

REGULATING TRANSPORT'S ENVIRONMENTAL IMPACTS IN A DEREGULATING WORLD

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PRIVATISATION AND TRANSPORT PLANNING: CONTRADICTIONARY TRENDS?

There is a growing consensus that no single policy measure alone can effectively tackle transport's global environmental impacts (Goodwin 1994, Hughes 1993 and Potter 1997). A programme to manage transport's social, economic and environmental impacts requires a 'package' of measures, some local, some national and some international.

The very nature of transport policy has fundamentally changed. When the predominant response was to 'predict and provide', transport policy was a relatively simple process of mainly building roads to accommodate traffic growth and, if necessary, maintaining public transport services for social reasons. Seeking to manage the demand for transport means that policy has to be considerably more proactive. This involves developing an understanding of how travel demands are generated, which are responsible for transport's most adverse impacts, which are most amenable to policy intervention and developing co-ordinated measures to modify travel behaviour.

A number of researchers and policy makers in the UK and abroad have indicated the key role that public transport must play in such a strategic policy to reduce CO₂ and other emissions from the transport sector. Not only is public transport more energy efficient per passenger kilometre and less polluting than cars or air travel but it offers an alternative that could enable restrictions on the more polluting travel modes to be more acceptable. Reports on such a role include those by the CEC (1992) on *Sustainable Mobility* and the *Citizens Network* green paper (1996). It is a key element in the Royal Commission on Environmental Pollution (1994) report, *Transport and the Environment* and the Dutch National Environmental Policy Plan. Such studies suggest rail and bus passenger carryings need to at least double, combined with at least a halving of projected road traffic growth.

Bus and Rail Privatisation

At the same time as the growing recognition for demand management transport policies, there has developed a process of deregulation and withdrawal of the state from the transport market. Bus privatisation and the deregulation of services outside London and Northern Ireland took place in 1986 and the privatisation of British Rail in 1995-97.

These privatisations have been part of a general economic and industrial policy in Britain (and to a lesser degree in other Western countries). Although there exists a considerable economic literature on the relative efficiencies of market or planned operations of different industries, Clarke and Pitelis (1993) suggest that political reasons to distance government responsibility from key industries and to raise funds to reduce the public sector borrowing requirement have been the prime motivations behind Britain's far-reaching privatisation programme.

This privatisation research literature draws attention to "the need to face not only the problem of how to privatise companies, but also the question of the subsequent market structure," (Clarke and Pitelis, op cit.) which has led to a significant role for government-appointed regulators who exert efficiency constraints and performance incentives upon the privatised enterprises. Kay and Thompson (1986) note difficulties where "non-commercial benefits, such as external benefits" were a core part of the rationale for state control and cites the railways as a particular examples of this. Regulation thus not only needs to cover questions of economic efficiency, but also non-commercial policy objectives. This is the core concern of McConville (1995, p.5) who sees a contradiction in the "increasing public acceptance of the central role which transport plays in socio-economic development and cost effective commercial management. On the one hand this has resulted in calls for greater privatisation and on the other stressed the importance of an integrated transport system." There are thus two seemingly contradictory trends. Firstly there is the move towards privatising public transport, with the state withdrawing from planning and control roles, while at the same time transport policy has changed to require an increasing role for integrated state planning. Can transport planning's new role be fulfilled in a deregulating world? This regulatory paradox is rarely recognised by government, but resolving it could well be the key to overcoming the transport policy inertia that has followed in the wake of considerable environmental political rhetoric.

This paper explores the tensions between these two trends for the relatively mature privatised bus industry and the newly privatised railway.

DEVELOPING BUS SYSTEMS FOR ENVIRONMENTAL POLICY

Although rail based modes are generally preferred by politicians and users, in the vast majority of cases (for the foreseeable future at least) improving the appeal of the bus is currently the only realistic option available. Unfortunately, simply increasing the number of bus users does not guarantee a reduction in air pollution, noise and congestion. Whilst more bus trips may be good news for the city (and the bus operator(s)) in economic terms, it would only be environmentally successful if the number of overall vehicle miles was reduced. It is therefore clear that for environmental targets to be met, policies aimed at restraining car use must be implemented at the same time as those geared towards increasing bus use.

What can bus achieve?

In order to determine just how much the bus could contribute to the meeting of environmental targets, a number of in-depth case studies were made of the cities of Groningen (NL), Ottawa (CAN), Oxford (UK) and Pittsburgh (USA). These were selected because each exhibited good practice bus based public transport systems. Of these only in Oxford have the bus services been developed in the context of a privatised, deregulated system, with the other cities involving state control, planning and finance, although a franchise system is proposed for Groningen.

Interestingly, all four of the good practice bus systems examined were implemented due to a desire by the local authority to improve the local environment. In the European examples, this was stated explicitly in the Groningen and Oxford cases, whilst Ottawa and Pittsburgh aimed specifically at preventing (or at least minimising) congestion. Only a summary of the case studies is possible in this paper, but detailed accounts have been published elsewhere (see references).

In Groningen the City Council has been regarded as a 'pace setter' in the transport planning world, thanks to the implementation of the *Verkeers Circulatie Plan* (VCP) - the 'Traffic Circulation Plan' in 1977 (reviews and improvements to which are still underway). This plan divided the central area of the city into four traffic cells, making it extremely difficult for private motor vehicles to pass from one area of the city centre to the other, and almost impossible for traffic to travel through it. It also contained parking restraint, and various improvements to public transport provision (the construction of exclusive busways, bus priority at signals, park and ride sites etc.), a comprehensive cycleway network, and to much of the central area being pedestrianised. A further influence was the well documented position of the Dutch Government enlightened attitude towards transportation, land use and environmental policies (Enoch, 1997a).

The level of bus use in Groningen is not high, but car use is low. Within the city, 33% of commuting trips were made by car, 55% by bicycle, and 5% by public transport, and from outside the figures were 43%, 40% and 16% respectively (Gemeente Groningen, 1996). Recreational traffic was similarly split, the figures being 46%, 46% and 7% respectively. The Dutch (and Groningen in particular) cycling phenomena reduces bus use, the bicycle and the bus being in competition for many trips (Davis, 1996). Despite this, the bus is considered to be a key part of the strategy for gradually reducing the level of car use in the city, and figures on individual radial corridors suggest a modal share of around 30% may be achieved when a further proposed busway becomes operational (interview with Gemeente Groningen Official, 28/9/95). Overall, in Groningen car use is below the 50% target suggested for UK urban areas by the Royal Commission on Environmental Pollution.

The Ottawa-Carleton busway System, when fully developed, 'will be the most extensive [busway] in North America.' (Nisar et al, 1989). The busway is combined with, the local authority's apparently effective use of 'some of the strongest [pro-transit] land-use powers existing in North America' (Henry, 1988). In addition, many other innovations have been introduced, including a hierarchy of express, limited stop services and all stop services, and computerised information systems to provide passengers with travel data, and to give operators greater control (Gault, 1991).

In the context of the highly car dependent culture of North America (car ownership in Ottawa is 0.48 per person), transit use in Ottawa is very high. The overall modal share of transit in the Urban

Transit Area of the Regional Municipality of Ottawa-Carleton is almost 15%¹ in terms of the number of trips made. Trips made by walking and cycling make up around 10% of the total. (IBI, 1995). A remarkable 70% of CBD workers currently commute by transit, compared with a national average of only 10% (Enoch, 1997b).

Oxford is often quoted as being the only case of where Britain's deregulation and privatisation of bus services under the 1985 Transport Act (Department of Transport et al, 1984) worked in the way it was intended. Following deregulation in 1986, bus patronage has fallen by 35.6% in metropolitan areas, and by 27.5% in Great Britain generally, a decline that is continuing. In London, where a franchise system was adopted, patronage has actually increased by 1.3% over the same period (Department of Transport, 1995). Perhaps of greater significance is that in mainland Europe, where the state has continued to own and develop bus services, or has entered into franchise-like partnerships with bus operators, patronage has also grown. Between 1980 and 1994, the volume of bus travel in EU member states increased by 6.5% (a figure which includes Britain's substantial decline).

Thus Oxford, which has defied the general trend of post-deregulation decline, is of particular interest. Two private companies compete 'on street' with each other, and there has been a healthy increase in the number of passenger trips made by bus in the city. This growth is attributed to a mix of improved service levels for passengers, (in terms of quantity and quality), lower fares, and an expanding level of demand due to increased economic activity and the implementation of tough anti-car measures contained in the local authority's transport strategy (Enoch, 1997c).

As a result, bus use in Oxford is high. Thames Transit (Transit Holdings, 1995) claims that overall bus use has increased by 70% (to 13 million passengers a year) since the start of competition. This seems slightly exaggerated to some commentators. For example, Bradshaw suggested that an increase of 40% is a more realistic estimate, and White calculated around 35% as a best guess (quoted in Enoch, 1997c). Even so, these figures of an increase of a third or more contrast with the decline by a third elsewhere in Britain.

Pittsburgh combines the presence of exclusive busways and the beginnings of a new Light Rapid Transit network. Like Ottawa, if a public transport system could be successful within the car dominated society of the United States, such a scheme has the potential to be successful almost anywhere (Enoch, 1997d).

Looked at on a corridor basis where improvements have been introduced, the figures are impressive. On the South Busway (opened in 1977), daily ridership is now 16 000 and on the Martin Luther King Jr. East Busway, the daily ridership figures increased from 20 000 to 27 000 after it opened in 1983 (Port Authority of Allegheny County, 1996). Such an improvement has led to two more new busway construction projects being undertaken. However, city wide bus passenger statistics (Bushell, 1984 - 1995/96), show a marked decline from 94.7 million passenger trips in 1981 to 76.2

¹ 15% of trips by transit is higher than most British cities. Although Tyneside and Glasgow have public transport modal shares of 19%, and those of London and Liverpool are 16% and 15% respectively, the West Midlands figure is only 12%, and in Manchester only 10% of trips are by transit (Potter et al, 1997). In addition, Ottawa uses a bus only system with no trains, tube or trams, and is both smaller and less densely populated than the British examples given.

million in 1993. In addition, over the period 1970 - 1990, the overall volume of personal trips has increased from 4.2 million to 5.8 million and average weekday vehicle miles risen from 25 million to 40.7 million. Thus the overall modal share of transit trips has fallen from 7.7% to 3.9% over the same twenty years (SPRPC, 1996).

The single policy of busway development, although it boosted bus use to start with, has been eroded in the long term and has done nothing to affect the general rise in car-based mobility.

Developing Bus-based Transit Systems

The major finding from these case studies was that measures to promote bus use need to be carefully integrated with a mix of complementary land use, car restraint and economic policies, and ideally under circumstances of changing attitudes to travel behaviour. For this to be achieved, the presence of a strong political will (of a person(s) and/or of organisations) was of vital importance in starting up and then maintaining such a process. It would also seem that the bus operator must continually seek to improve service quality even to maintain modal share, as expectations of service quality continue to rise. Finally, it was identified that as soon as the level of political and/or financial commitment began to waiver, external demographic, cultural and economic factors began to work against the public transport provider. This was particularly so in Pittsburgh and is coming into play in Ottawa.

The case studies possess this key mixture of measures to varying degrees, with it being strongest for the longest period of time in Groningen, which has a strikingly low level of car use. These studies indicate that bus systems can be developed to the level necessary to make a substantial contribution to the greening of transport policy. The potential is there and can work.

The establishment of such a mix of factors under Britain's current deregulated regime, has so far not been widespread. Over the last three or four years however, there has been a change in attitude by bus companies and local authorities, who now realise that there are mutual benefits in working together. This has manifested itself in the forming of 'quality partnerships', whereby bus companies agree to improve service quality, in return for local authority support in upgrading infrastructure. Whereas previously only Oxford exhibited a healthy operating environment for buses, cities such as Edinburgh, Leeds, Bristol and notably Birmingham (Millar, 1997) are also now recognised as having pro bus local authorities.

Despite these positive developments, there are some fundamental problems in trying to apply similar conditions nationwide. One problem is that before investing private companies tend to require either the stability that is provided by local monopoly, or the prospect of strongly expanding demand. The current system does not provide either of these conditions, although the quality partnership may go some way towards this.

One potential solution to this problem, would be to adopt a franchising system. This is the way forward advocated by several bus industry observers, but not by the bus operating industry itself. The main advantage is that it allows local authorities to directly address longer term social and environmental objectives, whilst maintaining the lower costs generated by privately run operations. There are however problems caused by increased levels of bureaucracy and bus companies, used to organising services themselves, would resent interference in their expertise in running buses. In London, the benefits of franchising leading to passenger growth have more than compensated for

additional administrative costs. Indeed, franchising is considered by the European Commission in its 1996 *Citizens Network* report to represent the 'best of both worlds' - increased efficiency through private sector involvement without the loss of network integration and long-term planning benefits.

However, the above case studies suggest that the ownership and organisational structure of the bus company is of only secondary importance. It is however, politically symbolic and a function of the objectives set. This is why so much attention has been devoted to the subject over the last fifteen years or so in particular.

Instead, in the case studies it was found that a number of common themes were in evidence. These could be divided into external factors (demographic, cultural and economic factors, location and structure of the city etc.), and measures necessary for success (level of political will, strength of anti car measures, image of public transport etc.). If these are all positive towards bus development then success is possible under a range of ownership/organisational systems.

Consequently, a more fruitful approach may be to try and influence these 'external factors' and 'necessary measures' in a pro public transport direction. To do this effectively, a more formalised public/private framework may be appropriate to allow for a longer term vision to be taken. Clear goals and objectives would then need to be agreed amongst the participants (local authorities, bus companies, employers etc.), together with a structure that would provide sufficient confidence for investment and commitment.

RAIL PRIVATISATION AND ENVIRONMENTAL POLICY

The privatisation of British Rail, under the 1993 Railways Act, has involved a mixture of franchising and outright deregulated sale of assets and operations. The previously unified and nationalised railway was restructured into over 100 separate companies, including 25 passenger Train Operating Companies (TOCs), the infrastructure company Railtrack, six rail freight companies, three rolling stock leasing companies plus other companies covering maintenance, engineering and other support services. During 1995-97 all passenger services were franchised to private sector operators, while all other companies were sold outright to the private sector. The privatisation process is now essentially complete.

Unlike with bus privatisation and deregulation, there is a national structure of regulation. A Rail Regulator licenses rail operators, regulates charging and access to the network and sets the basis of competition. Passenger rail services are under the control of the Office of Passenger Rail Franchising (OPRAF) who issues contracts via competitive tendering to the private sector to provide passenger rail services. These franchises run for between 7 and 15 years. Overall the level of regulation is fairly minimal for the rolling stock and engineering companies and for freight, but is relatively comprehensive in the case of passenger services.

This regulation has been designed essentially to safeguard existing rail services and customers. Although the privatisation took place once transport policy had shifted towards a demand management approach, the 1993 Act was conceived under the old 'predict and provide' regime. The suitability of this industry and regulatory structure for implementing demand management policies was thus not part of its basic design.

As the Royal Commission on Environmental Pollution discovered, in developing the legislation no consideration was given to the strategic transport or environmental implications of rail privatisation. For example, the development of railfreight is considered by many studies to be of central importance to reducing the strategic environmental impacts of freight transport, yet "the Department of Transport had no idea as to whether privatisation would improve rail's freight loadings or would entirely eliminate railfreight altogether: the issue had simply not been considered" (Macrory, reported in Potter, 1995).

This was despite the fact that Department of the Environment's 1991 guide for government departments required that; "All significant environmental impacts should be considered as part of policy appraisal" including "the impact of any policy which affects energy use or transport on the emission of carbon dioxide, a greenhouse gas." (DoE 1991, pp 14-15). At this time the Department of Transport was somewhat antagonistic to the Department of Environment's concerns about the environmental impacts of its roadbuilding policy stance.

Practices and policies of the new rail companies and the Regulator

This paper's main consideration is how rail privatisation affects the development of transport policies to reduce environmental impacts. However, it is first worthwhile considering how the privatisation has affected operational environmental practices within the railway. Such direct environmental impacts of railways (well documented in Carpenter, 1994) largely involve local effects (e.g. noise, vibration, air quality and waste) rather than regional or global impacts.

At present, the environmental policies of the Train Operating Companies (TOCs) are in the process of development and their policy statements are commercially confidential. However, by monitoring the development of environmental guidance by the Office of the Rail Regulator (ORR), the environmental standards the rail operators are required to fulfil can be identified. In July 1994 the ORR issued a consultation document on environmental guidance, which included an appendix summarising issues, current best practice and options for improvement. This referred to "pollution, global warming and the depletion of the ozone layer". The consultation document included sections on non-renewable resources, energy conservation and ozone-depleting chemicals. In March 1996 this consultative document was followed by the ORR's *Railway Operations and the Environment: Environmental Guidance*, setting out what elements are "essential in a well-constructed environmental policy" (ORR 1996, p.1).

The guidance was essentially administrative, on how to structure an environmental policy. The Regulator's introduction said that it would "not be appropriate for me to try to summarise current requirements and standards", as he had done in the consultative document. However he did suggest a 'forum' to "exchange relevant environmental information". There was only one line that indirectly acknowledged the policy role that rail might play in addressing strategic environmental issues, which noted; "another area for serious consideration by operators is how to encourage co-operation between rail and other modes of transport, for example by making provision for bus and cycle use as well as car drivers." (ORR, 1996 par. 2.4). Already some TOCs have improved cycle accommodation on their trains and there are some examples of feeder bus services and joint ticketing, particularly where a bus company has won a rail franchise. However joint ticketing has sometimes fallen foul of the Office of Fair Trading and so remains an area of difficulty.

Information gathered from rail companies shows a focus on local environmental issues, particularly compliance with environmental regulation to control vehicle noise and emissions, effluents, waste

and litter. The role railways could play as part of a more sustainable transport system was of very little (and vague) concern. However, one pre-privatised railfreight company did mention co-operating with policy makers to promote railfreight and the environmental advantages of railfreight over road haulage.

One disturbing indication concerns fuel use, which is one area where an environmental benefit might be expected from privatisation as companies seek to increase commercial efficiency by reducing fuel costs. Surprisingly, the opposite was the case. Under the previously integrated railway, the operating sectors of British Rail reaped all the benefit of investing in more fuel-efficient rolling stock; under the privatised structure, such rolling stock would have a premium on its leasing charge and, if electric, the Railtrack charging system can only roughly compensate for the lower fuel demand. Thus the incentive for fuel efficiency appears to be considerably diluted under the privatised structure.

Another effect relates to fuel choice and train design. From the literature consulted as part of this study, it was noted that diesel rather than electric traction seems likely to be favoured in the privatised railway. Privatisation is also leading to somewhat lower cost, conservative technologies being preferred over innovative, energy-efficient designs.

The reason for this is because diesel traction and simpler technologies reduces the complex interface with Railtrack as:

- electric power is purchased from Railtrack;
- new electric trains face rigorous, expensive and time-consuming safety procedures to ensure their electrical systems do not cause interference with signalling. This has caused very serious difficulties with rolling stock manufacturers;
- any incidents or breakdowns involve penalty payments – with less electrical interface for diesel trains, legal costs are likely to be lower. Also diesel passenger trains are multiple-engined and so a breakdown can be less disruptive.

Overall, legal relationships and litigation risks are pushing companies towards traditional technologies, materials and designs, which tend to be less energy efficient than the state-of-the-art, and also towards diesel rather than electric traction.

The environmental implications of these, often contradictory trends, have not been fully explored, but it is clear that the industry structure and regulatory rules are creating pressures for train design and operations that could well have quite unexpected environmental impacts, at global as well as at local and regional levels.

Rail's Strategic Environmental Impacts

The strategic environmental impacts of rail relate to the sort of markets rail operators seek to develop and the general mix of price, quality, coverage, reliability, integration with other transport systems, etc. that affect modal choice and demand for rail services as opposed to more environmentally-damaging modes of transport such as car, lorry or air.

The effect of privatisation upon rail's overall role in transport in Britain is very uncertain, with a mixture of possible positive and negative impacts as shown in Figure 1

Figure 1: Some possible effects of rail privatisation in Britain and implications for rail use and indirect environmental impacts

NEGATIVE	POSITIVE
Loss of network integration, leading to more complex ticketing, lack of co-ordinated timetable information, etc., especially for trips involving more than one TOC.	More aggressive and professional marketing of train services by individual TOCs.
Major staff reductions in order to reduce costs are likely to adversely affect services and service quality and reliability	New ways of using and training staff could improve customer care and increase productivity.
Integration and joint ticketing with bus services likely to reduce, especially where viewed as anti-competitive.	Increased integration of rail and bus services, especially from new owners of TOCs which also operate buses.
TOCs likely to promote profitable off-peak leisure and long-distance business travel rail markets which generate additional travel rather than shift passengers from road and air to rail.	Improved services operated by some individual TOCs could attract travellers from road to rail on certain routes.
Short length of TOC franchises discourages investment in attractive and energy-efficient new rolling stock.	Access to private sector finance could encourage investment in new rolling stock and infrastructure.
Vastly increased organisational complexity, leading to increased costs, difficulties of communication and increased accident risks.	Grants available to freight operators to encourage shift of freight transport from road to rail.
Railfreight businesses set up to promote competition all sold to single US operator.	Single freight operator in stronger position to compete with road freight. US private sector experience effectively transferred to Britain.

Network Integrity

The lack of network integration and effects of increased organisational complexity were major concerns during the passage of the 1993 Railways Act and remain an issue, not just for the railways, but for Britain's deregulated public transport system in general.

The UK Round Table on Sustainable Development (1997) specifically looked at the environmental effects of poor integration and interchange in public transport. They concluded that transfers within public transport and freight journeys represented a substantial obstacle to the promotion of more sustainable transport modes. For passenger services, their report identified the key barriers to be:

- Lack of information about services, timetables, interchange points etc.
- Lack of information during the journey about how and where to interchange
- The additional time interchange takes, particularly due to lack of co-ordination between timetables
- Physical inconvenience and fears for personal safety at some interchanges
- Extra cost of interchange when each stage of a journey involves buying a separate ticket

The Round Table report concludes that behind these barriers were key institutional and organisational causes. Deregulation and privatisation for buses had led to no restrictions on bus service changes and no requirements to accept other operators tickets. It was felt that it was wrong to lay the blame at the door of privatisation for all these factors; many aspects existed in Britain

when the state controlled public transport. However it does note that many elements of privatised operations and their regulation do mitigate against improving integration. These conclusions are consistent with the results of the buses case studies considered earlier in this paper.

Overall, the Round Table's secretary John Adams (Adams, 1997) appears to conclude that privatisation will reduce network synergy but says that reversing transport's unsustainable trend is "compatible with the services being provided by the private sector, provided the potential gains from increased competition are not outweighed by the loss of network benefits".

This conclusion, that the negative environmental impacts of loss of integration need to be compensated by positive impacts from expanded rail services, puts even more importance on the nature of the way in which rail services are developed. This will be central to whether privatisation produces a net environmental benefit or disbenefit.

Market Development

If privatisation results in a reduction in rail's carryings the environmental effect will obviously be negative. But even if rail's carryings increase, the effects could also be environmentally damaging. This is a point that does not appear to have been generally grasped. If rail simply generates more travel without diverting many trips from the more environmentally-damaging modes of car and air, or attracts trips from more environmentally benign modes such as bus and cycle (or water in the case of freight), then rail will be worsening the transport system's environmental impacts.

The structure of rail privatisation in Britain does encourage the growth of rail revenues and so the nature of market growth is a crucial consideration. This feature of rail privatisation was not so much planned as emerged as an unintentional consequence of the politics of getting the 1993 Railways Act through Parliament. With a slender majority, the government were pushed into a number of amendments that produced an industry/regulatory structure that particularly encourages revenue growth as a commercial strategy. This is because rail companies can do little to affect much of their cost base - track access charges, vehicle leasing costs and, for passenger services, there is a contractual minimum level of services to be operated. Equally there are controls on most of the fares charged. This means that, to be profitable, revenue generation is of primary concern. As the Adrian Shooter, Managing Director of the Chiltern TOC has recently said:

"There are opportunities for saving costs, but these are limited; there are bigger opportunities for increasing revenue. As fares are regulated, the surest way to increase revenue is to increase the number of passengers travelling. There is thus a neat alignment of objectives: action taken in the pursuit of profit by TOCs is compatible with the socio-political objective of getting more people to travel by train and thereby easing road congestion. This is a fundamental point in favour of the franchising process which I feel has been missed in much of the media comment on rail privatisation."

Shooter, 1997

There is a lot in what Adrian Shooter says, but the juxtaposition of policy aims and the commercial interests of TOCs is not as perfect as he suggests. Undoubtedly, revenue generation has become important to all TOCs. The East Coast InterCity franchise, for example, was won by Great North Eastern Railways on a business plan including a 35% increase in passenger revenue to 2003. In

general the revenue growth targets of the TOCs are viewed as ambitious, but even so, they fall short of an overall doubling of rail carryings that is suggested as the minimum necessary to green the British transport system.

More disturbingly, some other TOCs have sought other ways to increase revenue. Some evade ticket price capping (for example via increased restrictions on the use of the cheapest tickets) or increasing non-regulated charges, a 20% increase in car parking charges by South West Trains being an example (Murray, 1996).

There exist a series of grants for railfreight designed to attract marginal road traffic to rail, so strategic policy links seem stronger here than for passenger services. The main privatised freight operator, *English, Welsh and Scottish Railways*, has already won some significant new traffic to rail, although the scale of expansion seems well short of the quadrupling of railfreight carryings advocated to achieve environmental goals.

Shooter's point that the rail privatisation structure requires successful passenger franchisees to expand revenue needs to be taken in conjunction was a consideration of *how* it will be done. This is crucial to the net environmental impact of privatisation. Some TOCs have clearly targeted car users on motorway corridors, but overall there is nothing intrinsic in the privatisation structure or current regulation to encourage this. The "alignment of objectives" might occur, but not necessarily so.

The effect of privatisation on the design of investment schemes is, perhaps, more disturbing. For example, as originally conceived under British Rail, the CrossRail scheme in London was designed to provide relief for the congested Central underground line and cater primarily for short-distance commuter flows. These were the main transport policy objectives, one influence upon which were the high environmental impacts of work journeys. As rail privatisation progressed, the CrossRail project became modified in order to attract private funding. This involved changing it from a scheme that would address short-distance commuter flows, to one that would generate income by tapping into longer distance travel, including generating more trips. To a large extent the concept of CrossRail shifted from addressing an environmental problem to contributing towards the problem. In the end the privatisation process resulted in the whole scheme being deferred for a decade, but the effect of privatisation upon its design was disturbing.

Interestingly, a study of privatisation plans in the Netherlands yielded similar results. New rail infrastructure has been provided as part of the National Environmental Policy Plan, but Dutch Railways being required to behave in a more commercial manner, resulted in them developing long-distance commercially lucrative services and not short-distance commuter services to effect a shift from car use. The former is more profitable, but far less environmentally relevant.

Seeking new traffic to increase revenue is a natural commercial response to the privatisation structure, but there is no guarantee that the markets developed will yield anything by way of environmental benefits and the net impact could be negative. There is a real danger that under the privatised structure the railways, rather than being part of the solution to the environmental crisis, could shift to becoming part of the problem itself.

This, together with fact that, ambitious though they are viewed, the growth plans of the TOCs fall short of that needed for policy needs, raises the question of how further growth in rail carryings targeted upon environmentally important areas could be achieved by policy intervention under the privatised system.

Cost of Policy Intervention

An important benefit of rail privatisation is for private investment to pay for commercially remunerative improvements. For example, the privatised Railtrack is now developing major plans for the upgrading and re-electrification of the entire West Coast Main Line, a project that was continually deferred for lack of state funds under British Rail. However, infrastructure projects that are developed for non-commercial policy reasons need to be financed by outside sources.

One example of a 'policy-led' infrastructure project is the reopening of the Nottingham-Mansfield line, which was partly complete when the privatisation restructuring took place. The project's costs were increased by 6% due to the restructuring to cover profit margins required by the new companies, additional project management because of the more complex organisation and changes in accounting procedures. Given that this was for completing a current project, cost increases of 10-20% might be reasonably be expected for policy-led and state funded infrastructure improvements (Potter and Roy 1996).

Privatisation and State Subsidies to Rail

An overall picture is beginning to emerge that rail privatisation in no way was designed to take into account the environmental concerns that are now key to modern transport policies in Britain (and in all nations). Some environmentally beneficial changes are being stimulated by the privatisation structure and there are also a number of, perhaps less obvious, structural disbenefits. However, even under the most optimistic assumptions, the net environmental benefits are inadequate for rail to fulfil its role in greening transport. There remains a substantial need for transport policy intervention to increase the use of rail further, and so the barriers and cost increases to policy intervention are very important.

The overall financial impact of rail privatisation is therefore an important environmental consideration. If privatisation reduces the state subsidy needed for 'baseline' rail operations and results in a somewhat expanded railway, then the savings could be used as part of a private/public partnership to enhance rail's roles with specific environmental goals in mind. Thus, even if the cost of the individual schemes is higher, as was indicated above, if the overall cost to the state of running baseline services has been substantially reduced, then overall the state gains..

But, if privatisation does not reduce, or even increases the state subsidies needed for baseline services, then an effect of privatisation is that it drives up the cost of environmental policy intervention. This actually appears to be the case in Britain.

In the early 1990s, the integrated, nationalised British Rail required an annual subsidy of about £800m per annum. The restructuring for privatisation increased this subsidy to over £2,000m in 1995, due to the loss in integration and allowance for profits. The competitive franchising process was therefore required to produce substantial savings. In practice, the franchise contracts require this subsidy to reduce to about £1,200m by 1999 and are planned to return to the British Rail level of subsidy by 2010. However account needs to be taken that assets have been sold and that these figures represent financial plans that may, or may not, be realised.

Studies of the financial impacts of the privatisation of British Rail indicate that, at the very best, the continuing subsidy to rail will be about the same as that required by the nationalised system. This

study (White, 1997) is on the assumption that all the franchises achieve their financial targets for cost reduction and revenue growth. Other studies (e.g. Harris and Godward, 1997 and Save Our Railways, 1997), question the achievement of the more ambitious financial plans and note that OPRAF would have to find additional resources for any failed franchise. One estimate is that an additional £575m could be needed over the next 7 years to rescue over ambitious franchise holders, a 70% increase over the subsidy needed for the unified British Rail. Even allowing for increased investment costs, Harris (1997) estimates that keeping British Rail in the public sector would have saved the government over £4.5 billion.

Although the latter studies may prove to be pessimistic, a consensus is that the British model of rail privatisation has not reduced the cost to the state of supporting the baseline railway. Any specific policy intervention will thus require additional resources unless the system is reformed. If the more pessimistic studies prove to be correct, then considerable extra resources are going to be needed simply to keep the baseline railway running, let alone further initiatives to serve environmental objectives. At the end of the day this financial context will probably be crucial.

ACHIEVING 'ORGANIC' REGULATION AND A CLARITY IN POLICY INTERVENTION

This paper's examination of the bus and rail industries suggests that regulating for transport's environmental impacts in a deregulating world has two crucial requirements:

- 1) The industry should be so structured that commercial behaviour fulfils, or at least moves in the direction of, environmental policy aims.
- 2) That the structure does not inhibit non-commercial policy intervention. Included in this must be a consideration of regulatory aspects (e.g. that commercial regulations do not inhibit environmental regulation), that intervention does not adversely affect the commercial operations and that there is flexibility for policy adaptation.

The way in which an industry structure responds to environmental issues can be thought of in terms of 'organic' and 'inorganic' responses. The term 'organic' is used to indicate responses to environmental issues that are inherently part of the commercial operations of a business. 'Inorganic' issues are external or conflicting to commercial operations and so require non-commercial pressure (e.g. regulation) for companies to address them.

Transport's global environmental impacts are viewed very much as external costs and there is a substantial literature on how such external costs can be internalised (a recent core example is Maddison, Pearce et al., 1996). For the railways, fuel economy or integrated information systems might be considered good examples of 'organic' issues where commercial and environmental goals coincide. Attention to these are consistent with a purely commercial remit and regulatory framework. An 'inorganic' concern might be low fares or developing urban commuter flows in preference to more lucrative, but less environmentally beneficial long-distance traffic.

An important factor mentioned by many commentators on the privatisation of utilities is the need to structure the privatised industry and to regulate it so that policy issues are automatically addressed as part of the commercial operations of the companies involved (Kay and Thompson, 1986; Roberts.

Elliott and Houghton, 1991). For example, the way in which electricity privatisation in Britain failed to make energy conservation an 'organic' issue has been contrasted to the 'least cost planning' regulation in the USA, where private electricity companies can make more profit through energy conservation than by building more power plants. Attempts at policies to encourage energy conservation in Britain have even been thwarted by an industry regulator, in the case of the gas industry (ENDS, 1994).

In general, the bus deregulation has thrown up major problems as transport and environment policy aims are essentially inorganic and opposed by the industry. Rail privatisation partly fulfils the 'organic' requirement, but needs some adjustment to be fully achieved. The problem of privatisation not decreasing the subsidy needed for rail (and certainly increasing it for at least the next decade) does present serious resource constraints.

The second requirement, that the structure is compatible with policy intervention, is one that neither privatisation has taken on board to the degree needed for a modern, environmentally-focused transport policy. In this the bus structure of regulation is particularly lacking. For rail, mechanisms exist for a specific project to enhance a rail service, but there is no real agreement as how to integrate a private operator into a wider 'systems change' policy, or to allow sufficient flexibility for policies to evolve, change and be 'tuned'. At the moment, OPRAF can take policy goals into account when franchises are let or come up for renewal, but that is at least only every 7 years and may be as much as every 15 years. Shorter franchises are not viable for commercial reasons.

A possible reform would be for a public/private agreement to share the financial impacts of a policy initiative. For example if motorway tolling or road pricing were introduced specifically intended to shift trips to rail, then the private rail companies and Railtrack would reap substantial commercial benefits. Equally, a policy to prioritise high-cost urban commuter flows over lucrative long distance traffic could have an adverse commercial impact.

An agreed mechanism for distributing the costs and benefits of policy development and the involvement of transport operators in designing schemes could provide a clear basis for action. For example, the state would get a proportion of additional revenues generated, which could be used for other rail policy initiatives, including those where the commercial sector needs to be compensated for losses. A similar mechanism was considered for the 1993 Railways Act, but rejected. This was that any addition or shortfall in revenue over that planned by the TOCs would accrue to OPRAF. Thus OPRAF would have the resources to keep rail services running should a TOC run into trouble.

Such a mechanism is essential to reflect both the bus and rail industries' part in transport policy and the fact that transport policy is bound to have financial effects on privatised bus and rail operations.

The reality is that we are living in an increasingly deregulating world and one where previously state-owned utilities are being privatised. Mechanisms need to be developed in which it is accepted that policy is no longer a matter of the state imposing decisions upon the market. It is now one of network partnerships involving key stakeholders, with mechanisms to ensure that these stakeholders are empowered and effects (particularly financial effects) are fairly apportioned. Privatisation and deregulation does not mean the end of the need for policy mechanisms, but they do mean that policy has to be implemented in a very different way.

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