

Impact Analysis of the Structural Reforms to the Australian Rail Networks.

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Abstract:

This paper attempts to articulate the social, economic and environmental costs and benefits which may occur from the recent creation of the National Rail Corporation. The Australian rail networks with the exception of Queensland Rail are undergoing significant structural reforms due to the establishment of the new national freight network. All the systems have been heading toward some form of corporatisation in recent years and these reforms coupled with reductions in operations have impacted greatly on the Australian economy. The purpose of this paper is to articulate hitherto implicit impacts that these reforms have caused.

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1. INTRODUCTION

Transportation deregulation has created considerable opportunities for transport managers to lower costs and improve services. Less reliance on regulations has encouraged private and public transport services to be more creative and to innovatively approach the shipper-carrier relationship. The relaxation of economic regulatory controls over land, sea and air transportation in Australia permitted more novel approaches to resolving transportation requirements in terms of both cost and service. Air and sea transportation have received more attention from the Federal Government than land transport has in terms of micro-economic reforms. However, recently the publicly owned rail systems have undergone structural changes which have enhanced their ability to change shipper-carrier relationships to a more efficient, specialised and personalised service. This paper will analyse the impact of these reforms.

The deficits that have been incurred by the publicly owned railway systems have produced significant and widespread disbenefits of a hidden nature. Deficits of the public railway operations caused such demands on public funds that accumulated railway losses accounted for approximately one third of State sector net indebtedness. Table 1 shows deficits of the publicly owned railway systems in current and constant prices for the period 1980-81 to 1989-90. In real terms the deficits increased by 37% during the 1980's (see Table 1). One of the major recommendations of the Industry Commission's (IC) Report (1991) was that the extent to which railways are adding to public debt must first be accurately acknowledged and then alleviated. The three pronged recommendation sought for: (a) an explicit acknowledgement of the problem; (b) that such acknowledgement be accurate; and (c) the problem be alleviated. What seems to have happened is that (c) has received the attention that it deserves but (a) and (b) have been neglected in the government's haste to negate the reported financial burdens. Solutions for reducing the size of these losses have focused on improving financial and operating efficiency via cost reduction and corporatisation.¹

Most of the recommendations aimed at improving performance by reducing costs rather than targetting output-oriented aspects such as effective marketing. It is the density of railway operations, as reflected in the capacity to accumulate volume, that is often important in determining costs; and as the publicly owned rail networks tend to experience excess capacity (the problem being particularly acute in branch line networks), it would seem that successful marketing to gain more traffic would assist these networks to reduce the problem of excess capacity. When considering the effectiveness of reforms in rail transport that focus on improving costs, the most accurate analysis will be oriented towards product and asset-specific considerations, which consider both internal efficiency and external factors such as expanding markets.²

¹ Affleck (1990) provided a variety of options to improve freight operating performance whilst Kunz and Shiel (1988) discussed the effects of ownership on the performance targets in the railroad industry in the United States and Forsyth (1992) gave a discussion on regulation alternatives for nationalised companies which included railways.

² For example The Bureau of Transport Economics (1983) targetted major freight corridors.

It is often difficult to quantify the major benefits arising out of the massive structural and operational reforms that have occurred in recent years. This paper attempts to make explicit some of the concealed economic, social and environmental benefits and disbenefits that have and will continue to stem from these reforms; and thereby seeks to redress the dearth of attention that has been given to the complex nature of railway infrastructure's impact on our society.

Table 1

Railway Deficits¹ of the Eighties

Year	Current prices	Constant (1989-90) prices ²
		\$ million
1980-81	768	1,533
1981-82	955	1,711
1982-83	1,213	1,960
1983-84	1,548	2,338
1984-85	1,618	2,311
1985-86	1,708	2,277
1986-87	1,742	2,164
1987-88	1,655	1,916
1988-89	2,223	2,357
1989-90	2,100	2,100

1. Deficits are estimated as operating expenditure including interest payments and depreciation, less operating revenue excluding subsidies.

2. Conversion of current price estimates to constant prices was based on national accounts implicit price deflators for non-farm GDP.

Sources: ABS unpublished statistics; IC Report No 13 21/8/1991, Table 6.1 p120.

The paper is divided into various sections. The first section is the introduction whilst the second examines the legislative reforms which have affected all public railway networks in Australia with the creation of the National Rail Corporation in 1991. Economic impacts arising from these reforms are analysed in the third section. There is some overlap between the economic, social and environmental impacts. The Social and environmental impacts are briefly discussed under the next section. Section five is the conclusion which concludes that the creation of the National Rail Corporation is the major rail reform in Australia at present and its creation has forced the state rail systems to continue their operational improvements.

2. LEGISLATIVE REFORMS

Most systems have been required by legislation to aim for corporatisation of their services which has led to changes in management structures. The Australian National system is analysed initially because it experienced the first major reforms which all other rail systems have adopted to some extent since.

Australian National

The Australian National Railways Commission (AN) is a statutory authority under the *Australian National Railways Commission Act 1983*. It is responsible for the management and operation of railways owned by the Commonwealth Government. The Australian National system was established in 1975 and by 1978 it was fully operational. An Inquiry by the House of Representatives Standing Committee on Expenditure (1982) recommended substantial changes to the objectives of this national network and from then on AN was required to operate as a commercial enterprise. It was the first network in Australia to receive this directive. Since 1983 all community service obligations (CSOs) operated by AN have been separated from commercial operations. In July 1993 the Commonwealth Government re-affirmed its decision to transfer all of AN's interstate rail freight business, including ore traffic from Broken Hill and its licences to interstate roadtrailer services to the National Rail Corporation. AN's main function in future will be to operate the interstate passenger services of the Indian Pacific, Ghan and the Overland.

National Rail Corporation

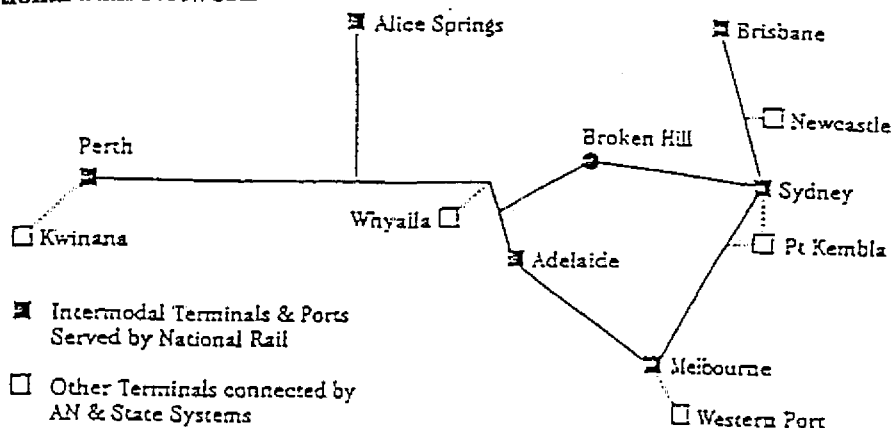
In September 1991 an agreement between the Federal and various State governments was reached to bring most of the interstate rail freight operations under a newly formed National Rail Corporation (NR). Although AN had improved its financial and physical productivity performances the newly created system was not given to AN to manage as was initially expected because it was argued that a greenfield operation was required to prevent any entrenched inefficient public sector work practices to be involved. In 1993 under the Federal government's One Nation programme \$454 million³ was allocated for rail infrastructure reform to assist the National Rail Corporation to develop a 'workable' national freight rail transport system.

NR is a fully commercial enterprise, incorporated under the Corporations Law, liable for both Commonwealth and State taxes and subject to no regulatory arrangements other than those imposed on any other private sector enterprise. The shareholders are the Commonwealth Government and State Governments of New South Wales and Victoria. By November 1993 the first freight consignment was shipped under the new corporation. The National Rail Enterprise Agreement Award (1993) reduced the

³This figure was later reduced.

number of unions operating within NR from around 30 to two, namely the Australian Services Union and the Public Transport Union.(IC, 1992/93)⁴ A potential benefit is the planned reduction in the labour force to 4000 compared with 9000 employees who were involved with interstate freight transport(ABM 1994) but as a significant component of works is expected to be contracted out, it will be difficult to assess the improvements in performance.

National Rail Network



Source: National Rail Corporation Limited Annual Report 1991-1992 p.5.

NR developed from systems which were regarded as public utilities and government utilities theoretically are supposed to select alternative investments that will minimize the revenue requirements from customers paying for the services of the utility, whereas the competitive firm (which is what NR is regarded as) is expected to select alternative investments that will be most beneficial to the owners of the firm; in this case the Commonwealth Government and the NSW and Victorian State Governments. There is a significant shift in cultural ethos which could have widespread economic and social repercussions but have not been addressed by legislation. Neither have any legislative constraints appear to have been imposed or considered for any future pricing or profit margins of NR.

State Rail Authority of New South Wales

In 1988 the State Rail Authority(SRA) began a restructuring program which established separate divisions based on operational type, i.e. urban passenger, country passenger, freight, and real estate. SRA changed its legislation in 1991/92 financial year to introduce the first Community Service Obligations agreement with the State Government. Benefits arising from its restructuring program have, according to SRA, included:

⁴National Rail Corporation Ltd Annual Report 1991-1992 stated that union coverage of NR employees is under two unions which is a reduction from 20 or so unions now represented in the rail industry. (p.10) There is a discrepancy in reporting between the IC and the NR Annual Reports.

"a reduction in real cash operating costs by a cumulative \$1.2 billion between 1987/88 and 1991/92: a reduction in the real cash cost to NSW taxpayers by \$432 million; reductions in real rail freights for coal and grain customers of 16.7% and 6.3% respectively." (Annual Report, 1991/92, p.9)

What has not been declared is the total real cash cost to the NSW taxpayer even though it has been reduced. The government cash contribution (excluding capital grants) totalled \$265million in 1991/92. This was a reduction of 25% from the previous year and was further reduced by 11% to \$234.5 million in 1992/93. Capital grants totalled \$474.7 million in 1993. (Annual Report, 1991/92 p.36 and 1992/93, p.6) In 1991/92 the freight division recorded an operating cash surplus of \$17 million for the first time which was achieved from an investment of \$322.5 million since 1988. (Annual Report, 1991/92). This return of \$17 million from \$322.5 million investment for Freight Rail division represents a return on assets of 5.2%⁵ Freight Rail division continues to improve with an operating cash surplus for 1992/93 of \$51 million. (Annual Report 1992/93, p.7) The public utility objective of maximising the benefits to consumers is clearly portrayed here.

A single rail freight terminal for Sydney is being redeveloped at the Enfield site which will be used by both SRA and NR. Although reforms in rail have included corporatisation of the systems, contracting out of maintenance facilities and leasing of wagons and containers, privatisation of trackage is still being investigated by the Department of Transport with a feasibility study for privatising the rail haulage of Hunter Valley coal. In this State the cultural ethos of the state government could go one step further than the Commonwealth government's plans for NR by privatising portions of the network which are used solely for one purpose by one company.

Queensland Railways

The *Transport Infrastructure (Railways) Act 1991* requires the Queensland Railways to operate to "sound commercial principles" and aims for corporatisation by 1995. A new organisational structure based on core business units was introduced in late 1990. The management structure changed from a traditional engineering and operating basis to a more business oriented service comprising six major business operating units, namely, Coal and Minerals, Freight, Passengers, Human Resources, Financial Services and Corporate Services. Under the Act, all community service obligations must be identified, explicitly funded and reported.

Excluding coal freight which is in a fluctuating situation, the remaining freight traffic of QR has been losing its market share and will continue to do so unless QR markets its freight services better. Obviously any improvement in the remaining freight traffic is highly contingent on an improvement in the state's agricultural conditions. Presumably labour shedding, enterprise bargaining and union amalgamation over the

⁵The five percent is an accounting return which in economic terms reflects an implicit opportunity cost under constrained budget situations.

next few years will reduce the need for a separate division of Human Resources which eventually could be incorporated into a Management Services division perhaps together with Financial and even Corporate Services if these divisions also become streamlined. The Coal and Minerals division will continue to be a separate entity given the gloomy and uneasy outlook for coal exports. Some of the coal lines may become privatised but as yet no feasibility study has been formalised. The traditional sections of freight and passenger will have to be the growth areas for QR and the capacity to expand will depend heavily on competitive marketing, quality of service and sufficient demand.

The political ideology of Queensland changed with the White Paper on Corporatisation which was released in March, 1992 together with the State Economic Development Policy which was released shortly afterwards. Previously, successive state governments had sought to balance the twin objectives of maintaining a competitive export coal industry and producing a return to the ultimate owners of the resource, the Queensland public, through QR coal rail freight charges. The Goss Government, faced with competitive world pressures in the coal industry, realised that the twin objectives had to cease and now the single objective is to enhance Central Queensland's coal export competitiveness with a Coal Rail Credit Scheme under which rail freight charges for export coal are based on an escalation formula in line with changes in the CPI⁶. This change in political ideology translated into a change in organisation culture of QR from one of public benefactor to commercial corporatisation.

Public Transport Corporation

Major reforms in the Public Transport Corporation of Victoria (PTC), the least efficient of the rail systems⁷, began in 1993 with the election of the Liberal government who proposed \$245 million reduction in the overall cost of public transport. During 1993 approximately four thousand staff were retrenched and the social impact of the consequent unemployment is a cost to the individuals involved at least in the short term. Other cost saving measures that have been introduced include contracting out and the removal of restrictive work practices. Within this context, railway unions negotiated retention of some services based on cost savings being met by productivity gains. The reform process is at varying stages within the individual rail systems and PTC has in the past led the way in reform of land transport. The handling and transport of grain has been subject to major reforms which have reduced costs and increased efficiency. The Victorian Minister for Transport announced that the share of state appropriations to PTC has reduced progressively from 9.9 per cent

⁶For an approximation of export coal earnings (Qld) and the tradeoff of loss of rail revenue see Barber (1993) CQJRD, 2,2, pp18-22. See also Queensland Coal Board's 41st Annual Review, p.11, and the Australian Mining Industry Council, Economic Report, June, 1992 and 1993.

⁷Operating efficiency performance indicators 1990/91 and Operating cost performance indicators for 1990/91 for rail freight services show that PTC on various labour productivity and capital productivity as well as world best practice measures PTC recorded the lowest figures. See BIE (1992) Research Report 41, Tables 2 and 3.

in 1983/84 to 5.7 per cent in 1990/91 (Press Release Victorian State Government Gazette, December, 1991)

Westrail

Westrail is the trading name for The Western Australian Government Railways Commission. In 1992 Westrail was restructured from functional branches to autonomous business divisions. It has recently undergone four major reforms in an endeavour to improve competitiveness. The Midland Workshop closed in 1994, 39% of Head Office Administration has been classified as surplus, interstate freight (one sixth on current freight) was transferred to the National Rail Corporation, the Indian Pacific was completely transferred to Australian National Railways and corporatisation is being implemented with the 1993 deregulation of bulk oil, minor bulk commodities and timber. Westrail operates in a completely deregulated market except for grain transport. Although grain is still regulated to rail transport grain freight rates have fallen by nearly 40% in real terms. Westrail gave seventeen performance indicators mostly showing steady improvements during the 1990s. (AR 1992/93, pp.35-39). The bottom line indicator for any private corporation is the financial position and in 1992/93 the commercial profit was \$11.9million (Westrail Annual Report, p.35)⁸

3. ECONOMIC IMPACT

The legislative reforms of each rail system was described in a different way as examples of what was generally occurring in all of the systems. NR has been created from portions of all other systems. AN has been markedly reduced in the size of its operations, SRA was recorded with a financial emphasis, QR's management structured changes were highlighted, PTC was a special case in that its operations have received severe budget restrictions and Westrail is tightening its efficiency net in a number of different ways.

Criteria for judging the efficiency of capital expenditures by government utilities can be analysed by looking at the maximization of the ratio of benefits to costs on an annual or present equivalent basis; minimization of combined annual cost to the public user and the public supplier of the facility when benefits are fixed; minimization of the present value sacrificed if the program were removed or optimization of cost effectiveness functions.⁹ The many economic benefits arising from reforms in rail transport are difficult to estimate accurately. A common procedure used by economists for analysing expenditure decisions is to postulate that

⁸An operating loss for the year as per the conventional financial statements was \$10.3 million and the budgeted operating loss was \$6.5m. (Westrail Annual Report p.34)

⁹Public utilities are confronted with selections between alternatives which involve differing patterns of cash flows and intangible considerations. When large capital expenditures are involved such as the recent funding for NR, government analyses include measuring benefits and costs often under such conditions in which no market yardstick is available. Numerous performance indicators have been established for government enterprises some of which are detailed below.

decision makers (e.g. governments) attempt to maximise utility, subject to a budget constraint. The problem with using such a procedure for railway expenditure is related to the difficulty of obtaining accurate expenditure figures.¹⁰ Broadly speaking large public infrastructure investments generate widely diverse and integrated long term externalities which are difficult to predict due to the complexity of the stages of consequences. Sometimes governments weigh the incidence of benefits on different individuals and groups rather than analysing impacts on the whole of society. Governments face difficulties in determining criteria for judging acceptability of projects and selecting the appropriate interest rate to convert benefits and costs into equivalent terms. Large public infrastructures especially railways are non-marginal and rarely comparable. Quantification in present value market prices may not be an appropriate measurement to act as a signal for private investment and as public railways in Australia are moving towards commercial behaviour, this is particularly pertinent for rail investment evaluations. Rail, but more so road infrastructure investment, creates significant spatial diversity in any given region. Reforms in rail networks which impact on local regional economies create long run integrated externalities which overlap between regions¹¹. The restructuring of rail transport corridors may not be as great as road construction impacts but staged externalities impacting on previous, future and other modal developments need to be acknowledged. Given the above examples the following is only an initial attempt to assess the impacts, which are of the first order only, of the legislative reforms mentioned in the previous section. However it is intended to show the way towards establishing more accurate criteria for assessing the diverse impacts consequent from the recent reforms in the public rail networks.

Debt and Crowding Out

There is an overlap between the economic and social impacts of railways debt and financial returns on assets. Debt has been included under economic impacts and the latter under social impacts because the latter is not only a separate issue from debt, it has a hidden opportunity cost due to railway's deficits. Both have very diverse impacts and it could be legitimately argued that both could be included in economic impacts. The topic of financial returns has been included under social impacts to emphasise that the taxpayers of Australia generally lose when rates of return from any public entity is negative.

The reforms in rail transport arose due to the large deficits incurred by the public systems. Many estimates of these debts have been provided but if one considers that approximately one third of public sector borrowings was being spent on rail deficits then the impact of such debts must be significant. The State governments could have used this revenue for other public works so there is a crowding out effect of at least public investment. The obvious economic analysis of considering the debt component

¹⁰ An examination of road expenditure in Queensland using such an approach was undertaken by Docwra (1982) and Docwra and Strong (1985) For a theoretical detail of the structure of the model see Beggs and Strong (1982)

¹¹ In Australia's case integrated spinovers would tend to occur between the capital city or closest major port and the region.

is in opportunity cost terms. The interest bill associated with these high debts need to be included and until recently these debts were incorporated in each State's requests for Commonwealth grants. This means that the opportunity cost was not just restricted to each State's economy but extended to Commonwealth funding as well. Railways were rarely in a position to contribute to repayment nor full interest payments and funding has been written off which hides the disbenefits associated with the continuous debts attributable to this industry. Government borrowing may increase domestic interest rates and crowd out some private investment. Did expenditures on railways 'crowd out' other State government investments? It must be assumed that the various State governments consider that the expenditure on rail would produce the greatest benefits to the people of that State. The opportunity cost associated with such significant expenditures must imply that railways produce intangible benefits which are not included in the financial recording of each system's accounts.

Public Capital and Private Sector Output

Recent studies have shown that although public investment may 'crowd out' some private investment it also stimulates the private sector. Aschauer(1989) provided empirical evidence for the United States on the link between the stock of public capital and private sector productivity. His work indicated that private sector productivity is positively related to non-military public capital stock, especially the 'core' infrastructure investments on transport and sewer and water systems. Although railroads are private sector activities in the United States they are a component of the public capital stock in Australia. With the creation of the National Railways a \$453 million injection of public capital into a core infrastructure of the Australian economy occurred and it would be expected that such an injection would stimulate an improvement in the private sector growth. On the other hand a principal criticism of Aschauer's studies is that although infrastructure investment is associated with economic growth generally, and hence with productivity growth, the causation may not be direct from infrastructure to productivity. Aschauer used lagged capital stocks in his aggregate time series regressions to eliminate this problem. Dowrick(1994)¹² has summarised the critical debate surrounding Aschauer original findings but argued that overall studies have supported the viewpoint the investment in public infrastructures does produce spillover benefits into the private sector. His study showed that there has been a sharp reduction in Australian public investment over the last decade and that recent increases in government spending on infrastructure will add to long run productivity gains as well as stimulating aggregate demand in the short term.

Otto and Voss(1993) attempted to quantify the role of public services in private production for the Australian economy over the period 1966/67-1988/90. They found that public capital did have a significant and positive impact on private production and private factor productivity. In a commissioned study by the Australian

¹²Dowrick argued that investment in equipment and machinery also provides substantial spillover benefits(p 26-28) in that the implied mechanism is one of learning by doing associated with the introduction of new equipment. Such positive spillovers may be occurring with the expansion of the suppliers of rail equipment. see Footnote 9 below.

Automobile Association(1993) Otto and Voss found that a one per cent increase in road stocks increases private sector capital productivity by 0.24 per cent. Although the quality of their data, they cautioned, was an important constraint of the depth of their analysis they did conclude a significantly positive correlation. An aspect that the Otto and Voss study did not appear to consider was how the revenues were raised for the public capital investments. Domestic funding may have less impact in the short term than foreign borrowing. It seems plausible, given the supportive evidence of these Australian studies that increases in investment in rail infrastructure would have a similar positive correlation on private sector productivity.

Pricing Reforms and Modal Competition

One aspect of reform that has not been addressed sufficiently as yet is the adoption of pricing structures which send the appropriate signals for infrastructure investment and freight users' choice of transport mode. (BIE (1992) p xvi)

One of the most hidden costs to the Australian economy has been the incorrect pricing signals which have distorted the modal transport task. With the ability to internally cross subsidize and the objective of traffic maximization under which State rail enterprises operated after WW11 until the late 1970s an inefficient signalling mechanism was established which distorted the road rail modal transport share.¹³ Reforms requiring commercial practices will begin to send appropriate signals for infrastructure investment and freight users choice of transport mode.¹⁴ A study by Batterham, Mikosza and Ockwell (1990) attempted to measure the opportunity cost associated with choosing a suboptimal mode of transport.

Due to increased efficiency in rail transport pressure will be placed on terminals and ports as well as coastal shipping to improve their standards of service in support of rails efficiency standards. Competitive pressure on road transport will force this mode to improve in order to maintain its modal share. According to a recent BTCE(1993) rail's share of the total freight market share of rail has declined but it is expected that traffic share will start to increase with the creation of the National Rail Corporation. Gains will occur on the major intercapital corridors where a vigorous rail freight service will compete with road transport for freight forwarders traffic. Terminal linkages have been improved with investment in terminal facilities and ports occurring as part of the major restructuring program and these investments will further benefit rail's push for greater reliability and quality of service.

¹³ Kolsen was one of the first Australian authors to discuss the road rail pricing distortions prevalent in Australia. See Kolsen (1968) see also ISC (1986) and BTCE (1988) Occasional Paper 90.

¹⁴ Road freight seems to underrecover full costs as well as but not as much as rail under recovers. Road pricing policies are very politically sensitive

Over the past decade, the freight market share of rail (in tonne-kilometres has declined to such an extent that road freight transport is of similar magnitude to that undertaken by rail..... There are many factors that help to explain this trend. Road transport has made major incursions into traditional rail markets such as coal and coke..... This transfer from rail to road has also been due in part to the highly competitive nature of the road freight industry, which has resulted in competitive road freight rates relative to rail freight rates. Another factor has been that road transport has largely met new needs and demands for growing industries which have located away from railheads. (BTCE(1993), p.7)

Combining the right pricing signalling with efficient investment decisions in the rail industry will impact on the major substitute competitor, namely road transport. Price competition has been improved with the gradual lifting of regulations restricting commodities to rail. Rail has been accused of reducing its prices to gain traffic from road whilst on the other hand it has been argued that road transporters do not pay their full costs and thus can price more keenly which also distorts an efficient allocation of transportation. Technological advancement will become more important with increased modal competition. For example, the new technology has ensured specialised wagon construction and marketing approaches such as leasing of container wagons to road transporters have steadily grown in the 1990s and with greater innovative freedom such efficiencies will continue to grow and benefit customers. Now that State networks have been released from interstate traffic greater attention will be directed to smaller more personalised customer services which will benefit customers not only by being able to choose the most efficient transport mode due to correct market signalling but also because the rail service itself will be improved. Westrail has implemented a combination of road and rail and bus services and with fewer impediments on competition and restrictions on railway policies, more rail systems will co-ordinate freight services with rail and urban road door to door service.

International Competitiveness

Savings in transport costs will favourably affect exports and the domestic price of import substitutes. The bulk of grain and coal exports¹⁵ are shipped by rail and consequently if the transport component of these production costs are reduced these exports will become more price competitive on the world market.¹⁶ Imports will mainly be affected by decreases in shipping costs rather than rail efficiencies but where relevant, any reduction in rail costs of trafficking imports will reduce domestic production and consumption prices. In the future this factor will become more

¹⁵see Royal Commission into Grain Storage, Handling and Transport(1988) especially Supporting Paper No. 4 Vol Two. The Study by the BCA(1989) estimated a total saving of \$3.2 billion 'about 40% of which is driven through the improved operations of the railways' (p 2 and section 3.7,p.38)

¹⁶For a comment on the recent changes in export coal rail pricing in Queensland see Barber (1993).

important with greater use of rail landbridging imports from one port of origin to various terminals throughout Australia. In the short term though these benefits will not be very large and improvements in terms of trade will be gradually generated.

A spinoff of the railway industry which is benefiting terms of trade is the rapidly expanding export industry in rail technology and equipment. With the Asian economies such as Malaysia, Thailand, Indonesia Taiwan and the Philippines upgrading existing rail networks; China developing new electrification mainlines and major metro networks as well as South America planning huge new rail networks the Australian suppliers are well positioned to gain from increased world demand¹⁷. Government statistics presently record rail and railway related equipment and services in such a manner that is difficult to enable future planning for these firms. A snowballing effect can occur on the technology front with these industries initially benefiting from Australian rail support and in turn gaining greater technology knowhow from the world arena and then returning it to the Australian systems.

Performance Indicators and Productivity Improvements

With corporatisation the primary performance indicator in the future will tend to be the bottom line commercial result per annum. Most systems are not in a position to list profit as their prime performance measure but all have been reducing their net losses which does indicate the reforms have improved financial performances markedly.¹⁸ If the situation continues financial performance indicators will gain prominence but at present this prominence has been given to labour productivity gains.

One of the most common measures used in assessing the improved performances of rail transport in Australia has been labour productivity, i.e. output per unit of labour input employed. Partial productivity indicators such as labour productivity measures do not demonstrate if overall productivity has occurred and do not account for increases or substitution of other inputs such as capital, technology and energy. Physical measures such as labour productivity permit comparison with other domestic and international rail systems. The BIE (1992) claimed that:

¹⁷Such companies as Asea Brown Boveri (ABB) who secured a \$100 million order to supply electric freight and passenger locomotives to the Indian Railways and Westinghouse who secured a \$115 million order to supply signalling and safe working equipment to the Thai railways are examples. The Australian Railway Industry Corporation (ARIC) recorded its members exported a total of \$A20 million in 1990 which is expected to expand to \$A200 million by 1994. (ABM (1994) p.100)

¹⁸The Steering Committee on National Performance Monitoring of Government Trading Enterprises (SCNPMGTE) (1993) published data on the dividend payout ratios i.e. performance was measured as dividends defined as a proportion of operating profit before tax and after abnormals, for government business enterprises in core industries. Railways and urban transport were excluded because in general they do not make dividend payments. An EPAC (1993) study by Clare and Johnston also looked at dividend payments of government business enterprises. Canada and White (1993) compare the opportunity cost of capital i.e. interest rates on funding, of public utilities and competitive firms. Their detailed studies viewed performance via the rate base or 'fair' return expectations compared with interest rated on capital broken down into core industries.

The best Australian labour productivity performance is about one third that of the worst performed North American system considered, and there is a more than ten-fold difference between the worst performed Australian system and the best practice North American system."

(BIE, 1992 p44)

The labour component has changed from unskilled and semi-skilled people to very highly skilled technicians and service personnel. The wage bill per labour input in constant terms has risen. The reduced numbers of employees in the railway industry are more highly skilled due to the technological advances permitting reduced labour and thus this reduced number of employees, on average, receive higher real wages, i.e. the cost per input of labour has risen. When studies concentrate on cost reductions and claim that labour numbers have fallen, the higher wage bill per unit of labour due to higher skills is sometimes overlooked. Substitution of high prices labour (similar to high price capital substitution) may ultimately be a disbenefit to the bottom line of the financial outcome. The redundancy procedures have caused the component of salaries and wages to total expenditures to fall markedly in most systems, for example in QR the salaries and wages component fell approximately 20 per cent during the eighties (see Table 2)

The BTCE (1991) looked at this issue of not isolating performance measures to partial analyses of labour and capital productivity. It recommended the use of total factor productivity growth rates and applied these to Australian National. Productivity measures are a useful indicator of performance of an enterprise and can support financial performance indicators but their useage especially in partial measurements must be viewed with caution.¹⁹ The other two major productivity indicators are based on locomotive carrying capacity (millions of net tonne kilometre carried per locomotive) and wagon and track productivity (000s net tonne kilometre per wagon/000s gross tonne kilometre per track kilometre), both of which have recorded improvements during the 1990s.

¹⁹see Hensher (1992) and IAC (1989) for indepth analyses of productivity measurements in Australian rail systems. The BTCE (1991) stated that variations in passenger and freight mix can also cause labour productivity measures to be poor indicators of performance. (p.30)

Table 2

**Salaries and Wages Component
of Working Expenditures - QR
1979 - 1989**

Year	Working Expenditures* \$m	Salaries and Wages** \$m	%
1979/80	483	315	65
1980/81	559	348	62
1981/82	677	434	64
1982/83	762	477	62
1983/84	834	518	62
1984/85	863	550	63
1985/86	1003	585	58
1986/87	1069	588	55
1987/88	1106	559	50
1988/89	1218	586	48

Source: All figures were calculated from QR Annual Reports 1979-1989.

*These figures are the total expenditures of Table No. 3 titled 'Working Expenses and Other Charges'

**These figures are the total figure given in Table No. 5 titled 'Statement Showing the Total Amount paid for Salaries and Wages including Travelling and Incidental Expenses in the Various Branches'

The performance indicator of the efficiency of the utilisation of capital used by the BIE (1992) study was the ratio of gross tonne kilometres to net tonne kilometres (gtk/ntk). This study cautioned that:

"there appears to be no clear consensus amongst railways on what specific further measures of capital utilisation might be employed."

(BIE, 1992, p.51)

The lack of emphasis on improving capital utilisation has been inadequate recording of the cost of capital assets according to the BIE and the vast difference in the technology used by the different systems.²⁰

²⁰see BIE (1992) Figure 4.8 p.51 for a comparison of the Australian and North American systems on the efficiency of utilisation of capital. It is interesting that although the BIE recommended more specific and more disaggregated labour productivity and technical efficiency indicators to be developed they also neglected the capital performance indicators. Barber & Manger (1994) have argued that not only does the recording of the cost of capital assets need to be reviewed but such a review needs to be urgently undertaken and in such a manner that permits breakdowns of asset specific types of capital and strategic business unit capital bases.

Gross Domestic Product

The Business Council of Australia Study (BCA) (1989) estimated that as the economy fully adjusted in the longer term to the beneficial effects of cheaper transport, employment opportunities would expand by 17 000 jobs and the real wage would increase by approximately three per cent.

The spin off effects of a more efficient transport industry will lead to the typical marco multiplier effects of increases in GDP, increases in investment, greater employment and higher real wages. The BCA study attributed half of the long term economic gains in their study to improvements in rail transport.²¹ They claimed a 1.4% increase (\$3.4 billion in 1986-87 dollars) to GDP from the overall cost reductions in all modes of transport in Australia. The Royal Commission into Grain Storage Handling, and Transport (1988, Table 5.4) provided a tighter estimate of labour productivity gains. It estimated that train running cost (comprising labour, fuel and maintenance costs) account for 47% of total costs of rail transport of grain in Victoria. It is these components that have improved greatly with recent reforms and consequently these benefits will be passed on as reduced export prices and generally multiply throughout the economy. This study also highlighted that costs vary significantly between States and a timely warning about aggregation of rail costs seems appropriate. Greater disaggregation of systems as well as commodity specific and asset specific benefits/disbenefits when calculating impacts from transport reforms will provide more accurate pictures of the effectiveness of such reforms and forecasts of their impacts.

4. SOCIAL and ENVIRONMENTAL IMPACTS

Reforms in railways have resulted from a change in political ideology which has moved towards requiring public utilities such as railways to be more cost efficient and profit oriented. Commercial practices are being introduced under changing corporate plans based on corporatisation of the systems. Railways are no longer government departments which exist for the benefit of consumers. The emphasis has shifted from increasing consumer surplus to benefiting producer surplus by indirect means and such behaviour will benefit consumers in the long run.

Financial Impacts

This section is included under the title of social impacts rather than economic impacts to emphasise that accuracy in reporting the accounting returns with the development of corporatisation could still result in hidden costs and benefits even though explicit

²¹ The fourth simulation of the BCA Study considered a 50% improvement in labour productivity with a resultant 30% reduction in railway costs of production. A considerable proportion of the inefficiencies result from passenger operations and the community service obligations which unfortunately the BCA could not separate out. The benefits/disbenefits of CSOs in rail transport are referred to later in this paper. It was estimated (BCA, Table 11, p.25) that long run increases in real GDP from a more efficient rail transport would be \$2920 m (1986-87 values) and the percentage increase in total real GDP increase would approximate 48%.

funding for CSOs and accurate accountability of interest rates etc may occur. Corporatisation will require reforms in accountability and any CSOs will be reported as a separate entity which will tend to impress on the public of Australia some of the huge intangible benefits attributable to rail transport. Urban passenger services and country passenger services especially in Queensland do not tend to cover operating costs. It was tended to be accepted that railways be subsidized in these services to (a) reduce congestion and pollution on the urban roads and (b) to assist the rural population. Explicit subsidization under corporate accounting methodology will highlight the costs and thereby perhaps question the effectiveness of such subsidization.

A major hidden impact of railway investment is the financial one. Over the last decade most rail systems have been set target rates of return to achieve. These rates of returns have been based on the capital asset pricing model which is used to discount estimated free cash flows as a performance evaluation tool. It explicitly calculates an objective rate of return for an investment given the *previous* volatility and returns that can be expected from investments in similar categories of similar risk. The taxpayers of Australia as shareholders should expect to make a return on the substantial assets acquired in the name of all our public railway systems.

Target rates of return for public business enterprises should reflect the return achievable from alternative private sector investments of similar risk that are just viable (marginal) (I C. Report 13, 1991, p 133)

The Economic Planning and Advisory Council (EPAC, 1992) estimated that the returns on all public railway systems in Australia were a **negative** 11.5%. The opportunity cost of railway investment is the negative contribution to the national deficit plus the alternative viable investment which is foregone. The economic impact of this is difficult to calculate as it depends on the alternative opportunity and the spin offs arising from such opportunities.²² From the 1993 Annual Report Westrail reported a commercial profit of \$11.9m but return on assets as a negative .2% (AR, p.35) and after interest an operating loss of \$10321 (AR, p.64). These figures highlight the dependence on accounting procedures which affect measurements of impacts. If one considers the huge deficits associated with rail transport in Victoria it must not be forgotten that grain was regulated to rail specifically to reduce congestion on roads.

Organizational Culture

Choice of carrier is not modal based as exclusively as it used to be. Carrier selection in today's more deregulated environment focuses increasingly on the service level carriers provide. More customized, tailored services are being demanded and suppliers are responding through a variety of mechanisms and in the railway industry

²² see Barber & Manager, (1993) for a fuller discussion on the debate of using benchmarks in government enterprises as an adequate measure of financial performance.

the prime response seems to have been to establish contract carrier relationships. Traditional railway managers are seeing their job emphasis shift from a passive cost-control and tariff-compliance role to a proactive style oriented toward increasing the product value added in the transportation function. Product differentiation is becoming more prevalent. Railways in Australia are aiming for services that provide consistent, low cost, specialised container services. Road freighters on the other hand seem to emphasise a consistent, low transit time service and reliability which means lower inventory levels for their customers.

Railway management negotiate with carriers for desired service levels and rates and then finalise the negotiations with bilateral agreements. The duration of these contracts is increasing from the normal one year to an upward limit of five years with the three- to five-year contract being most popular. Railways are following the road freighters negotiating skills and attempting to service all the transport needs for a given shipper. The strategy is to reduce the number and type of carriers a shipper uses. Reducing the number of shippers concentrates the carrier's business and increases the carrier's negotiating power. The increased market power enables the carrier to offer lower rates through lower costs and better services through specialised equipment. The shipper also benefits by enjoying lower costs, increased market power and providing their customers with better service. Deregulation has created a climate where shippers and carriers are developing strategic alliances, i.e. business partnerships. It is a mutually dependent relationship where both parties recognize the others needs and operate in such a manner to benefit the other party. In doing so they benefit themselves. Whether the benefits are extended to the general economy depends on the shippers market share and dominance in the market and its pricing strategies. Benefits ought to accrue from specialisation in transport contract negotiations. More productive and more efficient transport industries have emerged due to nationalisation of interstate freight corridors and more efficient smaller State rail systems are attempting to become more productive via corporatisation. Most of the State rail systems are being corporatised in varying degrees, for example, the Queensland system started their corporate planning in the early 1980s. Corporatization was formalised with the State Economic Development Policy presented in April, 1992 and is still being implemented. To date very little performance data is available to show the effects of improved marketing and reliability in rail services. (see next section)

Consumer Satisfaction

Most rail services in Australia now record different measurements of quality of service. 'On time Running' and 'Upgrading of Passenger Facilities' are two indicators frequently used to indicate that services have improved which implies that as costs reduce in real terms and service quality rises then consumers are better off from superior services. For example, in 1991/92 Westrail undertook a survey to gauge passenger satisfaction. The survey included areas such as booking functions, convenient timetabling and clean comfortable on-train facilities and results showed an approximate 68% level of satisfaction. (AR, 1993, p 38)

The BIE (1992) study used the major customer-oriented performance indicators of price, timeliness and quality of service and claimed that transit time is not the major consideration for most customers when choosing to move goods by road or by rail. It was found that reliability in meeting transit schedules was a more important determinant of modal choice. NR has set itself a target of 99 per cent availability of containers in the customer's premises as contracted. This target is higher than the North American present 'best practice' of Southern Pacific with a target of 95 per cent for wagon availability to customers as contracted. (BIE, p.33) The BIE (1992) study concluded that on price Australian rail freight services for coal and grain are not priced competitively compared with those faced by overseas customers but with corporatisation more market driven reforms will improve customers satisfaction relating to pricing. Regarding the service quality/reliability indicator of customer satisfaction the point was made that in Australia the relevant comparison should be with road performance which at present shows a large gap between road vs rail performance levels especially with the reliability indicator although estimates of the impact of the recent rail reforms indicate that rail market share on interstate corridors could increase by 30 per cent.

Labour Shedding

Massive labour shedding has occurred in all rail systems from recent reforms. Account need to be taken of the disbenefits suffered from some of the retrenched staff of these organisations. Kunz & Hintz (1990) found that a large number of redundant railway workers were in the younger age groups and had suffered long term problems of unemployment lack of retraining, low self esteem and relocation problems. This is a difficult social issue which impacts on the economy in the form of suffering, hardship, crime and wasted resources. With the general upturn in the economy some of these disbenefits will be reduced. (See Graph 1) On the other hand benefits accrue to the overall economy in the long run with more efficient transport services and more productive employees. Retraining to higher skills will benefit not only the individual but the economy as well.

Spatial Locations

The main and very visible environmental impacts occurring from reforms in railways are energy saving and locational aspects. There are a host of other environmental impacts which are not so obvious such as the spin offs from technology and supporting industries. With deregulation has come increased competition and more innovative practices which have had a technology push effect.²³ Also maintenance workshops have become privatised such as the ten year agreement between SRA and Goninan & Co. Ltd. to maintain the CityRail fleet and the refurbishment of the 47 XPT express passenger cars. All these supporting industries and technological

²³ As maintenance workshops have become privatised such as the ten year agreement between SRA and Goninan & Co Ltd to maintain the CityRail fleet and the refurbishment of the 47 XPT express passenger cars. All such supporting industries and technological developments create environmental benefits and disbenefits as well which in part ought to be attributable to the rail industry.

developments create environmental benefits and disbenefits as well which in part ought to be attributable to the rail industry.

Firstly the most important of environmental impacts which seems to be overlooked are the locational impacts. The State railways systems in Australia have all been of the hub and spoke design except in Queensland. This has its origins in the historical jealousy of the colonial governments and the power of the city merchants. What has resulted has been a grossly inefficient rail transport system for 100 years curtailing freight flows to within state boundaries and directed to the major capital city of each State. Interstate freight flows were limited to the capital city corridors and due to labour requirements differing at State boundaries even these services were inefficiently operated. Interstate rivalry has finally been reduced with the landbridging of the National Rail Corporation and the reduction in union power.²⁴

Pastoral and urban land values have been affected by the proximity of railway lines. Non urban properties were advantaged by rail lines running along boundaries. Urban properties were disadvantaged until the sixties when deisel instead of steam locomotives were used. Today the noise of urban rail services have reduced to such an extent that urban property values on average have increased with proximity to rail services especially in Sydney and Melbourne.

The One Nation Program under which the National Rail Corporation was created was the beginning of an initiative to provide balanced funding for the national rail and road networks on a basis relating to long-term national strategic criteria. At present, however, criteria differ for evaluation of investment in road and rail infrastructure in that rail projects are based purely on the financial 'bottom line' test and national economic and other benefits such as long term national strategic plans do not seem to be included.

Pincus(1981) produced a model to internalise the marginal benefits of land values. He compared the private US railroads and the public Australian railways and found where the railway and the land lord are one such as in the Australian case there is a tendency for overexpansion of the network which implies that dissipation of the social savings from the public enterprise will occur.

Railway tracks link traffic flows from points of origin to points of destination and usually in Australia the points of destination have been at ports. Consequently huge terminal and port facilities have been attached to railways and combine to impact on the environment. Due to incorrect signalling from rail transport's pricing policies coupled with regulatory constraints, excessive use of road transport has occurred in some areas which is an additional burden on environmental disbenefits attributable to rail. Reforms will assist remove some of these disbenefits caused by inefficient modal usage.

²⁴see Holthuyzen (1987) for examples of Commonwealth union power curbing interstate traffic flows in the railways

Pollution Emissions and Congestion

This is a large specialised area and as previously stated the purpose of this paper is to tabled briefly some of the considerations that ought to be included in measuring the impact of the recent rail reforms. The energy useage of rail is more efficient that road in some services.²⁵ The reforms may shift more of the long-haul freight transport task away from road to rail which for energy conservation reasons will be beneficial. The interstate segment of non-bulk transport task is becoming competitive with the recent rail reforms especially in marketing and quality of service improvements. Laird (1990) claims that rail's share of the level of interstate freight will increase as the total task increases rather than competing away the road share. Laird also argues that greater fuel economy will be gained when the rail track network of south-eastern Australia is upgraded which is the major area that the NFC has targetted for track upgrading. Modal shifts towards rail for bulk and non-urban freight and urban public passenger transport according to the NIEIR study (1990) will occur during the 1990s which will reduce greenhouse emissions. Major costs to the economy would precede savings and put stress in the short term on the macro-economy. A feature article in the Transport and Communication Indicators (1993) on "Alternative Fuels" stated that ;

At present there is insufficient knowledge of the environmental costs of transport emissions to enable the benefits of reductions in emissions to be valued in monetary terms. (p 25)

Most passenger networks run at deficits but if the reduction of congestion²⁶ and pollution as well as energy savings are calculated in a cost benefit analysis these deficits would be substantially reduced.

6. CONCLUSION

Reforms of the Commonwealth's GBEs was an integral part of the micro economic reform process instigated by the Federal Government. The reform package intended to give GBEs more suitable corporate structures and this approach was implemented by the various State rail enterprises in varying strengths and at different times. Creation of the National Railways Corporation has put pressures on all the other public rail infrastructures to improve the performance and quality of their services. The purpose of this paper was to articulate the diversity of impacts within an economic, social and environmental framework caused by these recent reforms in the Australian rail networks. It aimed to show that the impacts of the reforms have been wide spread, overlapping in different elements of the economy and particularly difficult to specify and quantify then this paper has achieved its objective. One of the most difficult aspects to specify is the time element of these impacts and it is trusted that a better conception of this element has been highlighted in this paper.

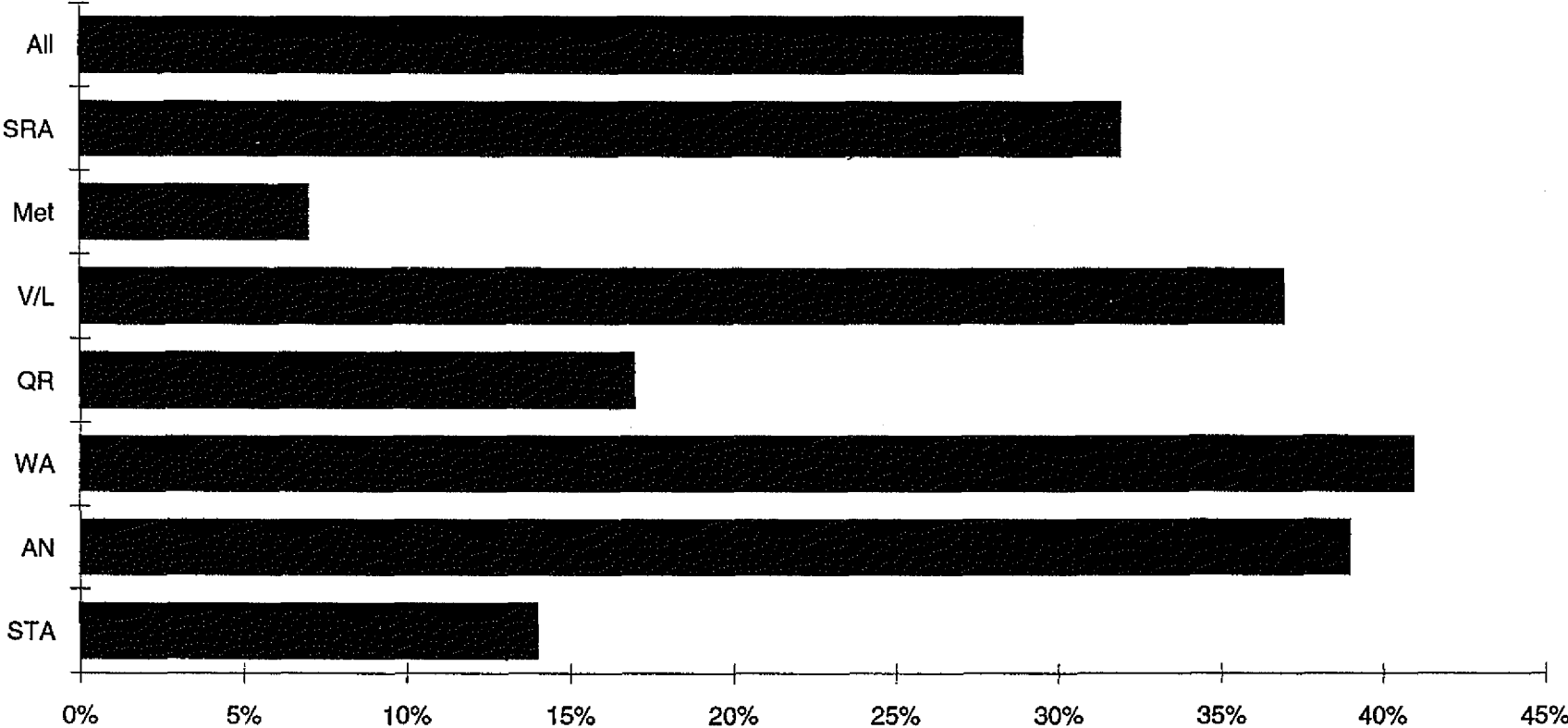
²⁵The BTCE(1991) Table 3 in Appendix I two compared Energy Use and Rate of CO₂ emissions for all modes and showed that for buld traffic rail was more efficient in both measures than road.

²⁶A debatable point see Hensher,D.(1993) Light Rail and Bus Priority Systems Choice or Blind Commitment? Working Paper ITS-WP-93-4.

Graph 1

Employment Reductions All Systems
1980 - 1989

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