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# Improving public transport in England through light rail



REPORT BY THE COMPTROLLER AND AUDITOR GENERAL  
HC 518 Session 2003-2004: 23 April 2004

# Summary

- 1 This report examines the Department for Transport's work in funding the construction of light rail systems to improve public transport in England. Light rail is a modern version of the electric street tramway systems that were abandoned in the middle decades of the twentieth century. Local authorities decide whether a new light rail line or system is appropriate for their area and usually have to seek funds from the Department and be granted legal powers by the Secretary of State for Transport before their schemes can proceed. Since 1980, seven new systems<sup>1</sup> have been built in England, at a cost of £2.3 billion. At more than £1 billion, the Department's contribution represents the largest share of these funds.
- 2 Five of the seven systems were designed, constructed, operated and maintained by private sector companies. The Sheffield Supertram was built and originally run by the local Passenger Transport Executive but later run and maintained by a private sector company. The Tyne and Wear Metro was built, and is still run, by the local Passenger Transport Executive.



- 3 Improving public transport through light rail schemes exhibits many of the key issues highlighted in the National Audit Office's January 2004 report *Increased resources to improve public services*:

**Complexity of the delivery chain**, where delivery of light rail schemes depends upon several partners to be fully effective;

**Capacity of delivery organisations**, where local authorities that promote schemes need to have the capacity in terms of staff with the right skills to deliver new light rail systems;

**Targeting of resources** to improve public transport where there is greatest need, and for the most effective use of resources; and

**Monitoring and evaluating performance**, to determine the extent to which schemes are delivering the expected benefits, on time and within budget.

<sup>1</sup> Tyne and Wear Metro, Docklands Light Railway, Manchester Metrolink, Sheffield Supertram, Midland Metro, Croydon Tramlink and Nottingham Express Transit.

## Departmental expenditure has been kept within budget in all but one of the six schemes that have been built

- 4 In five of the six light rail<sup>2</sup> schemes we examined, the Department paid either what it had originally agreed to contribute towards construction costs, or less. The Department paid more than it originally agreed on the Sunderland extension to the Tyne and Wear Metro. In the case of the Sheffield Supertram, however, the Department has incurred additional costs since the system opened. As a condition of contributing £220 million to the £241 million scheme, the Department required the South Yorkshire Passenger Transport Executive to privatise the operating concession after the system opened. Expecting privatisation proceeds of £80 million, the Executive secured receipts of only some £1 million mainly because of lower than expected passenger numbers, bringing the scheme a financial loss of £5.4 million in its first year of operations. The shortfall in privatisation receipts left the Executive with a debt that it was unable to service from its own resources. The Department decided to take over some of the debt, incurring service costs of some £6 million a year.

## There has, however, been incomplete evaluation of existing systems

- 5 Each of the seven light rail systems built since 1980 has cost more than £140 million to build. The Department has contributed up to 93 per cent of these systems' total construction costs, while local authorities have drawn on a range of other sources, including their own monies and private finance, to complete the funding. In the *10 Year Plan for Transport*, the government envisaged that up to 25 new light rail lines could be built by 2010 if the scale of the investment anticipated by the *Plan* were achieved and proposals for new schemes offered value for money; 12 new lines are under development. The Department expects to pay no more than up to 75 per cent of the cost of building new systems. It has evaluated four of the six systems that have been running for several years, but none of their extensions. The evaluations have focussed on key aspects concerning patronage levels, travel patterns, passenger perceptions and congestion relief. The evaluations have not assessed whether systems have put in place the tangible assets that were expected, such as stations and vehicles, nor on a consistent basis whether the systems have delivered their anticipated benefits, such as quick and reliable services for passengers. In particular, they did not fully examine systems' impact on the local economy, or the extent to which systems were integrated with other forms of public transport such as buses. The Department therefore has an incomplete picture of what has been delivered for the significant amount of public monies invested in the schemes, and does not have as informed a base as it should have for the consideration of future schemes.

<sup>2</sup> Excludes the Nottingham Express Transit, which at the time of our detailed examination had not been completed.

## Light rail has improved the quality and choice of public transport

- 6 Drawing on data from local authorities and the operators of five light rail systems, as well as the Department's evaluations, we found that light rail lines, stations and vehicles have been delivered much as planned. Light rail delivers fast, frequent and reliable services and provides a comfortable and safe journey. Local authorities monitor the performance of light rail operators and told us that, on the whole, they were satisfied with performance levels. The Sheffield Supertram and the Midland Metro, however, operated poorly for two years or so after they opened; their performance has since improved. In contrast, the Manchester Metro has attracted so many passengers that it experiences overcrowding at peak times.
- 7 Light rail has widened the range of public transport available. Light rail systems carry nearly 140 million passengers a year, up by 44 million, or 47 per cent since 1999. Systems have also encouraged a shift away from car use, while most people also think that they enhance the image of their host cities or towns.

## Anticipated benefits have been over-estimated, however, and are not being exploited to the full

- 8 Light rail systems are delivering many of their expected benefits. For example, the routes of light rail lines often go through run down areas, such as the Croydon Tramlink to New Addington and the Manchester Metrolink to Eccles, which offer real benefits to the socially disadvantaged. Patronage, however, has fallen short of expectations and potential benefits have not been fully exploited. There are several areas for improvement:

### Passenger numbers, and therefore passenger benefits, have been lower than expected

- The Department examines patronage level forecasts when it appraises the business case of a new scheme. Patronage is expected to build up over time, reaching maturity after some five years of operation. Actual passenger numbers have fallen well short of forecasts in three of the five systems that we examined. Shortfalls ranged from 24 per cent on the Croydon Tramlink after three years of operation, to 45 per cent on the Sheffield Supertram after 8 years of operation. Shortfalls in patronage have been attributable to over-optimistic forecasting, changes in the patronage base, early operational problems affecting services, competition from buses, and physical limitations on the routes selected for some light rail systems.

**Light rail systems are not fully integrated with other forms of public transport**

- Public transport systems are more likely to be regarded as attractive alternatives to the car if they operate in a joined-up, integrated way. Integration involves co-ordination between services, physical proximity allowing ease of interchange at stations, and through-ticketing and widespread availability of passenger information about routes, fares and timetables. Passengers consider the level of integration to be the least satisfactory aspect of light rail. Integration with bus services has been poor to moderate on many lines, and bus and light rail services have been in competition with one another on the same routes.

**Light rail has had a limited impact on road congestion, pollution and road accidents**

- The Department envisaged that light rail schemes would help to reduce urban road congestion, pollution and accidents by bringing about a shift away from cars. This is a demanding objective, against a background of increasing economic growth in recent years. For car owners, a light rail journey will rarely match the convenience of going by car, however good the light rail service on offer. There has been a shift away from cars, although there has not necessarily been an easing of road congestion or a reduction in pollution or road accidents. As people leave their cars and travel by public transport, some are replaced by other motorists using the free road space that they have vacated. Light rail cannot, by itself, reduce congestion significantly over the long term. Other complementary measures, such as park and ride schemes, are needed. There has been limited use of such measures, however, by local authorities with light rail systems in their areas.

**It is not clear what impact light rail has had on regeneration and social exclusion**

- The impact of light rail upon regeneration might take several years to become apparent and, to date, quantitative information about systems' impacts has been collected for only the Sheffield system. None of the evaluations has measured a system's impact on the inclusion of socially disadvantaged people, although social inclusion as an objective of light rail has been a relatively recent development. In measuring regeneration and social inclusion benefits, it is difficult to separate the impact of light rail from other regeneration programmes or from changes in the local or national economy. In July 2003, the Department published new guidance on how transport schemes' regeneration effects should be assessed.

## Light rail systems in France and Germany are designed differently to their English counterparts

- 9 Our visits to Lyon and Grenoble in France, and Freiburg and Karlsruhe in Germany, revealed several key differences in the design of their light rail systems compared with systems in England that help to improve the delivery of benefits to passengers and local communities:

### **Light rail lines are usually segregated from, and given priority over, other forms of traffic at junctions**

Cities in France and Germany have the advantage of a greater number of broad avenues where light rail can be placed without losing road space. Light rail is therefore always given priority over other road users, and it is rare for light rail lines not to be segregated from other road traffic, allowing light rail to deliver faster, smoother and more reliable services.

### **Systems are fully integrated with other forms of public transport**

French and German systems are embedded in a fully integrated public transport network in which buses, for example, feed the light rail systems as well as serving non-light rail transport corridors. Timetables are co-ordinated and all cities have comprehensive through-ticketing arrangements, facilitating seamless journeys.

### **In France, street improvement is an integral part of any light rail scheme**

In France, all new systems involve improving the streets through which the light rail lines run, with the laying of new road and pavement surfaces and new street furniture and the cleaning of the facades of buildings. These measures provide a significant facelift along the route to match the modern vehicles being introduced, although at additional cost.

## Systems in England have been running at a loss

- 10 Given the level of public money invested in light rail systems, the Department requires assurance from promoters that systems will be financially viable and continue to secure benefits over the longer term. The Department expects light rail systems to be self financing and not to require any operating subsidy from government. Of the existing systems, three made losses over the period 2000 to 2003 and until 2002-03 the Sheffield Supertram also made a loss. Private sector concessionaires' losses ranged from £200,000 to £11.4 million, while the Tyne and Wear Passenger Transport Executive subsidised the Tyne and Wear Metro to cover an operating deficit of £647,000 in 2001-02. Only the Docklands Light Railway has made an operating surplus.
- 11 Revenues have mainly been affected by the shortfall in expected patronage levels but economies in building some schemes have also had an impact. The costs of construction, including the contribution made by the Department, have been largely kept within budget partly by cutting back on some of the features that were originally planned for systems. In some cases the absence of park and ride schemes has affected patronage, whilst the lack of CCTV security cameras at stations has hindered the enforcement of fares.

## Light rail systems in France and Germany have higher reported patronage levels than similar systems in England

- 12 Reported patronage levels on French and German systems are significantly higher than on comparable English ones. For example, there are 7.3 million more passenger journeys a year on the Lyon system than on the Manchester Metrolink, although Manchester has a larger population. We identified three key reasons for higher passenger numbers in France and Germany:

### Light rail fares are heavily subsidised

In France and Germany, light rail fares are heavily subsidised by local government. For example, in Grenoble and Freiburg respectively, there is a 70 per cent and a 40 per cent subsidy from the local transport authorities, which help to encourage patronage.

### Larger patronage base

The light rail system in Grenoble, for example, has 40 light rail stations and 53 light rail vehicles. By comparison, the Nottingham system has 23 stations and 15 vehicles. Potential passenger numbers are higher in France and in Germany principally because inner areas of cities tend to have higher population densities within a short distance of stations. Systems in France and Germany also tend to have more vehicles and stations. Service and fare integration also contribute to higher patronage levels on French and German systems.

### Systems connect centres of social and economic activity

In France and Germany, light rail systems connect hospitals, universities and commercial and shopping centres, which generate passenger numbers. This has not always been the case in England, where some light rail routes have followed old railway lines remote from traffic generators. Future schemes being planned in England, such as those in Liverpool and Leeds and extensions in Birmingham, would expect to better connect, with centres of social and economic activity.

## The Department needs to do more to improve value for money and there are barriers to the wider take-up of light rail

- 13 There are currently seven urban centres served by a light rail system. In its *10 Year Plan for Transport*, the government envisaged that up to 25 new lines could be built in England by 2010. It has, to date, committed some £1.4 billion towards the cost of building new lines; these are at various stages of development and might be running by 2010. It now considers, however, that the construction of 25 new lines by 2010 might not be practicable, offer value for money or be affordable. Buses are still expected to make the bigger contribution towards the Department's target of achieving a 12 per cent increase in passenger journeys from light rail and buses combined, by 2010.

- 14 Against this background we identified five barriers hindering the wider take up of light rail and a range of issues that need to be tackled if future systems are to be improved:

Barriers	Issues to be addressed
Cost is the most significant factor discouraging the further development of light rail - 43 per cent of local authorities consider light rail is too costly when compared with other options, such as buses.	<ul style="list-style-type: none"> <li>■ Lack of standardisation in systems' design drives up costs.</li> <li>■ Costs are also inflated by applying heavy rail standards to light rail.</li> <li>■ The diversion of utilities is expensive.</li> <li>■ There are barriers to the development and adoption of new and cheaper technologies. For example, there are no government grants available to develop innovative, energy saving light rail technologies.</li> </ul>
Poor financial performance of some existing light rail systems is discouraging interest in supporting light rail and the costs of new systems are increasing partly as a consequence.	<ul style="list-style-type: none"> <li>■ Better sharing of risk and alternative forms of procurement contract could help to reduce costs and attract private sector investors.</li> <li>■ Improved pre-costing of passenger numbers would provide a firmer basis for assessing systems' financial viability before contracts are let.</li> <li>■ Revenue collection also needs to be improved.</li> </ul>
Local authorities are concerned about being able to secure sufficient funds at local level to promote a system and help pay for its construction.	<ul style="list-style-type: none"> <li>■ The costs of promoting light rail schemes can be substantial, while revenue funding generally for the development of local transport is limited.</li> <li>■ Local authorities need to harness sources of funds other than the taxpayer. They have powers, as yet unused, under the Transport Act 2000 to raise funds to improve public transport through congestion charging schemes. The scope for local authorities to share in the wider economic benefits arising from light rail schemes, where schemes increase the value of local trade and land values, also needs to be explored.</li> </ul>
It takes too long for local authorities to be granted the necessary legal powers for light rail systems and whether schemes will be funded is uncertain.	<ul style="list-style-type: none"> <li>■ The planning and approval process needs to be speeded up and decisions over funding approval need to be made clearer and more stable.</li> </ul>
There is insufficient in-house expertise in some local authorities to develop light rail and a lack of steer from the Department.	<ul style="list-style-type: none"> <li>■ The Department maintains an arm's length approach to where light rail might be developed. Against this background local authorities do not know which schemes have a realistic chance of gaining approval. And, some local authorities are not always best placed to assess whether a light rail system would be suitable or practicable for their locality, lacking the knowledge about what has worked well elsewhere in this country and abroad.</li> </ul>



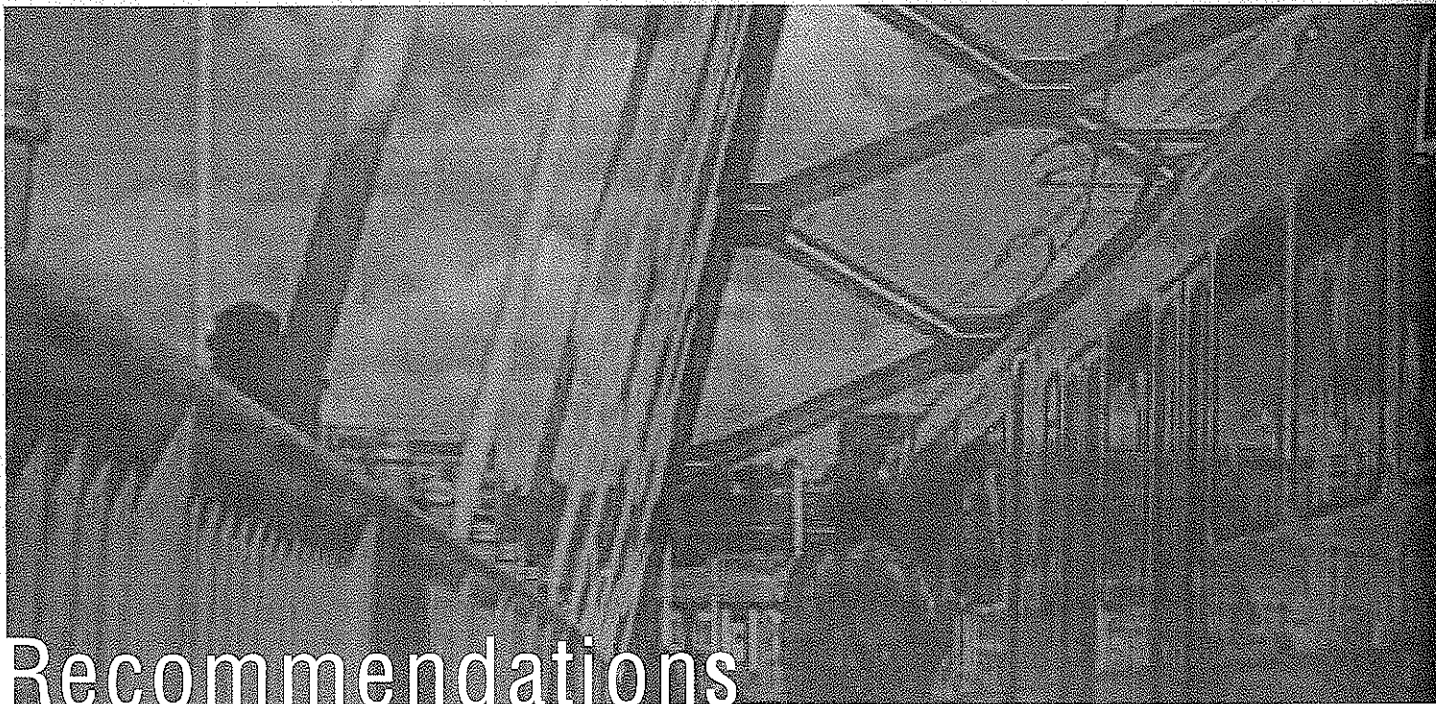
## The forecast costs of schemes currently under development have risen

- 15 The most significant barrier to the wider take up of light rail is affordability. New schemes are expensive to implement and costs are rising. Proposed new schemes are on average more than £3 million a kilometre more expensive to build than those that have already been built. Private sector concessionaires and other organisations are also concerned that the private sector might not be best placed to bear all the revenue risks of running a light rail system. The private sector's bearing of all of the revenue risks might also be driving up the cost of light rail schemes. Bids from private sector consortia for planned systems in Leeds, South Hampshire, and Manchester, for example, have all been higher than originally anticipated. Light rail schemes must compete with alternative options such as improvements to bus services which are usually less expensive to implement because capital investment is likely to be less. To stay within budget and reduce costs, promoters and builders cut back on facilities such as park and ride but this was counterproductive. While the passenger benefits of light rail are not necessarily matched by other modes of transport, the starting point for solving local transport problems is identification of the most cost effective solution.

## There are fewer barriers to light rail in France and Germany

- 16 If all proposed new lines are in place by 2010, 10 cities or conurbations would be served by a light rail system. By comparison, there are already 11 cities in France, and some 50 cities in Germany, with a light rail system. Many of the challenges faced by the promoters of new French and German systems are similar to those of their English counterparts. Promoters in France and Germany, however, face fewer financial and other barriers in several key areas:

- **The costs of diverting utilities are lower**  
In England, promoters have to pay 92.5 per cent of the costs of diverting utilities. In Germany, promoters contribute less, while in France they pay nothing.
- **Promoters in France can draw on local transport taxes to help pay for light rail**  
In France, a local transport tax on employers is a major source of funds for developing light rail systems.
- **In Germany, "track share" is more common**  
In Germany, there are more light systems that share their lines with heavy rail services through what is known as the "tram-train" concept. Tram-trains share lines, providing speed in out-of-town running combined with convenience and frequency of services into city centres.



# Recommendations

## 17 We make the following recommendations:

### Assessing whether value for money is being achieved

- i In conjunction with promoters, the Department should commission a comprehensive evaluation of the costs and benefits of every light rail scheme it has funded after it has opened to assess whether the expected number of vehicles and other infrastructure has been put in place, the frequency and speed of services are as expected, and systems are delivering the other expected benefits to passengers and local communities. Costs should be reviewed after one year; benefits, including services, and patronage and economic and social impacts should be evaluated after three to five years. The Department should make the lessons learned widely available to local authorities and other interested parties, by posting them on its Internet website.

### Realising more benefits for passengers

As a condition of its grants for light rail schemes, the Department should require local authorities to build into the design and implementation of their schemes, where appropriate, measures to:

- ii integrate light rail with other modes of transport. The Department should look for evidence that the relationship between light rail and bus services has been considered including physical integration, as well as the provision of through ticketing arrangements and passenger information about routes, fares and timetables. The implementation of quality contract schemes for buses, for example, might provide a means of addressing poor integration of light rail and bus services;

- iii complement light rail and encourage passenger take-up, such as park and ride schemes; and

- iv secure speedy and punctual light rail services by, for example, giving priority to light rail vehicles over road vehicles at key junctions.

### Improving the financial viability of light rail systems

- v Working with the industry and local authorities, the Department should evaluate the relative merits of different contract types for procuring light rail systems. The evaluation should identify the most cost effective procurement methods including an assessment of how long term financial viability could be improved.

### Reducing the costs of implementing light rail

- vi The Department should seek efficiency savings by requiring promoters, as a condition of its grants, to demonstrate greater standardisation in the design of systems, vehicles and methods of construction. The Department should look for evidence that promoters have drawn on existing systems or have established partnerships with the promoters of other new systems to drive down costs.
- vii The Department and Her Majesty's Railway Inspectorate should consider the case for developing safety standards specific and appropriate to light rail and for addressing the current anomaly in requiring a safety case for light rail systems segregated from other traffic, where none is required for systems running on streets alongside other traffic.