National Audit Office

REPORT BY THE
COMPTROLLER AND
AUDITOR GENERAL

HC 828
SESSION 2010–2011

1 APRIL 2011

Office of Rail Regulation

Regulating Network Rail's efficiency

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Amyas Morse
Comptroller and
Auditor General

National Audit Office

28 March 2011

The Office of Rail Regulation is the independent economic and safety regulator of the rail industry in England, Scotland and Wales. The Regulator's duties include promoting economy and efficiency in the rail industry.

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This report can be found on the National Audit Office website at www.nao.org.uk/network-rail-2011

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Summary

1 The Office of Rail Regulation (the Regulator) is the independent economic and safety regulator of the rail industry in England, Scotland and Wales. The Regulator's duties include promoting economy and efficiency in the rail industry. Much of the Regulator's work focuses on Network Rail, the owner and monopoly provider of the national rail network (including track, signalling and stations). In 2009-10, Network Rail spent £6.4 billion on the network.[1] In the same year the Regulator spent £14.3 million (0.2 per cent of Network Rail's expenditure) on functions other than rail safety, including the economic regulation of Network Rail.

2 The Department for Transport (the Department) is responsible for rail policy, and secures delivery of passenger services through franchise agreements with train operators awarded through competition, and monitors operators' performance. The Department also specifies the outputs (such as capacity and reliability) that the rail industry, including Network Rail, must deliver. Network Rail differs from most companies in other regulated industries in its governance and financial structure. It is a not-for-dividend private sector company limited by guarantee, financed not by equity but by debt, guaranteed by the Government. In 2009-10, Network Rail received £3.7 billion in direct taxpayer support in addition to its charges to network users.

3 The Regulator must judge how efficient Network Rail is and can be (whether it could spend less and still deliver its required outputs), and must incentivise it to improve its efficiency. Central to the Regulator's work is determining the charges that Network Rail can levy on passenger and freight train operators for access to its network. It does this through regular Periodic Reviews, the most recent of which was published in 2008, determining charges from April 2009 to March 2014. These charges totalled £1.5 billion in 2009-10. Charges to passenger operators are ultimately borne by tax- and fare payers, via ticket prices and levels of operator subsidy.

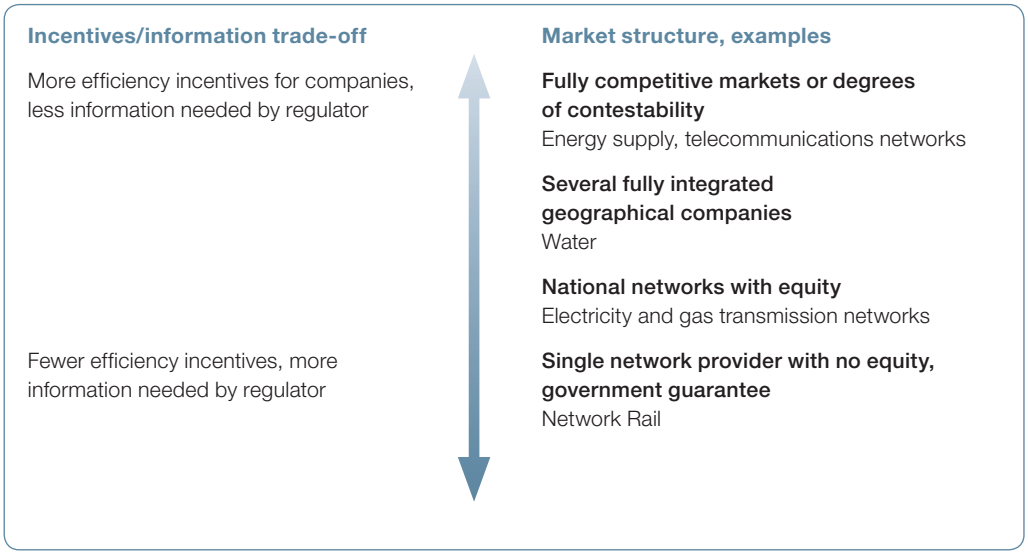
4 In this report we focus on the Regulator's effectiveness against two key requirements:

- there must be strong incentives on the regulated company to achieve efficient and sustainable levels of cost; and
- there must be robust information for the Regulator to judge what level of cost is efficient and sustainable, and how the regulated company's performance compares with that efficient cost.

5 We consider that a regulated company is more likely to seek greater efficiency and reveal its true efficiency potential when it has strong incentives to do so from shareholders, lenders and customers. Where these incentives are weak, the Regulator must rely more on good quality information on the company's costs and its potential for improvement (**Figure 1**).

1 All monetary amounts in the report are stated in 2009-10 prices.

Figure 1
Requirements for effective regulation of cost efficiency



Source: National Audit Office

6 Our report reviews Network Rail's efficiency outcomes as reported by the Regulator (Part Two), then considers incentives (Part Three) and information (Part Four).

Key findings

The Regulator has contributed to improving Network Rail's efficiency, but reports that a substantial efficiency gap remains

7 Network Rail was established in 2002 following the collapse of the previous rail network provider, Railtrack, after the accident at Hatfield in October 2000. Maintenance and renewal expenditure on the network increased substantially immediately after the accident. By 2003-04, the first full year of Network Rail's operation, it was 137 per cent above the average in the four years preceding the accident, partly because the company addressed a backlog of work. Network Rail has since reduced expenditure, with maintenance and renewal expenditure £409 million lower in 2009-10 than in 2003-04.

8 According to the Regulator's assessments Network Rail made cumulative efficiency savings of 27 per cent in the five years to 2008-09 (equivalent to £1.8 billion in 2008-09). This was below the Regulator's assumption of 31 per cent. For operating expenditure, where some comparisons are available, Network Rail's reported efficiency gains compared favourably with other regulated industries, although caution is needed in such comparisons. Published data on reliability and safety (as measured by fatalities or serious injuries) indicate Network Rail maintained or improved performance against these measures at the same time as reporting these efficiency gains and handling increased passenger demand.

9 The Regulator has determined that substantial scope remains for Network Rail to improve its efficiency. The Regulator estimates that Network Rail's maintenance and renewal activities were 34 to 40 per cent less efficient in 2008 than the most efficient level attained by European rail infrastructure managers. According to the Regulator's assessment this was the same relative gap as in 2003, despite the absolute efficiency improvements reported for Network Rail between 2003 and 2008. The Regulator determined that Network Rail could improve its efficiency by 21 per cent in the five years to March 2014 – equivalent to a saving of £940 million in forecast spending for that year. Network Rail questions the comparability of the data used in the Regulator's estimate of its relative efficiency, but has accepted that it can deliver the outcomes specified by the Department within the financial settlement determined by the Regulator.

Incentives for Network Rail to find efficiency savings are weaker than those facing other regulated companies

10 The Regulator adopts the same incentive-based approach that other UK economic regulators use. The Regulator's assumptions set a benchmark against which Network Rail is measured, and have helped to drive the savings that the company has achieved.

11 The Regulator is, however, unable to rely on many of the incentives that drive efficiency savings in other regulated industries. In most sectors shareholder and lender pressure, and regulators' comparisons of the relative efficiency of different companies, provide strong incentives to outperform efficiency assumptions. Network Rail, however, has no shareholders. It is financed by debt guaranteed by the Government; and it holds a national monopoly over the rail network.

12 Network Rail's main incentives to find greater efficiency are the reputational incentives on management to demonstrate that the company is efficient, and the component of Directors' remuneration relating to efficiency performance. The Regulator can specify objectives for the management incentive plan. The Regulator has in the past expressed surprise at, or a need for further justification of, the levels of executive bonuses awarded by Network Rail. Network Rail is currently reviewing its management incentive plan.

13 The Regulator and the Department have commissioned a wide ranging Rail Value for Money Study led by Sir Roy McNulty, former chairman of the Civil Aviation Authority. The Study's interim report highlighted the need to better align incentives in the rail industry to improve efficiency.

14 We judge that the skills and capabilities available to the Regulator to set efficiency assumptions and measure performance against them are broadly fit for its current purposes, and can also add value if deployed on projects subject to direct agreements between Network Rail and funders. The Regulator needs to be prepared to adapt to any changes in its role in the light of possible changes to industry and regulatory frameworks.

The Regulator has performed innovative benchmarking analysis but there are gaps in its information on Network Rail's own unit costs

15 The Regulator collects and uses information from Network Rail (audited by Independent Reporters) and other sources to assess the company's spending requirements at current levels of efficiency, its potential for efficiency gains, and its achievement of efficiency gains. For its latest Periodic Review the Regulator used a wide and expanded range of analyses, including innovative work on international efficiency benchmarking, to judge the potential for efficiency gains.

16 The Regulator needs good unit cost information to:

- have confidence in the unit cost assumptions underpinning the baseline spending (spending before efficiency gains) assumed in its settlement;
- judge the potential for further efficiency gains in future, and how quickly they can be realised; and
- measure the efficiency gains achieved during a control period.

17 Given the size of the estimated efficiency gap by comparison with international operators, information on Network Rail's internal unit costs was not critical to the Regulator's judgement on the percentage figure for potential efficiency improvement in the five years to March 2014. If Network Rail's efficiency improves, it should move closer to the most efficient overseas operators. Its own unit costs can then make a greater contribution to judging efficiency potential, for example, by comparing costs for similar activities in the more autonomous regional units proposed by the company.

18 Network Rail, with the Regulator's encouragement, has worked to improve the quality of its unit cost information from the poor position it inherited from Railtrack. But limitations in the coverage and reliability of Network Rail's unit cost information have restricted its contribution to the Regulator's assessment of efficiency potential and the gains actually achieved. The Regulator added these limitations to its list of matters to escalate with Network Rail for the first time in July 2010.

The Regulator has identified an efficiency gap but this is not yet fully explained

19 The Regulator considers that it is Network Rail's responsibility to lead on understanding the efficiency gap, in order to find the efficiency savings it has signed up to. It has, however, undertaken and commissioned its own work which has identified and quantified a number of reasons for the gap. However, a significant proportion remains to be understood or quantified.

20 It will be important for the Regulator to maintain a well informed understanding of the reasons for the gap as it narrows. The Regulator needs this understanding to have confidence in the amount of the gap which is within Network Rail's control, and the time period within which that control can reasonably be exercised.

21 Infrastructure costs in the UK are generally higher than elsewhere in Europe, and the Regulator's analysis has helped inform this understanding within government. There is a risk that allowances for input price inflation above general inflation, made by the Regulator (and by other economic regulators) when setting efficiency assumptions, may contribute to these high costs.

Conclusion on value for money

22 The Regulator has significantly developed the range and quality of analyses used in regulatory settlements and the methods it uses to judge efficiency, for example, through innovative work on international benchmarking. It has required substantial efficiency improvements from Network Rail, and reports that the company has come close to achieving them. There are, however, weaknesses in the Regulator's information on Network Rail's unit costs, and it needs to develop a better understanding of the reasons for the efficiency gap relative to more efficient operators. We judge that these limitations have not been critical to the pursuit of value for money to date, because of the scale of the efficiency potential revealed by the Regulator's external benchmarking. We believe that these weaknesses must be addressed promptly, however, in order to improve confidence that:

- efficiency targets for the next control period reflect Network Rail's true potential to secure value for money as the efficiency gap narrows; and
- reported efficiency gains correctly reflect Network Rail's actual performance.

Recommendations

23 The rail industry is currently subject to a wider Rail Value for Money Study. Our own recommendations therefore focus on actions by the Regulator which could improve confidence in value for money, taking account of the broad thrust of that wider review without pre-judging its outcomes.

a **Network Rail's unit cost information has improved but weaknesses in quality and coverage remain.** The Regulator should:

- require Network Rail to improve the quality, coverage and geographic breakdown of its unit cost and work volume information to the point where it can be a more valuable component of both Network Rail's own plans and internal benchmarking, and the Regulator's efficiency judgements in the next Periodic Review;
- work with Network Rail to improve its confidence in the breakdown of reported cost reductions between unit cost efficiencies, scope efficiencies and deferrals, and satisfy itself that the latter do not compromise short- or long-term delivery of required outputs; and
- adjust for levels of input price inflation different to those assumed in settlements, when reporting efficiency savings made by Network Rail.

b **The reasons for the evident efficiency gap relative to other rail infrastructure operators have not been fully quantified, and civil engineering costs generally are higher in the UK than in most of Europe.** The Regulator should work with Network Rail to understand better the reasons for the evident efficiency gap relative to the most efficient European operators, and the opportunities to bridge it. It should also work with other regulators and Infrastructure UK to understand the reasons for the generally high level of UK infrastructure costs, and to address any aspects of regulatory frameworks that may contribute to it.

c **The Regulator has found it difficult to reconcile the levels of management bonuses with its own assessment of Network Rail's performance.** The Regulator should amend Network Rail's licence conditions to require it to have regard to the Regulator's assessment of performance when setting management bonuses, as well as (as currently) stating how it has reflected that assessment in its decisions. The Regulator should also ensure that measures of efficiency used within the management incentive plan align well with its own measures of progress towards improved efficiency.

d **The interim report of the Rail Value for Money Study highlighted the need to better align incentives in the rail industry to improve efficiency.** Whatever new structures or realignment of incentives emerge from the Study, the Regulator should ensure that progress made in improving understanding of Network Rail's costs and reporting efficiency gains is protected and built upon within the regulatory regime.

e **Direct agreements between Network Rail and funders have covered the major Thameslink and CrossRail schemes and may continue to feature in the rail investment programme.** If direct agreements between Network Rail and funders for infrastructure provision are necessary, the Regulator should nevertheless have the opportunity to engage with their development, to satisfy itself that they represent efficient cost and do not expose tax- and fare payers to excessive risk.

f **Any substantial change to the Regulator's role could present resource challenges.** The Regulator should be prepared to undertake or commission a capability review in these circumstances.

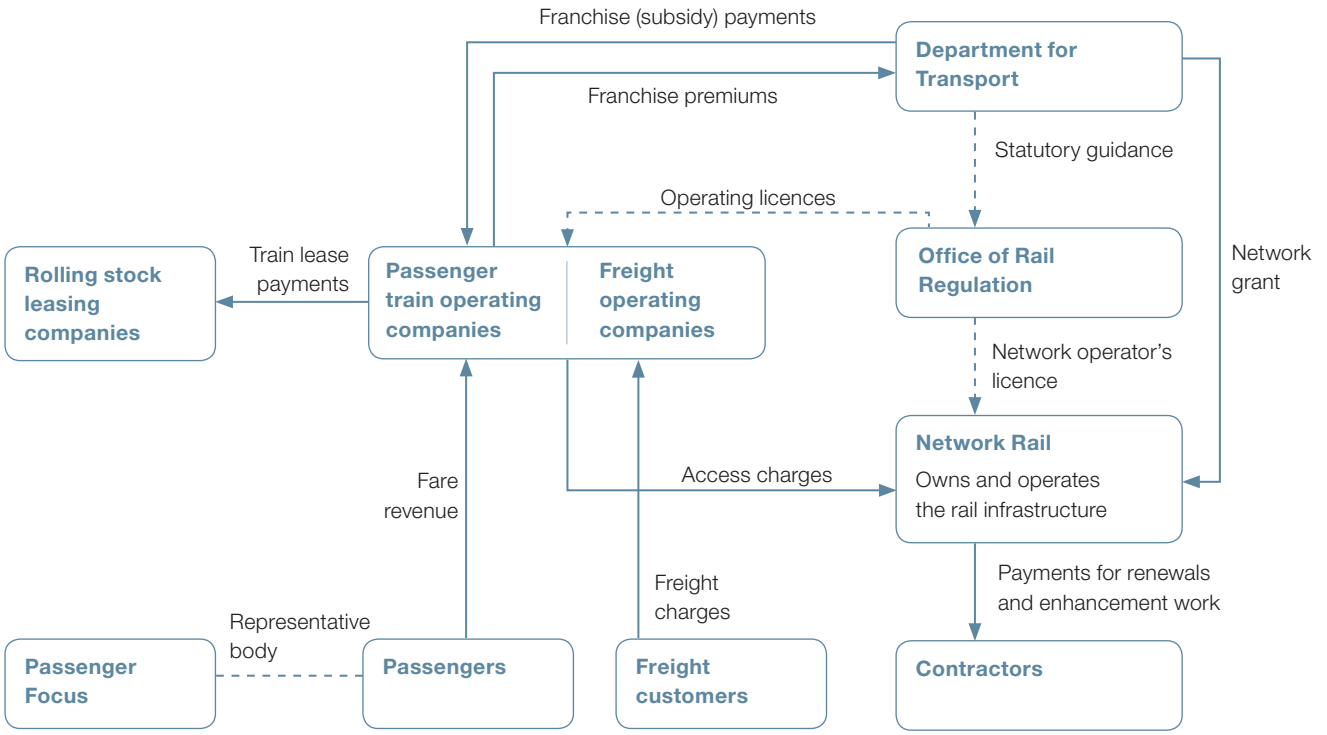
Part One

Industry and regulatory structure

Industry structure and funding

1.1 The operation of heavy rail services in Britain is divided between the national fixed rail network (tracks, signalling, tunnels, bridges, electrification assets, stations and depots), and train operations (**Figure 2**). Network Rail, the owner and monopoly provider of the national rail network, is responsible for its operation, maintenance and renewal, and for its reliability. Most passenger services are provided by train operators under franchise agreements with government, and freight operators work in a competitive market, with no public obligation to provide a given level of service. All train operating companies operate under access agreements with Network Rail for use of its network.

Figure 2
Industry structure and financial flows



Source: National Audit Office, Increasing Passenger Rail Capacity

1.2 The operation of the railways is funded by customers and taxpayers. In 2009-10, Network Rail received income of £5.8 billion, including £1.5 billion of access charges paid by passenger train and freight operating companies and £3.7 billion in government grants in lieu of such charges.[2] Train operators are funded from fares and government subsidies. Freight operating companies receive their income from freight users. Passenger Focus is the statutory independent passenger representative body.

Structure and finance of Network Rail

1.3 Network Rail was established in 2002, as a company limited by guarantee, following the collapse of Railtrack. It is a private company with a board of directors, but does not have shareholders or pay dividends. Instead, Network Rail is accountable to its members, who are drawn from the public and the rail industry. Its members' role is to oversee conduct of the business and ensure that standards are maintained. However, unlike shareholders, members do not have an equity stake in Network Rail.

1.4 Network Rail is financed mainly through debt raised from the capital markets. At 31 March 2010, Network Rail's net debt was £25.6 billion, backed by government guarantees. Network Rail pays a fee in return for guarantees, amounting to £174 million in 2009-10.

Regulatory and policy framework

1.5 The Office of Rail Regulation (the Regulator) is the independent economic and safety regulator of the rail industry in England, Scotland and Wales. The Regulator has statutory duties set out principally in the Railways Acts 1993 and 2005, which include promoting economy and efficiency in the rail industry. The Regulator's main economic regulatory functions cover licensing of all railway asset operators; limiting track access charges; Network Rail's stewardship of the rail network; and access arrangements with train operating companies. In 2004, the Regulator's governance structure changed from an individual regulator to a Board with a Chief Executive and Chair. Since 2006, the Regulator has been responsible for enforcing railway safety legislation, effectively doubling the size of the organisation. European Union law normally requires the access charges framework to be set by a body independent of the infrastructure provider.

1.6 The Regulator's main instrument for economic regulation of Network Rail is Periodic Review of Network Rail's access charges to train operators for use of its network. The Regulator determines the limits on access charges based on the outputs it expects Network Rail to deliver over the period of access charge control (the 'control period', generally of five years), its assessment of the efficient cost of delivering those outputs, and allowance for a return on capital. The determination represents the Regulator's judgements in striking a balance between efficiency assumptions and revenue and financing requirements, including specific incentives and risk protection for Network Rail. Economic regulators of monopoly infrastructure companies in other sectors adopt similar approaches.

2 The remaining £0.6 billion derives from other sources such as stations and property.

1.7 Network Rail's 'Regulatory Asset Base', the value upon which the Regulator's assessment of allowed returns is based, has risen considerably in the last five years. The Regulator allows Network Rail to add network renewal and enhancement expenditure to the value of its assets, while deducting an annual amortisation amount. In its latest Periodic Review the Regulator assumed Network Rail's cost of capital was 4.75 per cent, and at 31 March 2010 the Regulator assessed the Regulatory Asset Base at £35.7 billion, an increase of 52 per cent over the value of £21.8 billion at 31 March 2005. This mostly reflects spending on renewals, partly to address the backlog which had built up prior to the collapse of Railtrack.

1.8 The Regulator's costs are funded by railway service providers, through a licence fee (funding economic regulation activities), and a safety levy (funding safety regulation). The Regulator's costs in 2009-10 (£29.6 million, with £14.3 million covering economic regulation) were small by comparison with the size of sector it regulates.

1.9 The Regulator does not regulate the entire rail industry. The Department, which is responsible for transport policy, awards franchise agreements to passenger train operating companies, oversees train operators' performance, and sets limits for regulated fare increases. The Department also develops a High Level Output Specification and Statement of Funds Available, stating what it wants from the industry and how much it is prepared to see taxpayers contribute. These are informed by the Regulator's advice and form key inputs to the Regulator's Periodic Review. During a Review, Network Rail submits plans to the Regulator, which scrutinises and consults on them to determine whether they will deliver required outputs at an affordable and efficient cost. The Regulator also conducts its own analysis of issues relevant to the Periodic Review, including the scope to improve efficiency. Following the Regulator's determination, Network Rail produces a Delivery Plan to deliver the Department's specified outputs.

Context of this study

1.10 In this report, we examine the Regulator's effectiveness in securing an efficient Network Rail for tax- and fare payers. In making our judgements we have identified four key requirements for effective regulation of efficiency:

- Clarity of regulatory role and independence from government policy decisions.
- Strong incentives on regulated bodies to achieve a sustainable efficient cost.
- Adequate information for the Regulator to judge sustainable efficient cost and the regulated body's actual performance relative to that efficient cost.
- Transparency of regulatory decisions.

1.11 The separation of policy decisions and regulation, and the independence of the Regulator as described above, go a long way to meeting the first requirement. Our report focuses on the requirements for incentives (Part Three) and information (Part Four) in particular, and the interactions between them. Figure 1 in the Summary illustrates the framework we have used to judge the extent to which these requirements are met in the economic regulation of Network Rail.

1.12 The Regulator and Department have commissioned a wide ranging Rail Value for Money Study led by Sir Roy McNulty, former chairman of the Civil Aviation Authority. The study's interim report highlighted the need to better align incentives in the rail industry to improve efficiency.

Part Two

Network Rail's efficiency outcomes

2.1 This Part considers Network Rail's costs and efficiency in the context of historic rail infrastructure costs; the forward-looking assumptions made by the Regulator about scope for efficiency improvement; and available evidence on infrastructure costs and efficiency in overseas rail industries.

Network Rail's costs and efficiency

2.2 Network Rail's expenditure falls into four categories:

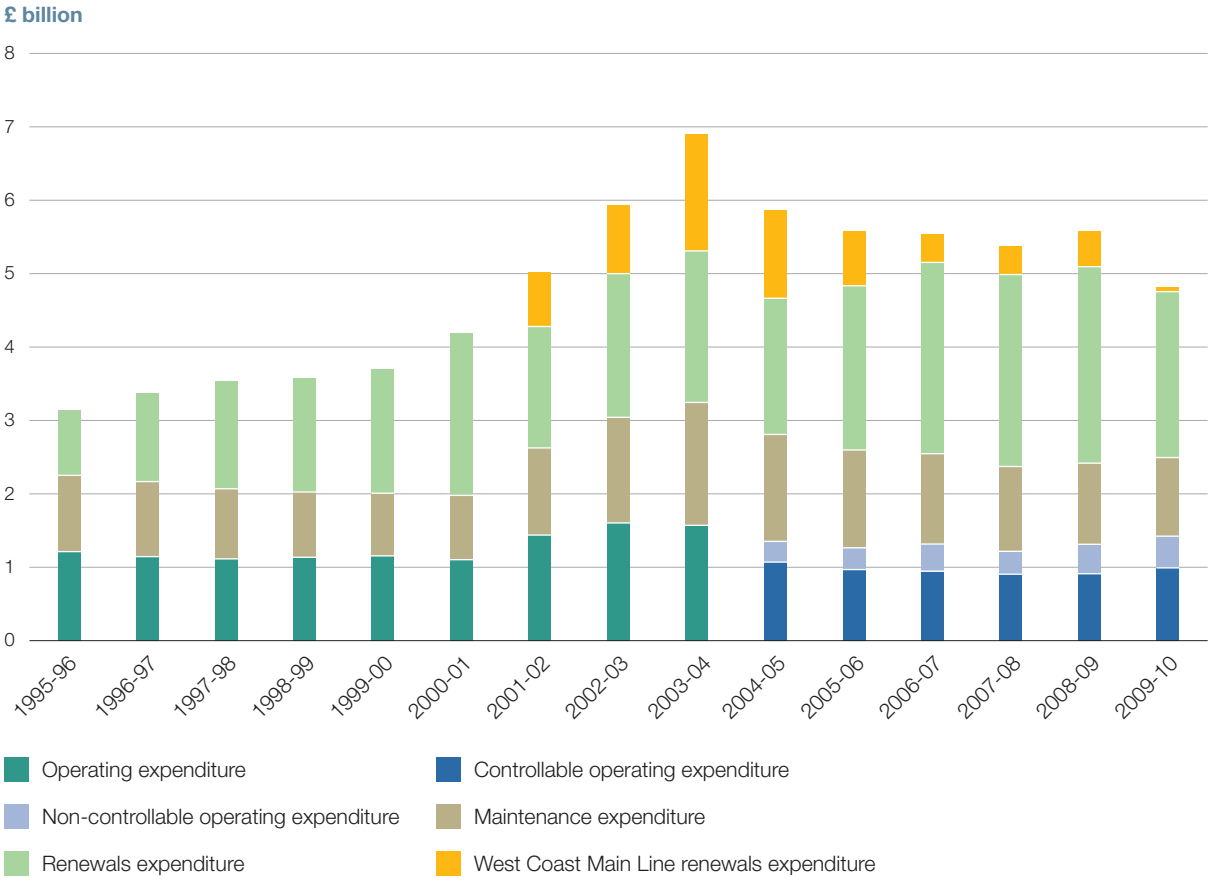
- Operational expenditure, consisting of controllable costs such as signalling and support functions, and non-controllable costs such as electricity for running trains.
- Maintenance expenditure, for activities that Network Rail carries out in order to sustain the condition and capability of existing infrastructure, but which does not involve significant replacement of assets.
- Renewals expenditure, consisting mainly of capital expenditure projects where existing infrastructure is replaced with new assets, normally without enhancement of performance.
- Enhancement expenditure, which is defined as capital expenditure resulting in a change to network outputs, usually involving construction, which improves network capacity or capability. Our report *Increasing Passenger Rail Capacity* examined enhancement expenditure.

2.3 Expenditure on operating, maintaining and renewing the network rose sharply from 1999-00 to 2003-04 (**Figure 3**). Maintenance and renewal expenditure increased substantially after the accident at Hatfield in October 2000, to 137 per cent above the average in the four years preceding the accident. Renewal costs associated with the West Coast Main Line Modernisation peaked at £1.57 billion in 2003-04.

2.4 In 2009-10, Network Rail spent £4.8 billion on operating, maintaining and renewing the network and £1.6 billion on enhancements. Maintenance and renewal expenditure, excluding West Coast Main Line Modernisation, was £409 million lower in 2009-10 than in 2003-04, while controllable operating expenditure was £79 million lower than in 2004-05 (the first year controllable expenditure was separately recorded).

Figure 3

Network operating, maintenance and renewal expenditure since 1995-96



NOTE

1 Non-controllable operating expenditure (for example, on electricity) was not separately recorded before 2004-05.

Source: The Regulator, Annual efficiency and finance assessment of Network Rail 2009-10, September 2010

2.5 The Regulator assumed overall efficiency savings of 31 per cent in the five years to 2008-09 and in its latest Review assumed a further 21 per cent efficiency gain in the five years to 2013-14 (**Figure 4**). An efficiency saving is a reduction in cost relative to a pre-defined baseline level which does not compromise the sustainable achievement of the outputs required of the regulated company (network safety, asset condition, reliability, capability and capacity). The Regulator assessed that Network Rail made efficiency savings of 27 per cent in its operational, maintenance and renewal expenditure, in the five years to 2008-09. The Regulator was disappointed with this underperformance, given that Network Rail made cumulative savings of 24 per cent in the first three years of the control period. Our previous work on regulated industries has identified both stronger incentives for regulated companies to find efficiency savings in the early part of the control periods, and cyclical expenditure by companies over control periods, with lower spend in earlier years.

Figure 4
Regulator's Network Rail efficiency assessments

Expenditure category		Regulator's efficiency assessment for:		
		Control period ending March 2009	Control period ending March 2014	
			2009-10[1]	Whole period[2]
Controllable operating expenditure	Assumption (%)	30	2.8	16
	Outturn (%)	28	-14.4	
Maintenance expenditure	Assumption (%)	34	3.2	18
	Outturn (%)	35	6.7	
Renewals expenditure	Assumption (%)	30	5.0	24
	Outturn (%)	24	7.1	
Controllable operating, maintenance and renewals expenditure	**Assumption (%)**	**31**	**3.8**	**21**
	Outturn (%)	**27**	**2.8**	
Monetary value of efficiency in last year of period	**Assumption (£m)**	**2,003**	**185**	**940**
	Outturn (£m)	**1,799**	**128**	

NOTES

1 The Regulator's assessment of renewals efficiency in 2009-10 is currently indicative only.

2 Outturn assessments will not be known until the period ends.

3 Percentage and monetary values of efficiency gains are relative to the baseline for the relevant control period.

Source: The Regulator

2.6 If Network Rail achieved the Regulator's 21 per cent efficiency assumptions by March 2014, its forecast controllable operating, maintenance and renewal costs in 2013-14 would be £3.55 billion – £940 million lower than forecast spending without these efficiency gains. Network Rail has since planned for a higher level of 23 per cent gains for the period to 2013-14 since its starting position was worse than had been assumed by the Regulator. The Regulator's assessment of 2.8 per cent efficiency savings in 2009-10 is slightly below its expectation for that year of 3.8 per cent, although the Regulator regards this assessment as indicative due to the difficulty of distinguishing between deferral of renewal activity and genuine efficiency in that year. There is, however, a more general difficulty in obtaining information to identify genuine efficiency (paragraphs 4.10 and 4.11).

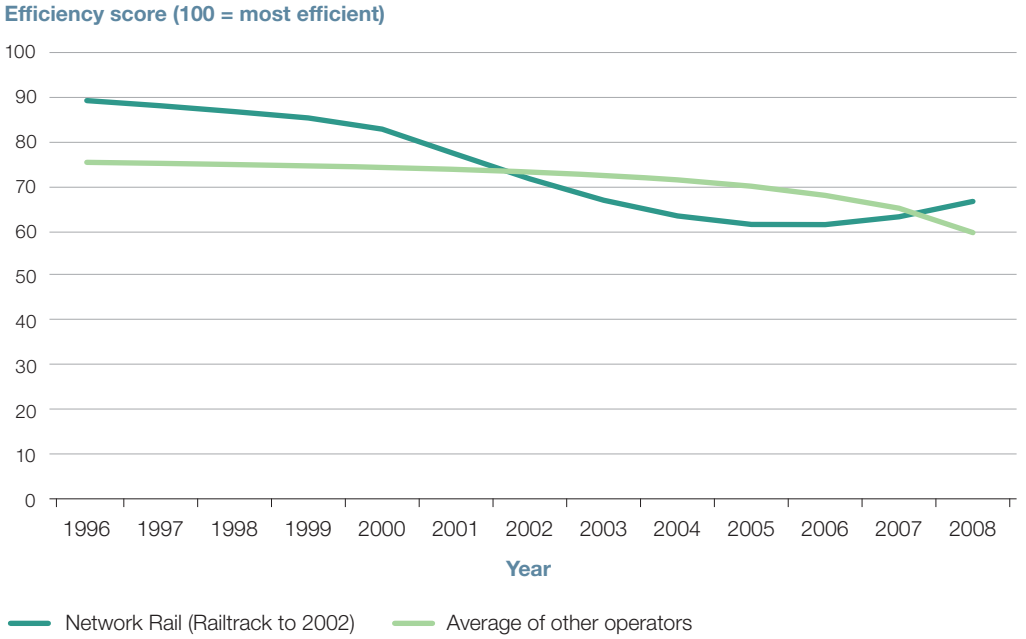
2.7 Reported efficiency gains on Network Rail's operating costs, where some comparisons are available, compare favourably to improvements in other regulated industries. Caution is needed in such comparisons because initial efficiency levels may vary widely. A 2005 review of other regulated industries by LEK Consulting and Oxera for the Regulator suggested a range of reductions in real operating expenditure – excluding outliers – of 2.5 to 5.7 per cent per year. The Regulator reported average 6.4 per cent per year reductions in Network Rail's controllable operating costs in the five years to March 2009.

Network Rail's efficiency relative to other European operators

2.8 There is a large gap between Network Rail's efficiency and that of the most efficient of 11 other European rail infrastructure managers, according to the Regulator's econometric analysis. This analysis (discussed further in paragraph 4.17) estimates that in 2008, Network Rail was 34 to 40 per cent less efficient in its maintenance and renewal activity than the most efficient comparative infrastructure manager. The results of the model yielding the lower point in this range are shown in **Figure 5** overleaf.

Figure 5

Efficiency relative to estimated optimum for 12 European rail infrastructure managers



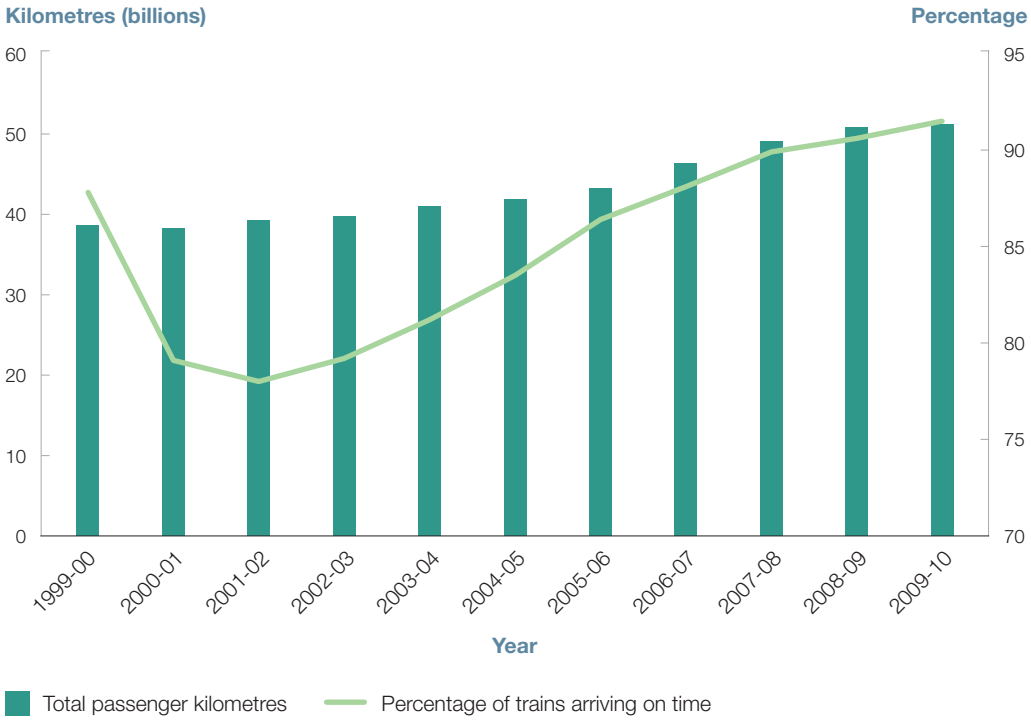
Source: The Regulator, National Audit Office analysis

2.9 The analysis also estimates that the efficiency gap in 2008 was similar to that in 2003, the year after Network Rail took over from Railtrack. The gap widened from 2003 to 2006, then narrowed to 2008. Network Rail reported significant absolute efficiency gains for maintenance and renewals in 2004-05 and 2005-06, while its estimated relative efficiency was falling. These different trends are based on different data and analyses but taken together they do not provide a consistent narrative on Network Rail's efficiency performance. Network Rail questions the comparability of the data used in the Regulator's estimate of its relative efficiency, but has accepted that it can deliver required outcomes within the financial settlement determined by the Regulator by March 2014.

The relationship between efficiency and other aspects of performance

2.10 Published data indicates that Network Rail has maintained or improved against other performance measures while reporting these efficiency savings. **Figure 6** shows continuing improvement in overall industry reliability during a time of increasing passenger rail demand. National train punctuality, as measured by the Public Performance Measure[3], has increased from 78.0 per cent in 2001-02 to 91.5 per cent in 2009-10, while passenger rail usage has increased by 31 per cent.[4] **Figure 7** overleaf shows that passenger and worker safety has improved since 2001-02, although track worker fatalities and major injuries have increased slightly since 2006-07. The Rail Safety and Standards Board, following a request by the Regulator, published a report in January 2011 finding significant under-reporting of minor injuries by Network Rail.[5]

Figure 6
Reliability performance, 1999-00 to 2009-10

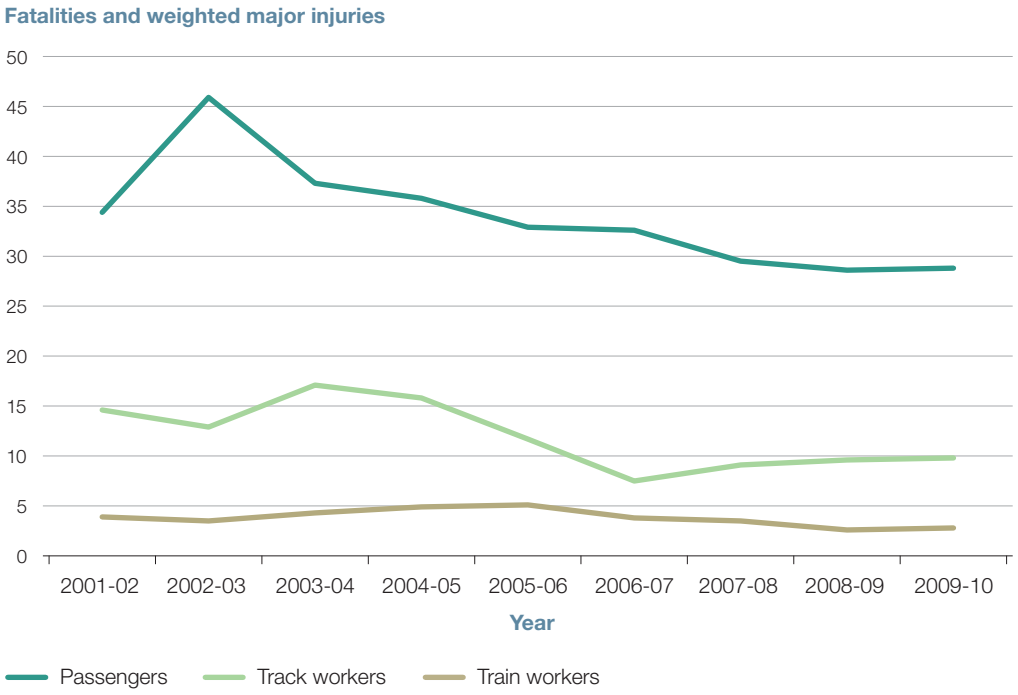


Source: The Regulator, Network Rail

3 The percentage of franchised passenger trains arriving at their destination within a specified lateness margin (typically five minutes, or ten for some long distance services).
4 From 39.1 billion kilometres in 2001-02 to 51.1 billion kilometres in 2009-10.
5 *Independent review of RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) reporting by Network Rail and its contractors*, January 2011.

Figure 7

United Kingdom rail safety trends – passenger, track and train worker fatalities and major injuries



NOTE

1 Weighting counts each major injury as one-tenth of a fatality.

Source: Rail Safety and Standards Board

Part Three

Use of regulatory tools including incentives to promote efficiency

3.1 This Part considers the Regulator's overall regulatory approach to promoting greater Network Rail efficiency, and how the Regulator incentivises Network Rail to deliver the efficiency improvements it has identified.

The Regulator's overall regulatory approach to promoting efficiency

3.2 The Regulator has set out strategic objectives in relation to efficiency. In its 2009 strategy, the Regulator's vision included "efficiency equivalent to that achieved by the best comparable railways across the world", and defined success as Network Rail meeting the efficiency challenges set in the 2008 Periodic Review, and working with train operators and suppliers to strive for further improvements and innovations for the future.

3.3 The Regulator's approach to economic regulation of Network Rail follows the principles generally adopted by economic regulators in other UK infrastructure industries. The model:

- is outcome- and output-based, with regulators letting companies find the most cost-efficient way to deliver outputs rather than specifying actions; it acknowledges that private companies are responsible for managing their businesses, including efficient management of assets;
- acknowledges that monopoly infrastructure providers have weaker incentives to operate efficiently and innovate to find efficiencies than is the case in a competitive market;
- is incentive-based, seeking to provide regulated companies with incentives to improve efficiency by letting them keep savings for a specified period (usually five years), thereby mimicking the gains they would make through innovation in a competitive market;
- seeks to ensure that price limits reflect efficient costs of delivering outputs, and that companies can finance their activities;

- seeks to ensure that efficiency assessments of regulated companies are based only on controllable costs, but that companies do not benefit from 'windfall' savings (for example, reductions in the price of materials) which have not arisen from greater efficiency; and
- provides regulated companies with protection against risks, both within the settlement and through triggers for reopening the settlement if circumstances change significantly from those assumed by the Regulator.

Providing incentives through access charge reviews

3.4 The central element of the Regulator's approach to promoting efficiency is to make assumptions about Network Rail's potential future efficiency within its Periodic Reviews of access charges, and ensure that it has the right incentives to deliver and outperform those assumptions. This approach is consistent with economic regulation in other sectors. The Regulator's most recent Review, concluded in 2008, set access charges from April 2009 to March 2014.

3.5 Efficiency assumptions within overall access charge determinations provide the company with benchmarks of the Regulator's expectations for minimum efficiency improvements over control periods. The Regulator's aim is to set a determination which is both challenging and achievable for Network Rail.

3.6 The Regulator also set out in its 2008 Review how it would treat overspending and underspending by Network Rail during the five-year control period to March 2014. Network Rail is allowed to keep the financing cost benefits of efficient capital underspend for five years from the year in which they are achieved but must bear the financing costs of overspends for the same period. It must also bear the financing costs of the first £50 million of overspending on enhancements and any further manifestly inefficient spend on those enhancements.

3.7 The Regulator has an interest in reviewing efficiency on major projects covered by direct agreements between funders and Network Rail. The Department designed an agreement with Network Rail for the Thameslink enhancement project at a target delivery price. The Regulator reviewed the agreement and, at a high level only, the associated cost plan, relying on the Department's assessment to ensure an efficient price was obtained. It was content that the agreement should establish a framework to enable efficient delivery of Network Rail's programme, although it did alter risk sharing arrangements between Network Rail and the Department for underspends or overspends. A similar position arises in respect of the CrossRail scheme: the Department, CrossRail Ltd and Network Rail (not the Regulator) determine the efficient cost of works, although the Regulator will determine the efficient target price if requested by any of those parties in the event they are unable to reach agreement. Similar positions may arise for other works although the Regulator would prefer that requirements are captured by the Department's High Level Output Specification and procured through the Periodic Review process.

Regulatory instruments

3.8 The Regulator regulates Network Rail through its network licence, which sets out the conditions with which Network Rail must comply, and the Regulator's powers to act if those conditions are breached. The possibility of enforcement action by the Regulator and financial penalties carries limited weight, since there are no shareholders to bear the cost of any fine, while any fines would be paid into the Consolidated Fund and reduce resources available to the industry. The Regulator has developed a 'regulatory escalator' as an innovative mechanism to identify and deal with potential risks arising from Network Rail's activities and performance. The Regulator uses the escalator to record areas of concern and to raise these with Network Rail at an early stage. If the Regulator is not satisfied with Network Rail's explanations or corrective actions, it can 'escalate' areas of concern to more formal action. The Regulator has encouraged Network Rail to improve its unit cost information (paragraph 4.6), adding the issue to the escalator in July 2010 for the first time – to signal the importance of action on the issue.

Barriers to greater efficiency arising from the position, governance and financing of Network Rail

3.9 Experience in other regulated industries suggests that the rate of efficiency improvement slows over time. Studies by LEK and Oxera, commissioned by the Regulator, found evidence to suggest that efficiency improvements increase after an initial period of small improvements (possibly while inefficiencies are identified), gradually decreasing in later control periods.[6]

3.10 In the UK economic regulation model, regulated companies only earn a return above the level required by shareholders if they outperform the regulator's efficiency assumptions (while delivering the required outputs). Shareholders may replace management, or the company may be taken over, if it cannot deliver the returns they require. The power of this incentive increases if there is more than one regulated company in the industry, allowing the regulator to compare the relative efficiency of companies and to set more challenging efficiency assumptions for less efficient companies. Ultimately, the risk of bankruptcy exercises a further discipline on management to operate the company's activities efficiently.

3.11 There are a number of factors specific to Network Rail which hamper the effectiveness of incentive-based regulation:

- Network Rail is wholly debt-financed, so there are no shareholders to exert pressure on Network Rail's management to find efficiency savings more quickly.
- Network Rail's debt is guaranteed by the Government, which blunts the incentives for its management to operate efficiently.
- Because of Network Rail's geographic monopoly, the Regulator cannot compare Network Rail with companies in other regions, although international comparisons are available.

6 *Assessing Network Rail's scope for efficiency savings over CP4 and beyond: a preliminary study*, LEK and Oxera, December 2005; *Scope for efficiency gains in CP4*, Oxera, April 2008.

3.12 With these incentives absent or weakened, the strongest incentives for Network Rail to find greater efficiency are the reputational incentives on management to demonstrate that the company is efficient, and the financial incentives from the element of management's remuneration which relate to efficiency outcomes. Network Rail's management incentive plan rewards its management across a range of performance measures, including efficiency. The Regulator can specify objectives for the management incentive plan through conditions in Network Rail's licence. The licence also requires Network Rail to state how it had regard to the Regulator's assessment of performance when it made bonus decisions, but does not directly require it to have regard to that assessment at the point of making those decisions. In 2008, the Regulator made no public statement on bonus levels. In 2009, it expressed itself "surprised and disappointed" at their level. In 2010, it acknowledged that while the committee had considered its view of the company's performance it had taken a different view on some issues and "needed to fully justify how it had reached its decisions". In commenting on bonuses for 2009-10 in its annual report, Network Rail noted a fundamental variance of approach to the measurement of efficiency between that of the Regulator and that of its own executive team. The company is currently reviewing the management incentive plan and the Regulator has proposed high level objectives for it under licence conditions, including delivery or outperformance of efficiency assumptions.

3.13 The Regulator has sought to strengthen Network Rail's efficiency incentives through measures covering its finances. The allowed return set by the Regulator at the 2008 Periodic Review was 4.75 per cent per year on the Regulatory Asset Base providing for:

- Network Rail to cover its debt financing costs, plus a fee of 0.8 per cent payable on the value of guaranteed debt per year, to encourage Network Rail to fund its activities through the surpluses it generates, rather than through new debt;
- a £208 million risk buffer to deal with cost and revenue shocks during the control period; and
- the remainder to fund capital spending on renewals or enhancements required by the High Level Output Specification through a ring-fenced fund. The Regulator will not add this capital spending to the Regulatory Asset Base, to prevent Network Rail benefiting twice from the same return. This ensures that surpluses up to the allowed level are used for capital spending within the control period, and puts achievement of some High Level Output Specification outputs at risk if Network Rail underperforms against the settlement assumptions.

3.14 Between 2009 and 2014, Network Rail intended to raise new debt of around £4.4 billion on an unsupported basis and envisaged that all new debt thereafter would be unsupported by the Government. The Regulator supported this intention – subject to a value for money test – principally because it believed it could transfer risk from taxpayers, and scrutiny from at-risk lenders would create stronger efficiency incentives. Network Rail has not yet pursued the intention, due to adverse financial market conditions. Some participants at a Joint Regulators Group workshop on regulation of state-owned bodies noted, however, that experience suggests that providers of debt capital have tended not to suffer financial loss when regulated companies have encountered difficulties. The efficiency gain from unsupported debt may therefore be nominal, while its extra costs are real, so the value for money test prior to its introduction must be robust.

3.15 In February 2011, Network Rail announced its intention to devolve more authority to more powerful regional or route-based sub-units. This initiative may help in the development of internal cost comparisons between geographical units, though it will not obviate the need for external benchmarking.

Industry and wider economic factors

3.16 Poor alignment of incentives between different parts of the industry means there is limited pressure from customers for Network Rail to reduce costs. Franchise agreements between the Department and the passenger train operators contain a 'no net loss/no net gain' clause (or financial models with equivalent effect) whereby train operators pass to the Department any changes to their access charges at Periodic Reviews, including reductions due to efficiency savings. In its 2008 Periodic Review determination of access charges, the Regulator introduced an efficiency benefit sharing mechanism between Network Rail and passenger train operators. But at that time the Department did not consider that cash payments to train operators would represent appropriate use of industry funds, and was not prepared to waive the 'no net loss/no net gain' provisions which would claw back any share of the gain from train operating companies. The Department said it would support an alternative mechanism whereby payments would not be made in cash to train operators but instead go into a ring-fenced fund for reinvestment in the industry, at the discretion of train operators.

3.17 Where train operators are exposed to changes in Network Rail's costs they take a keen interest in Network Rail's efficiency. The Association of Train Operating Companies highlighted to us its members' interest in the efficiency of electricity charges levied by Network Rail, which are outside the 'no net loss/no net gain' provisions. Freight operators, who are fully exposed to changes in Network Rail's track access charges, take a keen interest in the level of those charges. But these areas of direct customer pressure only bear upon a small proportion of Network Rail's costs.

3.18 The Regulator does not regulate the whole industry and cannot, therefore, take a holistic view of efficiency. The Department specifies, tenders, and awards passenger rail franchises and monitors the performance of the train operating companies in delivering their obligations. It also sets limits on the level of regulated fares. Rail franchises span access charge control periods and 'no net loss/no net gain' provisions are designed to avoid companies pricing the risk of higher access charges into their franchise bids.

Part Four

Information collected and used by the Regulator to measure and promote efficiency

4.1 This Part considers the effectiveness of the Regulator's arrangements for collecting and using information from Network Rail on its costs and efficiency; its use and analysis of information from other sources to arrive at an assessment of Network Rail's potential to increase efficiency further; and its understanding of the reasons why Network Rail may be less efficient than overseas rail infrastructure managers.

The Regulator's information on Network Rail's costs and efficiency

4.2 The Regulator requires Network Rail to submit information on its performance and activities through annual submission of returns and regulatory accounts. The main purposes of this information in relation to efficiency assessment are:

- At Periodic Reviews:
  - **a** to support assessment of Network Rail's plans, as a baseline for efficiency assumptions; and
  - **b** to judge the efficiency of Network Rail's own costed proposals for delivering output requirements.
- During control periods, to monitor Network Rail's costs, efficiency gains, and delivery of required outputs.

4.3 Together with Network Rail, the Regulator appoints four Independent Reporters, from consultancy firms, to provide independent assessments of the completeness, accuracy and reliability of information supplied by Network Rail. One Independent Reporter audits Network Rail's annual returns and gives an opinion on the accuracy and reliability of data within them, including Network Rail's own assessments of its efficiency.

4.4 Network Rail itself needs good unit cost information to understand what is driving its business performance and where there is scope for efficiency savings. Network Rail's proposed baseline spending for a control period (proposed spending before efficiency gains) is derived from an infrastructure cost model which applies unit costs to forecast activity volumes.

4.5 For the Regulator, good unit cost information gives confidence in:

- the unit cost assumptions underpinning the baseline spending assumed in its settlement: this baseline is as important as the assumed percentage efficiency gains in setting expenditure allowances for the control period, and measuring actual efficiencies achieved;
- bottom-up benchmarking within and beyond Network Rail to support top-down estimates of the potential for efficiency improvement at the start of control periods;
- judgements on how much of the efficiency potential can be realised within a particular timescale: these judgements also require an understanding of the barriers to efficiency improvement and the time needed to overcome them;
- measures of efficiency improvements over time, particularly where activity levels fluctuate; and
- judgements on whether asset management policies represent value for money in whole-life cost terms: such judgements require knowledge of the unit costs of different maintenance and renewal regimes as well as the durability of assets under those regimes.

4.6 With encouragement from the Regulator, Network Rail has worked to improve the quality of its unit cost information from the poor position it inherited from Railtrack. But the latest information reported by Network Rail, and audited by the Independent Reporter, indicates continuing limitations in the quality of maintenance unit cost information and the completeness of renewals unit cost information.

Monitoring of costs and efficiency

4.7 For the control period to March 2014, the Regulator monitors whether Network Rail delivers the high level outputs specified in the Regulator's final determination of access charges, and the more detailed outputs that Network Rail agreed to deliver in its Delivery Plan. The Regulator does not specify the level of activity needed to achieve these outputs, although the Delivery Plan provides a framework against which progress can be judged and changes can be consulted upon and agreed.

4.8 In assessing efficiency annually, the Regulator considers Network Rail's delivery of outputs and its cost changes, both year-on-year and relative to levels assumed in the Periodic Review. In assessing whether cost reductions have been achieved, the Regulator:

- recognises unit costs lower than assumed at the Periodic Review as efficiency savings: however, they may also indicate lower than assumed input price inflation (labour, materials etc.) and the Regulator does not adjust for this;
- recognises activity volumes lower than expected at the Periodic Review as 'scope efficiency' if delivery of required outputs, long-term asset condition and serviceability of the network are not compromised; and
- disregards activity reductions where these conditions are not met, and activity deferrals, where necessary work is put back.

4.9 The Regulator was, however, unable to base its assessment of Network Rail's efficiency for the control period to March 2009 on unit costs, because of the lack of robustness of the unit costs data and its limited coverage. The Regulator therefore based its assessments for operational and maintenance expenditure on changes in overall spending, and for renewals on Network Rail's budget variance analysis, and said that consequently its assessment of renewals efficiency performance for the period should be treated with a degree of caution.

4.10 The Regulator faces similar difficulties in assessing Network Rail's efficiency during the current control period to March 2014. The Regulator includes both unit cost and scope efficiency in its overall efficiency assessment, but acknowledges the weaknesses of the unit cost information available for this assessment. Moreover, it can be difficult to distinguish between scope efficiency and deferrals.

4.11 Deferral of activity by Network Rail may be justified in certain circumstances, but can affect services to customers if backlogs arise and are not dealt with. In 2009-10, Network Rail underspent against its Delivery Plan renewals budget of £2.9 billion by £591 million, of which £471 million (80 per cent) was deferred activity, £89 million was efficiency savings and £31 million was scope efficiency. Network Rail similarly deferred a large amount of renewal activity during the early part of the control period ending March 2009, and ultimately did not catch up and deliver it.

Challenging enhancement cost proposals

4.12 In our 2010 report *Increasing Passenger Rail Capacity* we commented on the Regulator's approach to judging the efficient cost of enhancements. We advocated development of a shared enhancement cost database with Network Rail and independent benchmarks so the Regulator can better challenge the proposed costs of future investments.

4.13 Since our report, the Regulator commissioned work from its Independent Reporter on Network Rail's processes to capture and benchmark enhancement costs. This noted that Network Rail is rolling-out its Cost Analysis Framework – currently used for renewals – to cover enhancements, and recommended that this approach should underpin cost estimates for enhancements. The Reporter doubted that external benchmarking would be sufficiently well developed to make a meaningful contribution to overall assurance of estimates of enhancement costs for the next Periodic Review, while acknowledging that they could nevertheless serve to highlight individual efficiency improvement opportunities.

Assessing Network Rail's potential efficiency

4.14 We found that economic regulators adopt similar approaches to assessing the potential for future efficiency improvements and use a variety of information sources and analyses during their price control reviews, for example:

- comparing (where possible) the relative efficiency of different regulated companies, to assess how far the least efficient companies have to catch up;
- making assessments of the scope for all companies to become more efficient, including the most efficient (or 'frontier'). These can include references to costs in comparable industries; and
- making allowances for changes in input prices to reflect both general and sector-specific cost inflation, which may reduce the achievable efficiency improvement.

4.15 The Regulator used a wide range of information sources and techniques to assess the scope for improving efficiency. The Regulator employed both in-house resources and consultants on these analyses, which included:

- econometric analysis of the relative efficiency of Network Rail and other European infrastructure managers;
- international benchmarking of approaches to asset management, signalling and track possessions;
- assessing scope for improvements in the efficiency frontier, based on productivity improvements in other industries;
- 'top-down' benchmarking of operational expenditure;
- 'bottom-up' assessments of the reasons for the efficiency gap between Network Rail and overseas infrastructure managers; and
- using reviews commissioned by third parties on the scope for efficiency savings.

4.16 The Regulator used a wider, expanded range of information and analysis in the 2008 Periodic Review compared to previous reviews of rail network access charges in 1999 and 2003. It enabled the Regulator to make a judgement on efficiency potential and the pace of change based on a range of estimates drawn from different approaches.

4.17 Network Rail's geographic monopoly means the Regulator is unable to compare its efficiency with other UK companies in the same industry. To compensate for the lack of domestic comparators, the Regulator initiated an innovative international benchmarking exercise with the Institute of Transport Studies (University of Leeds) during its 2008 Periodic Review. This used data provided by the International Union of Railways on the costs and other characteristics of its European members, including Network Rail. The Regulator used econometric analysis to estimate the relative maintenance and renewal efficiency of Network Rail and 11 other rail infrastructure managers, controlling for factors such as the size of the different networks. On the basis of this analysis, the Regulator estimated that in 2006 Network Rail was 37 per cent less efficient than the upper quartile of efficiency levels attained by European infrastructure managers and 40 per cent less efficient than the most efficient level they attained. This estimate was after adjusting Network Rail's renewals spending to a 'steady state' position assuming 2.5 per cent of the network renewed each year.

4.18 Network Rail questioned this analysis and the comparability of the data used in it and considers that the Regulator placed too much emphasis on it in arriving at its efficiency assumption. It nevertheless accepted that it could deliver required outcomes within the financial settlement determined by the Regulator by March 2014. The Regulator commissioned an independent academic, who concluded that the Regulator's econometric approach was sound. Network Rail still questions the comparability of data, and the Regulator has needed to make certain assumptions, for example regarding the volume of renewal activity in each country, which may affect the outcome of the analysis.

4.19 In September 2010, the Regulator updated this analysis and estimated that in 2008 Network Rail was between 34 and 40 per cent less efficient than the most efficient level attained by European infrastructure managers. The Regulator intends to continue and build on this work in future.

4.20 At the start of the current control period the most efficient European operators were evidently considerably more efficient than Network Rail. Therefore the Regulator rightly looked beyond Network Rail's own performance to overseas comparisons when setting its efficiency targets. If Network Rail's efficiency improves, its best unit cost performance for the same activity across projects and business divisions will move nearer that of the most efficient overseas comparator. In those circumstances, reliable information on the range of Network Rail's own unit costs becomes more valuable to the Regulator in judging the potential for future efficiency gains and creating internal competitive pressures. Work conducted for the 2008 Periodic Review indicated renewals unit cost differentials of 9 to 13 per cent between Network Rail's operating units although the reliability of this information was not high. Officials at other regulators we interviewed considered that more internal benchmarking might partly compensate for the absence of domestic comparators for Network Rail. External benchmarking will still be needed, however, to ensure Network Rail is not slipping behind international best practice.

4.21 The Regulator and Network Rail are working to achieve reliable disaggregation. Network Rail will be required to break down its regulatory accounts between operating routes in 2010-11. These will be audited and published in subsequent years.

The Regulator's understanding of the reasons for inefficiency

4.22 The reasons for the efficiency gap to other infrastructure managers are not fully explained. As the gap narrows, and partly because Network Rail has relatively weak efficiency incentives, it will be important for the Regulator to maintain a well informed understanding of the gap, to ensure it has confidence in the amount of the gap which is within Network Rail's control, and the time period within which that control can reasonably be exercised. Generally the Regulator considers that it is for Network Rail to investigate the reasons for inefficiency and find its own solutions, although it undertook its own site visits to overseas infrastructure managers during the latest Periodic Review. It appointed engineering consultants (RailKonsult) to build on work during that Periodic Review by obtaining a better understanding of the reasons why overseas infrastructure managers appear to be more efficient. From a study covering four international managers, RailKonsult identified contracting strategies and managing network possessions for maintenance and renewal, as potential explanations for much of the efficiency gaps, but substantial parts of the gaps remain to be understood and the analysis was described as a 'first pass'. The Regulator plans further work in this area.

4.23 Infrastructure UK noted in December 2010 that UK civil engineering works cost some 60 per cent more than in Germany in 2007, and found evidence that infrastructure maintenance costs are also higher in the UK. The Regulator's analysis has helped inform this understanding within government. The Regulator has made allowances for input price inflation of 8.14 per cent above retail price inflation (RPI) for operating expenditure, 6.55 per cent for maintenance and 3.44 per cent for renewals in its settlement for the five years to 2013-14. It has also resolved that actual input price inflation on renewals – as measured by the Infrastructure Output Price index – above or below these levels will be allowed and accommodated at the end of the current control period. But explicitly allowing an unlimited level of input price inflation may itself contribute to higher costs. Similar allowances for input prices were made by other regulators. Ofgem, for example, allowed 7.20 per cent above RPI for operating expenditure and 5.62 per cent above RPI for investment expenditure in its settlement for electricity distribution companies over the five years to 2014-15.

4.24 The Regulator cannot fully rely on Network Rail to investigate why its costs differ from other rail infrastructure managers, and needs to keep the pressure on Network Rail to investigate these differences and ensure that Network Rail has plans to reduce the efficiency gap. It cannot rely on the incentives that regulated companies in other regulated industries have to do this work themselves. The Regulator also needs a robust understanding of these costs to be able to identify which differences are within Network Rail's control, when making its assessments of potential efficiency. More reliable unit costs within Network Rail would help identify the efficiency potential of innovative approaches in more autonomous regional units of the company, to support the Regulator's understanding of the scale and timing of efficiency opportunities achievable on the UK railway.

The Regulator's processes and capabilities

4.25 The processes, techniques and evidence used by the Regulator are transparent and are documented at length on the Regulator's website. In addition to the draft and final determinations themselves (the latter running to 447 pages) most consultants' reports associated with establishing and monitoring the determination are publicly available.

4.26 The Regulator took positive steps in appointing a team of regulatory experts led by John Nelson to independently review its 2008 Periodic Review process, comparing it to those adopted by other regulators in their sectors and asking stakeholders for their views of the process. The team's report was mostly favourable, with some recommendations for improvement in the Regulator's processes in its next Periodic Review.

4.27 Some stakeholders have questioned the Regulator's resource mix, suggesting that the Regulator's strengths in economic analysis need to be matched by a better engineering understanding of the constraints and opportunities on the UK railway. The Regulator has pooled the in-house engineering capability from its safety and economic regulation functions to maximise the value from that resource. It is also conscious of the need to avoid over-detailed prescription or assumption of engineering approaches in its economic regulator role. Our judgement is that the skills and capabilities available to the Regulator are broadly fit for its current purposes, although it needs to be prepared to adapt to changes in the regulatory role. In 2009, Ofgem undertook an internal capability review in advance of a substantial increase in its administration of environmental programmes for the Government, and the Regulator should stand prepared to do the same should its role change in future.

Appendix One

Methods

The main elements of our fieldwork, which took place between December 2010 and February 2011, were:

Selected method	Purpose
1 Quantitative analysis of Network Rail's costs and efficiency We analysed the Regulator's data on Network Rail's costs and efficiency.	To understand if the Regulator has helped to secure efficiency savings in Network Rail.
2 Quantitative and qualitative review of the Regulator's benchmarks We reviewed the data and assumptions the Regulator used to benchmark Network Rail against international comparators.	To evaluate whether the Regulator's benchmarking is based on sufficient and appropriate evidence.
3 Interviews with the Regulator and review of documents We interviewed the Regulator's staff and examined supporting documentation.	To understand how the Regulator uses its resources, information and incentives to regulate Network Rail's efficiency.
4 Stakeholder consultation We took views from over 20 organisations involved in the rail industry.	To obtain stakeholders' views on the Regulator's use of resources, information and incentives.
5 Literature review We reviewed literature regarding the evolution and effectiveness of economic regulation of infrastructure providers.	To understand the role of incentives in economic regulation, particularly the consequences of non-equity financial structures.
6 Interviews with other regulators We interviewed economic regulators of other sectors.	To understand regulatory frameworks and approaches in other industries.
7 Expert panel We commissioned experts in specific areas for advice and review of our draft findings:	• Transport engineering – Colin Porter (Lloyd's Register Rail) • Transport economics – Professor John Preston (University of Southampton) • Economic regulation – Professor Dieter Helm (University of Oxford), Steve Smith (Lloyds TSB; formerly at Ofgem)

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