hours and are anticipated to worsen significantly without further intervention. This package also includes investment to relieve congestion at Liverpool Central station.

This package will require changes to be made to network capability at Liverpool Lime Street and Sheffield stations. There is an opportunity to minimise disruption to rail users and deliver this work efficiently during CP5 in conjunction with the planned renewal of life expired signalling assets at these locations.

The outline business case for the overall package is summarised in Table 22.

Table 22: Socio-economic appraisal of city region commuter market capacity package

	Present Value £ million
Net cost to Government (broad transport budget)	331
Net benefits to consumers and private sector	818
Net Present Value (NPV)	487
Benefit Cost Ratio to Government	2.5
Notes: 60 year appraisal using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

The business case presented in Table 22 does not include the specific component of the package delivering additional peak capacity into Liverpool on the Merseyrail network during CP5. This particular component has been appraised as one part of a longer term strategy for the Merseyrail network, which overall provides a socio-economic benefit cost ratio of 2.6.

Midland Main Line long distance capacity

This investment choice delivers longer trains, up to a maximum of 11 cars in length, calling at stations between London St. Pancras International and Nottingham, Derby and Sheffield. This will provide capacity to accommodate the anticipated increase in passengers identified by the East Midlands RUS.

An option has been developed which includes lengthening of all relevant platforms on the route, delivering a benefit cost ratio of 1.4 (Table 23). A more affordable option has also been identified which includes the use of Selective Door Operation (SDO), delivering a benefit cost ratio of 1.8.

Table 23: Socio-economic appraisal of Midland Main Line long distance capacity scheme

	Present Value £ million
Net cost to Government (broad transport budget)	56.4
Net benefits to consumers and private sector	78.0
Net Present Value (NPV)	21.6
Benefit Cost Ratio to Government	1.4
Notes: 30 year appraisal using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

Cross country train service connectivity

This investment choice develops the capability of the network on the route between Leamington Spa and Coventry enabling diversion of the existing hourly service between Reading and Newcastle via the Coventry corridor. This improves the connectivity of the rail service between the North, East Midlands and Birmingham International Airport by providing direct rail services for the first time. This strategy was recommended by the West Midlands and Chiltern RUS. It delivers a benefit cost ratio of 1.5.

Table 24: Socio-economic appraisal of cross country train service connectivity improvements

	Present Value £ million
Net cost to Government (broad transport budget)	26.2
Net benefits to consumers and private sector	40.6
Net Present Value (NPV)	14.4
Benefit Cost Ratio to Government	1.5
Notes: 30 year appraisal using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

Birmingham New Street to Tamworth corridor capacity

This investment choice enhances network capability in the Tamworth area in order to accommodate additional local services between Tamworth and Birmingham New Street, which in turn will relieve crowding on some longer distance services using the corridor. A turnback facility at Tamworth is required to operate these additional local services, which are proposed to link with the existing Birmingham New Street to Worcester services providing better cross city journey opportunities.

These passenger benefits can be delivered efficiently in conjunction with a further package of measures to accommodate the anticipated increase in freight traffic using the corridor. These measures include the installation of four aspect signalling between Water Orton West Junction and Wichnor Junction and provision of a new northern access to Kingsbury freight terminal.

The business case for the entire package of works is presented in Table 25.

Table 25: Socio-economic appraisal of Tamworth corridor capacity scheme

	Present Value £ million
Net cost to Government (broad transport budget)	23.4
Net benefits to consumers and private sector	188.1
Net Present Value (NPV)	164.8
Benefit Cost Ratio to Government	8.1
Notes: 35 year appraisal using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

Western access to London Heathrow Airport

The objective of this investment choice is to improve western access to London Heathrow Airport from the Great Western Main Line. The Great Western and London & South East RUSs identified that whilst Heathrow Airport serves a large catchment covering Greater London and the South East of England, rail access from the west and south west is poorly developed, presently by means of an interchange from Thames Valley stopping services at Hayes and Harlington, or onto connecting road services at Reading, Woking or Feltham stations. Network Rail will develop detailed options and the case for this investment choice over the forthcoming months.

9.4.4 Investing to meet the needs of freight users

The demand for rail freight services has grown strongly since the mid 1990s, driven principally by continued globalisation of trade and containerisation of imports. Demand softened during the recession reflecting the decrease in trade across the world's economy, although intermodal traffic continued to grow virtually throughout.

A return to longer term trend rates of growth in the economy is now forecast to drive further, significant growth in the market. These factors, along with a consistent focus and investment by freight operators to make sure that their customers are served reliably and effectively, are reflected in industry's current long term forecasts which anticipate that rail freight traffic will double over a period of 25 years.

As much of this growth relates to container traffic entering the UK via the deep sea ports, the real choice is not whether to provide for this growth, but how best to provide for it. The underlying trends in the market play to rail's core strengths, that is, moving large volumes of goods efficiently over long distances, often from the UK's deep sea ports. Perhaps more significantly, providing sufficient rail capacity to accommodate longer term growth will avoid the impacts associated with road haulage, principally road congestion and environmental pollution.

Responding to growth in the market, Chapter 7 identifies a number of strategies to deliver a rail network better suited to the needs of freight users. These choices have been developed through industry's Strategic Freight Network group, and there is strong stakeholder support for their implementation. The IIP proposes a fund during CP5 to further develop the Strategic Freight Network. The following schemes are considered to be candidates for progression.

Felixstowe to Nuneaton capacity phase 2

This provides the network capability to accommodate anticipated growth in intermodal traffic from the port facilities at Felixstowe and Bathside Bay, to terminals in the Midlands, North West, North East and Scotland. In addition, it will enable some freight that is currently routed via London to these destinations to use the cross country route instead. This has the potential to offer journey time savings and release capacity on the congested Great Eastern Main Line for other rail services and in the London area in connection with the new London Gateway port. There may also be spin off benefits for passenger services, including better punctuality and reliability and opportunities to increase service frequencies. The scheme has been assessed as delivering a benefit cost ratio of 2.0, which is thought to represent a conservative estimate of value for money.

Table 26: Socio-economic appraisal of Felixstowe to Nuneaton Phase 2 freight scheme

	Present Value £ million
Net cost to Government (broad transport budget)	187
Net benefits to consumers and private sector	374
Net Present Value (NPV)	186
Benefit Cost Ratio to Government	2.0
Notes: 45 year appraisal using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

Gauge clearance on the Great Western Main Line

This scheme enhances the loading gauge to W12 on the Great Western Main Line between London and Bristol and Cardiff, including the connection to the West Coast Main Line at Acton, enabling the network to accommodate forecast growth in 9'6" containers on flows from the deep sea ports to the west. Gauge clearance also enables freight terminals to be developed at Colnbrook (near Heathrow Airport) and Avonmouth. An opportunity exists in CP5 to minimise disruption to rail users and deliver this scheme efficiently in conjunction with the electrification of the Great Western Main Line. A business case will be developed over the forthcoming months.

Southampton to West Coast Main Line capacity

This provides the network capability required to accommodate the forecast growth in freight traffic between the terminals at Southampton and the West Midlands / West Coast Main Line. Infrastructure options for core and diversionary routes will be developed and appraised over the forthcoming months, along with a business case.

West Coast Main Line capacity north of Preston

This scheme will provide the network capability to accommodate the anticipated growth in both freight and passenger traffic in CP5, over the largely two track section of the West Coast Main Line between Preston and Glasgow. Table 27 summarises the business case for this scheme.

Table 27: Socio-economic appraisal of West Coast Main Line (north of Preston) freight scheme

	Present Value £ million
Net cost to Government (broad transport budget)	28.9
Net benefits to consumers and private sector	233.9
Net Present Value (NPV)	205.0
Benefit Cost Ratio to Government	8.1
Notes: 30 year appraisal using social time preference discount rates Present Values (PVs) are in 2002 market prices and discounted to 2002	

9.4.5 Investing to meet the needs of passengers

The latest rail passenger satisfaction survey shows that nationally 84 per cent of passengers are satisfied with their journey overall[40]. In *Planning Ahead 2010* the train operators and Network Rail stated a longer term ambition to deliver a railway in which at least 90 per cent of passengers are satisfied.

Along with further improvements to the fundamental aspects of the rail service (that is, a safe, quick and reliable journey, with a comfortable seat for all but the shortest of trips), delivering better customer service will help the industry to achieve this

[40] Passenger Focus "*National Passenger Survey*" (Spring 2011)

ambition. The IIP identifies a number of investment choices for CP5 (discussed below) to start delivering the industry's longer term ambition, which will be complemented with continued investment in employees.

Better stations and improved passenger information

The IIP proposes investment during CP5 to deliver the Customer Information Strategy set out in chapter 8.

Whilst passengers' expectations for train service information is being met to a reasonable degree under normal circumstances, it is recognised that the timeliness and consistency of information provided during service disruption falls short of both passengers' expectations, and the level of customer service the industry aspires to provide. This became apparent during the recent series of severe winters, and is reinforced by Passenger Focus[41] research which highlights that availability and accuracy of information, especially during periods of service disruption, is ranked highly by passengers as a priority for improvement.

The IIP also proposes a stations improvement fund for CP5 to deliver the improvements set out in Chapter 8, recognising that passenger satisfaction with some aspects of rail stations is often relatively low. The stations improvement programme being delivered in the current control period is conceived locally to meet local needs, and has been able to attract additional third party funding.

Better station accessibility

A small proportion of rail users, between one percent and two percent, have a reduced level of mobility. Where step free access is offered through stations to trains this percentage is far higher, typically four percent, demonstrating the significant benefit which investment in obstacle free access can provide to some passengers.

Investing in station accessibility can also deliver high socio-economic returns; a review of station accessibility investment during the early years of CP4 suggested returns consistent with a benefit cost ratio[42] of more than three.

The IIP proposes an investment fund for CP5 to deliver a programme of station accessibility improvements.

9.4.6 Renewal led opportunities

The IIP identifies a number of additional investment choices (aligned with the strategic intent of the plan) for which a major opportunity to make them at reasonable cost arises during CP5, typically in conjunction with planned renewal of life expired assets.

A typical example is the replacement of life expired signalling layouts at a major terminus or junction. Such layouts were typically first installed 30 or more years ago to support the pattern of rail services at the time, and are not always best suited to today's services, or the pattern of service necessary to accommodate anticipated growth in passengers or better journey times. The necessary improvements can often be made at relatively modest cost in conjunction with the renewals, but making them later on can incur much higher costs, making them less affordable, delivering lower value for money, and potentially causing unnecessary disruption to passengers and freight users.

[41] Passenger Focus "Passengers' priorities for improvements in rail services" (August 2010)
[42] WebTAG socio-economic appraisal benefit cost ratio

The IIP identifies the following once in a generation opportunities for CP5:

- a package of enhancements on the Oxford corridor, delivering benefits to both passenger and freight services;
- East Kent package, delivering improved capacity into London, more trains through the Medway towns, and a better integration between the railway and the town centre in the Rochester area. The socio-economic benefit cost ratio for the scheme has been appraised as being financially positive;
- improved layout at Derby station, delivering better journey times for passenger services through Derby. Work to date has identified several options providing different levels of benefit for a range of costs. Outline appraisal of these options suggest socio-economic benefit cost ratios of roundly 1.0 at present, but Network Rail plans to do further work over the forthcoming months to understand better the efficient cost of the enhancement to improve value for money;
- enhancing the route between Ferriby and Gilberdyke, reducing journey times and improving performance for services to and from Hull. The overall scheme has several components, including reballasting to increase line speeds, remodelling Gilberdyke Junction, provision of a bi-directional loop at Ferriby, and shortening of signalling sections. Outline appraisal work suggests the scheme provides a socio-economic benefit cost ratio of 1.9;
- South Humberside Main Line capacity increase, delivering signalling enhancements to accommodate the anticipated increase in freight traffic over the route from the port of Immingham to the power station at Ferrybridge. The scheme has been appraised as delivering a socio-economic benefit cost ratio of 2.0; and
- Halifax and Bradford Interchange capacity improvements. Network Rail plans to undertake further work over the forthcoming months to develop and appraise options to improve network capability in conjunction with planned renewals in the Halifax and Bradford Interchange station areas during CP5.

9.5 Outputs delivered by the plan

This section summarises the outputs delivered by the IIP in England and Wales. This covers both the outputs delivered by the base plan, plus the incremental outputs associated with the choices and options to deliver better outcomes in areas such as safety, efficiency, economic growth, rail user satisfaction and carbon during CP5.

9.5.1 Safety

The improvement in safety delivered by the plan is illustrated in the tables below.

Table 28: Assessment of public safety

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Fatality weighted index – Public (base plan)	54.7	54.4	54.0	53.7	53.3	53.0
Fatality weighted index – Public (base plan plus options)	54.7	53.9	53.1	52.3	51.5	50.7

Table 29: Assessment of passenger safety

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Fatality weighted index – Passenger (base plan)	48.1	48.1	48.0	48.0	47.9	47.9
Fatality weighted index – Passenger (base plan plus options)	48.1	47.9	47.7	47.5	47.3	47.1

Table 30: Assessment of workforce safety

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Fatality weighted index – Workforce (base plan)	24.2	24.1	24.0	23.9	23.8	23.7
Fatality weighted index – Workforce (base plan plus options)	24.2	24.1	24.0	23.8	23.7	23.6

The main drivers of the continuing improvement in safety risk include station investment, lower risk arising from the development and implementation of new technologies for level crossings where reasonably practicable, improvements delivered by a better safety culture, and improvements to engineering access and electrical isolation arrangements reducing risk to infrastructure workers.

The options and choices for funders identified by the plan reduce safety risk further, reflecting anticipated benefits from the level crossing safety fund, and other investments which result in the replacement of infrastructure and rolling stock with modern equivalents which are often safer than older equipment.

9.5.2 Punctuality and reliability of train services

As described in Chapter 2, the IIP proposes a particular focus during CP5 on improving the punctuality and reliability of the worst performing services, and also improving train service performance on the worst days. As a result, and together with availability of a performance fund, the 'headline' measure of passenger train service performance will improve over CP5, resulting in 93.0 per cent of passenger services arriving on time by 2018/19, but with more significant improvements visible at local level. The performance of freight services will also improve over CP5.

Table 31: Assessment of passenger performance levels

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Public Performance Measure (PPM) (base plan)	92.6%	92.9%	92.9%	92.9%	92.9%	92.9%
Public Performance Measure (PPM) (base plan plus options)	92.6%	92.9%	92.9%	93.0%	93.0%	93.0%

Table 32: Assessment of freight performance levels

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Total freight delay minutes per 100 freight train km (base plan)	2.94	2.96	2.87	2.80	2.68	2.64
Total freight delay minutes per 100 freight train km (base plan plus options)	2.94	2.97	2.87	2.80	2.69	2.65

9.5.3 Passenger capacity

The overall level of peak passenger capacity delivered by the plan has been assessed for central London, plus the large regional cities included in DfT's CP4 High Level Output Specification (HLOS). This assessment reflects existing commitments in the base plan, plus the investment choices proposed for CP5.

The overall level of peak passenger capacity delivered by existing commitments in the base plan has been assessed for central London, plus the large regional cities included in DfT's CP4 High Level Output Specification (HLOS).

This assessment measures average train loadings during the weekday morning peak between 07:00 and 10:00, plus a separate assessment of the busier peak hour between 08:00 and 09:00.

Train loadings are calculated as the number of passengers (measured at the most heavily loaded point on a train's inwards journey), divided by the amount of capacity provided (measured as the number of seats provided plus a further allowance for standing on short trips of less than 20 minutes only). For presentational purposes the overall assessment of train loadings presented in the IIP has been aggregated into large urban areas.

This aggregation will mask incidences of crowding. For example, by the end of CP5 existing commitments in the base plan deliver average train loadings of 77 per cent across central London in the high peak hour. This does not mean that there is 23 per cent spare capacity, because:

- one of the consequences of the flexible 'turn up and go' nature of rail services is that uniform 100 per cent train loadings are unachievable. In practice, some services will be at or over capacity when average train loadings reach 75 per cent to 80 per cent;
- The aggregation will combine a number of routes with different load factors. For example, by the end of CP5 central London will be served by a number of routes with sufficient capacity to accommodate growth (for example, the Thameslink route after completion of Key Output 2), and other routes where further interventions will still be necessary to relieve incidences of crowding;
- on routes where spare capacity does exist, this is generally not transferrable to other routes; and
- The assessment of central London also reflects the anticipated purchase of 'high density' rolling stock (designed with a relatively high standing to seating ratio for short distance trips) for the Crossrail and Thameslink programmes.

Table 33: Three hour weekday morning peak load factors delivered by the plan (07:00 to 10:00) [43]

	Base Plan			Base Plan plus Options		Change in average load factor delivered by options
City Region	Forecast End CP5 Passengers	End CP5 Capacity	Forecast End CP5 Average Load Factor	End CP5 Capacity	Forecast End CP5 Average Load Factor	
Birmingham	40,600	70,950	57%	72,900	56%	-1%
Bristol	10,300	18,400	56%	19,650	52%	-4%
Cardiff	12,700	28,550	44%	28,550	44%	0%
Leeds	32,700	38,800	84%	46,000	71%	-13%
Leicester	6,900	13,500	51%	13,800	50%	-1%
Liverpool	24,100	33,700	72%	41,300	58%	-14%
London	632,700	1,022,750	62%	1,063,600	59%	-3%
Manchester	36,800	53,050	69%	56,550	65%	-4%
Newcastle	3,900	9,500	41%	9,500	41%	0%
Nottingham	4,300	9,350	46%	9,600	45%	-1%
Sheffield	8,500	14,800	57%	15,000	57%	0%

[43] The figures presented are not directly comparable to previous High Level Output Statement 1 (HLOS1) capacity metrics. This is because (a) the number of passengers in the IIP are counted at the most heavily loaded point on each train's journey, which is not necessarily the terminating station (b) capacity is now defined to include a standing allowance only for shorter journeys of 20 minutes or less; and (c) Passengers on Merseyrail services are now included in the overall total for Liverpool. Overall, the metrics used in tables 4 and 5 of the IIP better reflect average train loadings experienced by passengers during peak hours, principally as demand is now measured at the most heavily loaded point

Table 34: One hour weekday morning peak load factors delivered by the plan (08:00 to 09:00)

	Base Plan			Base Plan plus Options		Change in average load factor delivered by options
City Region	Forecast End CP5 Passengers	End CP5 Capacity	Forecast End CP5 Average Load Factor	End CP5 Capacity	Forecast End CP5 Average Load Factor	
Birmingham	21,300	28,400	75%	29,200	73%	-2%
Bristol	4,500	6,200	73%	6,750	67%	-6%
Cardiff	6,800	11,150	61%	11,150	61%	0%
Leeds	16,100	18,350	88%	21,100	76%	-12%
Leicester	3,400	4,900	69%	5,200	65%	-4%
Liverpool	12,000	13,650	88%	16,050	75%	-13%
London Total	315,500	409,800	77%	427,800	74%	-3%
Manchester	18,800	23,550	80%	25,950	72%	-8%
Newcastle	1,800	3,800	47%	3,800	47%	0%
Nottingham	2,300	4,100	56%	4,350	53%	-3%
Sheffield	3,800	5,300	72%	5,400	70%	-2%

The options and choices identified by the plan deliver well targeted increases in capacity, relieving current incidences of crowding not targeted by existing commitments, and providing capacity to accommodate the anticipated growth in demand.

The city region package provides a particular focus on Leeds, Liverpool and Manchester, where anticipated growth means that average train loadings will rise above 80 per cent (in the busiest hour) by the end of CP5 without further intervention. Further choices are also identified for central London to tackle incidences of crowding which do not benefit from commitments in the base plan.

Overall, across large regional cities the plan delivers a 15 per cent increase in peak capacity by the end of CP5 relative to today's level of service. Roundly half of this extra capacity is delivered by existing commitments, whilst the rest is delivered by the additional choices and options identified by the plan.

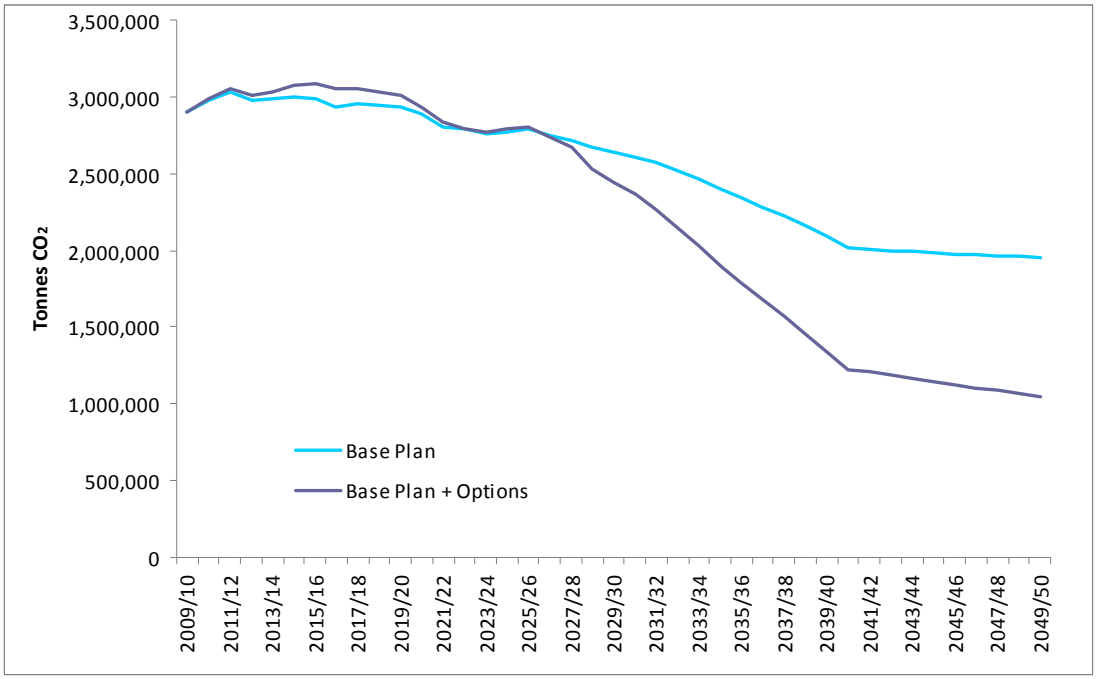
In London, the plan delivers a 45 per cent increase in central London peak capacity by the end of CP5 relative to today's level of service. Most of this extra capacity, 40 per cent, is delivered by existing commitments including the Crossrail and Thameslink Programmes, although a large part of this arises from the procurement of high density new trains (with a relatively high standing to seating ratio to accommodate short distance trips) for Thameslink and Crossrail services. The overall level of additional capacity delivered by the plan in London is less if measured using vehicle arrivals or seats.

In total, the plan delivers an additional 170,000 seats at peak times for commuters relative to today's level of service.

9.5.4 Carbon

Figure 16 illustrates the anticipated long term trajectory in traction carbon emissions from rail services, where the range of investment options and longer term strategies proposed in this IIP are delivered.

Figure 16: Traction carbon emissions



In the short term, additional traffic resulting from investment choices proposed in the IIP will increase carbon emissions relative to the base plan. However the additional electrification options proposed for CP5 followed by a rolling programme of electrification in line with the Network RUS: Electrification strategy, coupled with the decarbonisation of electricity generation, will underpin the very low carbon railway required in future.

With this investment the industry could achieve cost-effective reductions in absolute carbon emissions of 64 per cent by 2050, from 2009/10 levels. Beyond this, additional investment is likely to be necessary. The industry will continue to prioritise the identification and delivery of further improvements in carbon and energy efficiency, for example in seeking to develop and deploy alternatives to self powered, diesel rolling stock. These will be further incentivised through the implementation of the Industry Carbon Management Framework.

9.6 Affordability of the plan

Chapters 2 and 3 of the IIP describe how the industry plans to deliver the outputs of the railway more efficiently in response to economic priorities and the challenge to reduce costs. In part, this will be delivered by a number of investments to reduce operating costs, including the network operating strategy. Overall, this will result in a much reduced level of underlying[44] taxpayer support by the end of CP5.

Support for the railway in England and Wales is forecast to fall from £2.9 billion in 2014/15 to £1.0 billion by the end of CP5, reflecting delivery of the efficient railway identified by the RVfM study and continued growth in passenger and freight demand. This is equivalent to a reduction in support from 5.1 pence per passenger km to 1.6 pence per passenger km.

[44] "Underlying" support refers to the difference between whole industry costs and income. The actual value of support provided by funders at any point in time may differ due to adjustments and the nature of risk allocation contracted in Franchise Agreements (FAs)

In England and Wales the industry could produce a surplus over costs by 2023/24, although the London and South East and Long Distance sectors could fully recover their allocated costs several years earlier.

These forecasts assume delivery of cost savings consistent with the 'low' efficiency scenario identified by the RVfM study's "should cost" analysis. Delivery of further efficiencies consistent with the RVfM study's 'high' scenario could all but eliminate rail subsidies in England and Wales by the end of CP5.

The forecasts exclude the net impact on public finances of High Speed 2 Ltd's proposals for a high speed network linking London, Birmingham, and cities across the North and Scotland.

Table 35: Forecast of support for the railway in England and Wales (2011/12 prices)

	2014/15	2015/16	2016/17	2017/18	2018/19
Base plan 'low' efficiency (£million)	2,869	2,469	1,998	1,510	985
Per passenger km (pence)	5.1	4.3	3.4	2.5	1.6
Base plan 'high' efficiency (£million)	2,622	2,061	1,379	705	27
Per passenger km (pence)	4.7	3.6	2.3	1.2	0.0

The impact of the investment choices identified by the IIP for CP5 on overall industry affordability is assessed in Table 36. This assessment assumes that:

- the choices identified by the IIP are all delivered in full;
- investment continues throughout Control Periods 6, 7 and 8 to provide sufficient capacity to accommodate longer term growth in the market. The assessment includes an estimate of the longer term operational costs and revenues associated with this policy, along with assumed capital investment of £1 billion per year in Control Periods 6, 7 and 8; and
- the assessment assumes delivery of the 'low' efficiency scenario identified by the RVfM study's "should cost" analysis.

Table 36: Forecast of support for the railway plus additional options and choices identified by the IIP to deliver better outcomes in England and Wales (2011/12 prices)

	2014/15	2015/16	2016/17	2017/18	2018/19
Base plan (£million)	2,869	2,469	1,998	1,510	985
Base plan plus options (£million)	2,909	2,552	2,135	1,726	1,245
Difference (£million)	40	83	137	216	260

Relative to the base plan, the choices and options identified by the IIP to deliver better outcomes in areas such as safety, efficiency, economic growth, rail user satisfaction and carbon, require a further £260 million of support in the final year of CP5, although the value of Network Rail's net debt is higher (Table 37). The wider socio-economic benefits generated by this extra support and debt is reflected by the investment appraisals in this chapter.

Table 37: Network Rail's net debt, England & Wales (£ million 2011/12 prices)

	2014/15	2015/16	2016/17	2017/18	2018/19
Base plan (£million)	29,940	30,790	30,900	30,610	29,680
Base plan plus options (£million)	30,720	32,610	33,810	34,530	34,420

The principal determinants of the level of support required at the end of CP5 are income growth and efficiency. Relative to these, the impact of the investment choices identified by the IIP is small. This reflects the way in which rail projects are typically financed. It is also a reflection of the choices themselves, some of which deliver lower net operating costs (such as further network electrification), whilst others increase net operating costs in order to generate wider economic and social benefits.

The industry's subsidy requirement is driven to a significant extent by the need to remunerate historic investment which is reflected in Network Rail's Regulatory Asset Base and associated debt. This debt reflects recent investment to expand the railway but also historic costs inherited at the time Network Rail took over ownership of the infrastructure and the cost of addressing the backlog from previous underinvestment in renewals. An illustrative £10 billion repayment of these sunk costs along with a £15 billion reduction in the Regulatory Asset Base in 2013/14 would reduce support for the railway in England and Wales in the final year of CP5 by approximately £530 million.

9.7 Deliverability of the plan

The capital expenditure implied by this plan to be delivered by Network Rail has been assessed for deliverability. The assessment has covered the control period spend and profile for each asset and enhancements and compared it to the plan for delivery in Control Period 4 (CP4). The assessment has been carried out for the totality of the capital expenditure programme including renewals as well as enhancements. Overall there is a slight increase (less than five per cent) in total capital expenditure from CP4 to CP5. The largest areas of growth are in signalling and electrification works. Key deliverability risks have been identified, along with associated mitigating actions. Key areas to be developed and understood are around access to the network and management of critical signalling resource. Generally, there is not considered to be a significant issue in putting the mitigating actions into effect. There are no significant overall deliverability concerns implied by the capital expenditure forecast. The use of future alliances and partnerships will also assist in robust delivery.

9.8 Risks and uncertainty

The IIP describes the assumptions used in developing the industry's plans, all of which are subject to a degree of uncertainty which may impact on outcomes. This section describes the key areas of risk and uncertainty.

Cost efficiencies

It has been assumed that the industry will at least achieve the minimum efficiency levels set out in the RVfM study. There are risks to the industry's ability to achieve these savings in the following areas:

- industry and regulatory reform: achieving the level of efficiencies assumed in the plan is contingent on reforms to the franchising and regulatory frameworks to provide Network Rail and train operators with the necessary freedoms and incentives to realise the opportunities identified in this plan. The scale and pace of cost savings are therefore driven to a large degree by the scale and pace of these reforms
- business and operating environment: significant Network Rail and train operator efficiencies are assumed to be delivered through the application of modern operating methods and the use of new technologies. There will be a need to mitigate against industrial relations risks which may come about as these proposals are developed
- input prices: plans have been developed on the basis of the current forecasts of input prices, particularly workforce and materials costs. If real wage increases, global commodity or energy prices vary significantly from current forecasts this will impact on the net levels of efficiency to be achieved.

Passenger revenue

Passenger revenue forecasts reflect assumptions about the pace of employment, population and economic growth over the longer term, and the relationships between these wider factors and the demand for rail. There are uncertainties (both upside and downside) in any economic forecast which may result in demand being different from that forecast. There are other external factors which, if they arise, would have a significant impact on the demand for rail, for example changes to wider transport policy.

10 Next steps

The Initial Industry Plan (IIP) has been developed in order to meet the needs of funders, in particular to reduce costs, support economic growth, and address the key drivers of customer satisfaction. The key outputs the industry believes it should focus on in Control Period 5 (CP5) are:

- maintaining high levels of safety and reducing risk at level crossings. The IIP sets out proposals to achieve reduce safety risk by 50 per cent in CP5;
- closing the gap in performance between operators by improving lower levels of performance. The IIP sets out proposals to achieve 93 per cent PPM by the end of CP5;
- delivering value for money and affordable enhancements in rolling stock and infrastructure capacity to support economic growth. The IIP sets out proposals to provide 170,000 more seats at peak times for commuters and accommodate 30 per cent more freight traffic by the end of CP5;
- addressing key drivers of user satisfaction including improved passenger information, the station environment and accessibility ;
- striking the right balance between when users wish to operate services and when the infrastructure needs to be maintained, renewed and enhanced in order to maximise net industry value and revenue; and
- improving the carbon efficiency of the railway. The IIP is forecasting a reduction in CO_2 emissions of 25 per cent per passenger kilometre.

10.1 Developing the High Level Output Specifications

The industry does not believe all these outputs should necessarily be specified in the High Level Output Specification (HLOS). Certainly any outputs that are critical to achieving the desired outcomes need to monitored and plans developed to improve them.

10.1.1 Passenger satisfaction

Passenger satisfaction is a key outcome that should be measured, and the industry recognises that action plans for improvement must be developed. However, there are key factors that influence satisfaction which are beyond the industry's control such as fares policy, for example, which impact on price and the perceived value for money of the service. The relationship between action and outcome is complex and this makes forecasting and costing improvements in user satisfaction difficult to do with certainty. The industry is recommending that passenger satisfaction is monitored and used to track the impact of its actions but not included in the HLOS as a specific target.

10.1.2 Freight user satisfaction

The complexity of the different logistics chains involved in the various rail freight markets, together with the more directly commercial and competitive customer interface which freight train operators have, render it difficult to construct a specific customer satisfaction metric akin to the survey type measures used in the passenger railway. As a proxy, therefore, it is proposed that, once the suite of existing performance metrics are enhanced, these and other output metrics can be used as an indicator of customer satisfaction.

Rail freight is a competitive market and all rail customers have choice – both of rail freight provider or of other modes of transport. In the end customers can – and occasionally do – exercise that choice if the rail freight industry does not deliver the service or product they require. Competition therefore provides incentives on freight operators to maintain and improve customer satisfaction.

10.1.3 Safety

Rail continues to be one of the safest forms of transport and Britain's railways compare very favourably against the rest of Europe. As stated in the European Safety Directive, the overarching safety requirement for European railways is to maintain safety and improve it where reasonably practicable. The individual organisations within the rail industry manage the businesses to meet this aim. In CP4, achieving this aim will additionally ensure that the passenger and workforce safety targets laid out by the Department for Transport (DfT) in the HLOS are met.

The industry's legal and statutory obligations provide organisations with a clear safety objective. The industry believes that it is therefore unnecessary to specify in the HLOS a general safety output as was the case in CP4.

Network Rail has set out a proposal for additional funding to go beyond its statutory obligations in reducing risks at level crossing and is seeking explicit specification and funding for this in the HLOSs and Statement of Funds Available (SoFAs).

10.1.4 Reliability outputs

Reliability outputs should be a key HLOS output measure. Good performance allows the industry to deliver its promised service offer to its customers. Performance is the most important driver of customer satisfaction and poor performance potentially imports cost into our plans in order to mitigate it.

National Task Force has discussed the strengths and weaknesses of the current Public Performance Measure (PPM) and possible alternatives, based on the following criteria:

- driving performance improvement in the areas which have the biggest impact on rail usage, revenue and satisfaction;
- being easy to understand by the public, stakeholders, funders and the industry;
- being possible to measure with current systems; and
- being a true indicator of the experience of passengers using the train service

PPM's strengths are that it is easy to understand and is already being used and the systems support it. It does, with the supplement of the Cancellation and Significant Lateness (CaSL) measure, focus the industry on driving performance improvements but clearly does not capture the complete passenger experience. For example, it does not measure punctuality at intermediate stations nor measure a "right time" railway.

However analysis provided to National Task Force demonstrated a strong correlation between very different performance metrics, indicating that PPM has not led to perverse behaviour and improvements in PPM have resulted in the average lateness of our passengers falling. The analysis also indicated that improving PPM has improved "right time" (as per the published passenger timetable) and to improve PPM the industry has focused on initiatives which remove small but consistent delays. Delivering right time is recognised as critical, particularly in a congested and complex railway where the knock on impact is significant.

In summary National Task Force concluded that:

- PPM is a train based measure and a good indicator of "passenger performance";
- passenger PPM is impossible to measure accurately;

- alternative metrics weighted by passenger or station stops result in similar levels of reported performance;
- industry is already incentivised to focus on passenger lateness by the performance regime in track access contracts; and
- all measures are open to challenge that it isn't reflective of any single journey experience.

Industry therefore recommends that PPM should be retained along with CaSL as the key measure of poor performance.

The industry recognises that there is a separate and important discussion about the level of disaggregated performance data (e.g. by station, service group, time of day, even by train) that should be published.

For freight services, Network Rail and its freight customers are reviewing the appropriateness of the current measure and will be developing proposals for inclusion in the SBP.

10.1.5 Capacity

The first HLOS specified capacity outputs in a number of ways. Firstly, by specifying project outputs, for example in terms of the outputs of the Thameslink Programme. Secondly in terms of funds with specific objectives, for example the Strategic Freight Network. Thirdly by expressing output metrics in terms of load factors and passenger kilometres to be accommodated, although these were underpinned by specimen schemes identified through the Route Utilisation Strategies (RUSs).

Funders specifying outputs, rather than focusing on inputs, allows the industry flexibility to develop the most cost effective way of delivering the required capacity and to explore options such as the combination of timetable change, rolling stock and infrastructure interventions. It also allows flexibility to adjust the plans to changing circumstances, including being able to adjust the plans in light of the outcome of the franchise re-letting process.

The industry will work the Department for Transport (DfT) to explore alternative options for specifying capacity. A key issue will be the level of disaggregation at which capacity outputs could be specified. The industry will share with DfT its underlying route based analysis of demand and capacity analysis that supports the IIP to inform these discussions.

10.1.6 Availability

The key objective for the industry is to strike the right balance between the provision of services and access to maintain the network, in order to maximise industry value and revenue. This requires train operators and Network Rail to develop access strategies that make clear the priorities in terms of key passenger and freight flows and the opportunities to examine the trade off between delivering the timetable and providing access to the network to maintain, renew and enhance the network in an efficient way.

The Possession Disruption Indices (PDIs) for passenger and freight, whilst providing a useful network measure of changes in access and availability, have a number of weaknesses. These include not being widely understood, and being difficult to disaggregate. It is proposed that alternative measures be looked at for CP5.

A cross-industry working group comprising representatives from Network Rail, the Association of Train Operating Companies (ATOC), Passenger Focus, freight operators, long distance operators, regional operators and commuter operators will be established. This group will develop alternative measures and make recommendations on those to be adopted in CP5.

A staged approach will be taken assess what measures will be adopted for CP5. This will identify the attributes of a good measure; test the existing measures against those attributes; make recommendations for amending existing measures and create new ones; and finally agree those to be taken forward.

The suites of measures for CP5 will be agreed before the end of 2011/12 in order that they may be used to gather baseline information in 2012/13 and 2013/14 to provide early indication of the trends going into CP5. Once the measures have been established, targets for CP5 can be developed in light of the Route Network Availability Strategies.

10.1.7 Journey time

One of the key competitive advantages of the rail industry is its ability to provide fast journeys for both passengers and freight users. The National Passenger Survey highlights that there is general satisfaction amongst current users with journey times, but the industry recognises that to attract new business all aspects of its service offer should be kept under review. The significant improvements in volume and market share achieved on the West Coast Main Line experienced since the completion of the major infrastructure upgrade and introduction of faster, more frequent train services demonstrate that improving journey times significantly results in more traffic using the network.

Britain's rail network is increasingly busy, and is generally mixed traffic, resulting in a mix of train types, speeds and stopping patterns. In some cases more capacity can be delivered through ensuring that the timetable is optimised over particularly congested route sections, which may result in the fastest trains having additional scheduled time to allow more trains to pass through at a similar speed. Paradoxically, in some cases, faster running time may reduce the total capacity available over a route, or result in reduced operational performance if contingency timings are reduced, with consequential impacts on other operators.

Improving journey times therefore depends upon a set of complex relationships between infrastructure capability, the performance of rolling stock and the demand for train services on the network. The complexity of timetabling long distance passenger and freight services means that local changes may not be easily integrated across the whole system, although with a steady base timetable there is more potential to implement changes that reflect developments in service specification and network characteristics that generate benefits for users.

Particularly for passengers, the time spent on the train is not the only component of journey time, and there will be a trade off between frequency, which reduces waiting times, and faster journey times which may reduce the total capacity of a route. Faster journeys between principal stations may require changes to stopping patterns elsewhere, which may not be commercially or operationally feasible.
The industry does not recommend that a specific measure of journey time change be developed or included as a target in the next HLOS process, given its complexity and the requirement to optimise the use of the network.

During the coming years, there will be opportunities to review and where possible improve journey times. Some of the key drivers will be:

- further electrification, which provides more consistent traction performance as well as improved acceleration and deceleration;
- introduction of new rolling stock and the cascade of better performing modern trains across the network;
- upgrades to infrastructure, including signalling renewals, new track capacity and potential improvements to route alignment and geometry; and
- changes to train service specification, mainly but not exclusively through the franchising process, resulting in greater optimisation of performance and journey time outputs.

The industry will take advantage of opportunities to improve journey times where possible, as one of the main drivers of growth and customer satisfaction. As the issues are complex, and individual operators' aspirations need to be assessed in the light of the rights of other access holders, journey time opportunities will be part of the route planning process, recognising that defining the correct outcome will not necessarily be a mechanistic process, to reflect the diversity of both the rail network and the markets that it serves.

10.1.8 Carbon

The industry recommends that carbon reduction is not subject to an HLOS or regulatory output metric in CP5. There is a risk that any metric would have the potential for perverse knock on effects in meeting other targets with important social and economic benefit, particularly in the wider context of transport industry carbon savings brought about by modal shift. This is a particular risk given that the relationship between key operational issues, for example timetabling and performance, and energy consumption is very complex and currently not well understood. The industry believes that the best way forward is for it to commit to developing and implementing a robust and comprehensive carbon management framework as part of its planning for CP5.

10.2 Consistency between the High Level Output Specifications and franchise outputs

Clarity of purpose, alignment of objectives and common incentives have been identified as key enablers to the industry delivering a better value for money and more affordable railway. Consistency of outputs between those specified in the HLOS, the periodic review process more generally, and the franchising process will support a common set of objectives between train operators and Network Rail. Greater consistency of the specification between the two processes will facilitate train operators and Network Rail developing joint improvement plans across a range of outputs, aimed at delivering a common set of system outputs as well as individual organisational obligations. This requires consistency in terms of the outcomes and outputs specified, the metrics used to measure the outputs and the levels of output sought. To achieve this, greater alignment is required between the outputs procured through the franchising and periodic review processes. A key difficulty in achieving consistency between Network Rail's outputs and individual franchise commitments as franchises are re-let, is the different timings of when outputs are specified between the periodic review process and the individual franchise re-lettings, and the different planning horizons of the two processes. To achieve this consistency requires a more transparent, collaborative and iterative framework within which Network Rail's output obligations and the output obligations of individual franchises

and the franchises as a whole, can be continuously reviewed for consistency and with capability to flex outputs to maintain alignment.

10.3 Local outputs

The IIP includes a range of options that can contribute to sustainable economic growth and the needs of users at a national, regional and local level. The IIP thus provides a menu of choices not only to inform the development of the HLOSs but also for other public funders as well as possible private funders with more specific regional or local goals.

10.4 Reform

The IIP makes clear that delivering improved value for money requires significant change to how Network Rail and train operators work together and the framework within which they operate. The franchise and regulatory frameworks must provide the appropriate freedoms and incentives for the industry to deliver better value for money through a more mature commercial relationship based on a stronger sense of trust and common purpose. The industry, particularly through RDG, will continue its discussions with funders and the Office of Rail Regulation (ORR) to change the regulatory and franchising frameworks to facilitate this closer working.

10.5 Improving value for money

The Rail Delivery Group (RDG) is developing its future work plan, focusing on the key cross-industry issues to be addressed to deliver improved services to rail users and value for money to the taxpayer. Ultimately the outcome of RDG's activities will be reflected in the future cost savings delivered by Network Rail and train operators.

Network Rail will continue to develop it efficiency plans and reflect progress in its Strategic Business Plan (SBP). Through the process of progressive assurance towards the SBP, Network Rail will continue its engagement with ORR on the development of its plans for CP5 and beyond. Network Rail and train operators will continue to explore opportunities to develop deeper partnerships through alliancing.

The programme of franchise re letting will provide the opportunity for funders to capture further efficiencies but reform to the franchising framework is required to deliver further efficiency savings beyond those captured in the current franchising process. Set out below is the replacement programme for the current franchises between now and the end of CP5:

Year	Franchises
2012	Greater Anglia
	Intercity West Coast
2013	Greater Western
	Essex Thameside
	Thameslink
	Northern
	Intercity East Coast
2014	South Eastern
	London Overground
	Scotrail
2015	TransPennine
	East Midlands
	South Central
	West Midlands
2016	Cross Country
2017	South West Trains
2018	Wales and Borders

The industry looks forward to engaging with DfT and Transport Scotland on the development of the franchising framework and the individual specifications in order to deliver a better value for money railway.

10.6 Developing the Strategic Business Plan

Network Rail will publish its Strategic Business Plan (SBP) in January 2013. This will set out how Network Rail intends to deliver the outputs specified in the HLOSs in a cost effective and sustainable way. Network Rail will work with train operators on a bilateral basis and through established industry groups such as National Task Force to develop the required forecasts of whole system outputs and to develop the strategies to deliver these outputs.

The SBP will reflect the impact of devolution on Network Rail's plans. The SBP will include forecasts of outputs and expenditure at both a network and operating route level including route based asset management plans.

10.7 How you can contribute

Network Rail, ATOC, RFOA and RIA welcome feedback on the contents of this publication.

Feedback can be submitted electronically to Calvin Lloyd at the following address:

planningahead@networkrail.co.uk