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ISSUES IN NATIONAL TRANSPORT POLICY

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1. INTRODUCTION

1.1 Purpose

This paper is concerned with inland or internal transport in Ireland and not with other forms of transport, i.e., with sea or air transport. Its focus is mainly on the future development of transport facilities and services, but this naturally requires some consideration also of the utilisation and upkeep of existing facilities and services. The discontinuance of the road tax on private motor cars below a certain horsepower and the consequential transfer of the cost of road improvements to voted capital expenditure financed by the Exchequer, together with the shift of part of the maintenance cost of roads from local rates to the Exchequer, make it opportune to re-appraise public expenditure on roads and transport generally. Serious transport problems exist and are apparent in the growing congestion in Dublin and Cork and the mounting deficit of the public transport undertaking, CIE. The uncertain outlook for oil, both in relation to its continued availability and its cost, means that transport development policy must have increased regard to energy considerations.

The Government's White Paper on *National Development 1977–1980* stated that "the Government will give first priority to expenditure directed at enlarging employment and maintaining existing employment in the directly productive sectors of the economy. These expenditures fall mainly within the Public Capital Programme . . ." (p. 64). Since road and public transport development and improvement schemes have to compete for funds with each other and with other projects for public capital expenditure, it is important that sound policy guidelines should be evolved for transport development so that the maximum national benefit is obtained for a given expenditure. This paper discusses some of the more important issues and problems associated with public financing of road and public transport improvements. In addition, the paper is intended as a contribution to the discussion on internal transport development requested by the recent Government Green Paper on *Development for Full Employment* (pp. 55–57).

The first part describes in historical perspective the features of Irish transport systems and summarises the current financial pressures on the public purse where transport is concerned. Section 2 presents some important policy objectives of the Government, and Section 3 outlines the main transport options facing government in the context of stated policy objectives. The fourth section is concerned with the integration and co-ordination of the various issues and interests associated

*The views expressed in this paper are the responsibility of the author and do not necessarily reflect the views of the Institute of Public Administration.

with developing transport policy, public and private. Finally, conclusions and general guidelines for investment and allocation of resources in the transport sector are suggested in Section 5.

1.2 Features of Irish Transport Systems

1.2.1 Roads

The vast road network which this country has inherited can be gauged from the fact that in 1834 it was estimated that there were 14,500 miles of roads in the whole of Ireland, and by 1885 this had increased to 52,000 (O'Keeffe, 1973). Although Irish roads have improved substantially since the last century, the total mileage of roads has not grown dramatically since then. Ireland now has a total mileage of roads in excess of 55,000. This is the longest road network per head of population in Europe. It is approximately double the second longest, France, and furthermore, about 80 per cent of the Irish road network has a dust free surface which is a higher percentage than in many developed countries, including the United States.

Viewed from the perspective of car ownership, Ireland has, at present, much the same level of motorisation (182 cars per 1,000 population) as the UK had in 1966 (180 cars per 1,000 population), and as the USA had in 1930 (187 cars per 1,000 population). Continuance of the current rate of growth in car ownership would give a figure of at least 250 by 1985 and over 300 by 1990. This growth is likely to continue unless there is a severe economic recession for energy or other reasons.

Where commercial vehicles are concerned, the 1973 Annual Vehicle Census reported a total of 49,040 such vehicles, representing just under 8 per cent of all the road vehicles licensed in the Republic of Ireland. The size and composition of commercial vehicles receives greater attention in the formulation of roads policy than numbers alone might suggest. The reasons for this relate to the contribution which commercial vehicles make to the Road Fund, their high traffic interference characteristics, and the structural damage to roads which is caused by the passage of heavy axle loads over them. In fact, the assessment of the useful life of a road reduces to the prediction of the volume of heavy commercial vehicle traffic likely to use it (McCarthy, 1974, p. 1).

The main features of the existing road transport situation in Ireland can be summarised as follows:

(a) the country is sparsely populated with a high degree of dispersal of population which is well serviced by rural public roads (almost every inhabitant of the country has ready access to a road),

(b) the standard of rural roads is relatively good, with the exception of certain sections of the national primary route network which have been identified by the *Road Needs Study* of An Foras Forbartha (Devlin, McCarthy and McGuinness, 1974),

(c) in terms of mileage travelled, roads now carry about 96 per cent of internal passenger travel and about 83 per cent of internal freight traffic,

(d) traffic on the roads is increasing at a rate of about 6 per cent per annum or doubling every twelve years with private cars being mainly responsible,

(e) the number of commercial vehicles has remained relatively stable over the past ten years, but this has been accompanied by an increase of about 55 per cent in the carrying capacity of the fleet (O'Hanlon, 1976, p. 14).

1.2.2 Public Transport

The development of the Irish railway system, which began in 1834, transformed inland transport in Ireland. By 1850 a national railway system was in operation, providing coast-to-coast transport. However, from about 1890 the railways suffered considerable financial instability due to the increasingly high overhead and labour costs, changing and falling markets, and the provision of uneconomic services to remote rural areas. Furthermore, the financial instability inherent in these trends was exacerbated by the introduction and development of private transport during the last sixty years. Similarly, public road services finances declined after the initial boom period of 1925–1945. The growth of private transport seriously depressed public transport markets, and resulted in public transport continuously facing a falling share of the total transport market. While recent evidence would suggest that public transport's market has stabilised in absolute terms, it is unlikely to experience a major growth in users over the next ten years unless there are major unforseen dislocations in the economy. The 1977 CIE annual accounting deficit was of the order of £33 millions, a sum 50 per cent greater than that available for road improvement and almost three times that available for public transport investment in that year (see Appendix). A subvention of this magnitude puts a considerable strain on public expenditure and ultimately has the effect of reducing the amount available for investment in the transport sector. This is particularly so in present circumstances in which a significant amount of current public expenditure is financed by borrowing.

Overall, then, public transport in Ireland may be summarised as follows:

(a) despite cutbacks in the rail networks in Ireland, an extensive network still exists which is heavily subsidised from central government funds,

(b) the standard of rail and bus services is relatively high and modernisation of the mainline rail system is already in hand to ensure adequate service and capacity,

(c) in terms of passenger mileage, public transport has a very small share of the total market,

(d) the absolute level of demand for public transport is stabilising and is unlikely to grow very rapidly over the next ten years unless there are major dislocations in the economy.

1.3 The Future Prospect

Given these features of Irish transport systems and the evidence of historical trends, it is not difficult to arrive at the conclusion that the popularity of private transport and, in particular, car ownership is likely to continue to increase at a steady rate in the future. From current car ownership levels of 182 cars per 1,000 population in this country, car ownership can be expected to climb inexorably to levels of 400 cars per 1,000 population as income and wealth increase. This is what has happened in more advanced industrialised countries.

The reasons for this are to be found in the advantages offered by the car. No other transport system can offer the same flexibility, utility and appeal. It allows

people independence and an ability to go where they want, when they want, without restriction, almost. Therefore, it is understandable that every citizen wants this means of transport and will take advantage of it as soon as income and personal circumstances permit.

If this upward trend in increased car ownership continues, with consequent economic and social benefits, then a price will have to be paid by the community in terms of the extension and improvement of road facilities. This price will primarily take the form of some loss of amenities and environmental disadvantages and of increased investment in road development. Given the extensive secondary and tertiary road network that already exists and the self-supporting nature of private transport, once the infrastructure has been provided, the price is unlikely to be too high in most cases. The cost of maintaining continued access to city centres has been found, however, to be prohibitively high everywhere in the world. The problems of ensuring unrestricted access are such that even where a country is rich enough to be able to afford the necessary technical solutions, more seems to be destroyed than is created in the process. Los Angeles and New York are two examples of cities which have suffered this fate. Therefore, the reality that continued unrestricted access to city centres is not practicable on cost or environmental grounds must be faced.

Turning to public transport, which suffers from stagnant or declining market shares, it is evident that its future is almost the reverse of that of the motor car. Its problems are its restricted access through a limited number of terminals, fixed in location and burdened by high labour costs. Furthermore, it is evident that its tendency towards financial instability will increase and that levels of subvention must rise from the current 30 per cent of total expenditure to a much higher percentage, if productivity and price adjustments continue to lag behind cost increases. Despite this, however, public transport services will continue to be required. No matter how high levels of car ownership become, a significant number of the community will never own a car. There is always likely to be a minority in the community, namely, the young, the old and the poor, without cars available to them. Public transport will always be required to cater for such people. Outside this, public transport will be required for urban commuting and shopping purposes, given the unacceptable price of city centre access by the car; and for business and bulk goods traffic between cities, given the high price that must be paid to accommodate this traffic. However, the rising cost of public transport means that the price of this service can only be met if real improvements in efficiency are obtained. If the geographical spread of public transport must be maintained to ensure a national service, then the cost of providing that service must be reduced. Productivity measures must continue to be implemented and staff reductions must be phased in gradually to guarantee cost control on the one hand without excessive personal hardship on the other.

Overall, then, the future prospect is for an increase in car ownership and use with the benefits of greater mobility being constrained mainly by available facilities, particularly in urban and to a lesser extent in inter-urban travel. Public transport's role will become increasingly that of a welfare service providing for the less advantaged, except for travel in urban areas and some inter-urban travel requirements. Since the various transport proposals which have been made and published during the seventies are aimed at guiding and influencing public transport policy,

and since the Government is constrained by the availability of resources, the next section summarises these transport proposals and the financial demands which they generate.

1.4 Current Financial Demands

Before considering what investments should be given priority, it must be recognised that the transport sector is in competition with other demands on government expenditure for a limited supply of funds. Any practical transport investment programme must be based, realistically, on levels of finance that are likely to be available. The waste of resources that would occur if an ambitious investment programme were to be prematurely halted would be intolerable.

In this paper a number of separate and complementary investment proposals for transport are examined. They are contained in:

(i) *A Road Needs Study,* by An Foras Forbartha, (1974).

(ii) *CIE – The Way Ahead,* by Dr L. St. J. Devlin, (1977).

(iii) *Transportation in Dublin,* by An Foras Forbartha, (1972).

(iv) *Dublin Rail Rapid Transit Study,* prepared for CIE, (1975).

(v) *Cork Land Use/Transportation Plan,* commissioned by South-West Regional Development Organisation, (1978).

In terms of finance, it has recently been estimated that at 1976 prices the lowest investment level of the Road Needs Study would cost some £400 millions, the roads proposals of the Dublin Transportation Study would cost some £300 millions, that the Dublin Rail Rapid Transit System would cost £150 millions, and that the transportation proposals of the Cork Study would cost £55 millions. This gives a total conservative estimate of over £900 millions, in 1976 prices, or £45 millions per annum (but excluding effects of inflation and interest charges) over a twenty-year period, without consideration of other investment needs in the smaller urban areas in Ireland, or currently committed investment in the national rail network. In practice, it must be realised that much of this expenditure would be required in the initial years of the investment period, thus giving a much higher investment cost in those years.

The actual public financial commitment to the inland transport sector, during the years 1972 to 1977 inclusive, is presented in the Appendix to this paper. For the year 1976 the cost of road improvements was £16.5 millions, and the Government subvention to CIE was £11 millions, giving a total public investment in inland transport of £27.5 millions in that year. The £45 millions per annum, already noted in the last paragraph, is largely an additional requirement (though not entirely) to the £27.5 millions already spent. Thus, even making allowance for the small proportion of the £45 millions, which would have already been provided in the £27.5 millions, the new investment proposals would more than double the public investment in inland transport. These financial demands would have to be reconciled within existing government budget and expenditure programmes (Public Capital Programme Outturn amounted to £544 millions in 1976) and may require a reconsideration of the allocation of resources to other sectors, e.g., health, housing, agriculture, etc.

The studies which provide the basis for the transport investment proposals

are of a type which can be classified in a general sense as 'needs studies'. They generally utilise cost-benefit techniques, the advantages of which are well known. However, the limitations of these techniques, perhaps, have been less frequently referred to.* In a recent EEC report the point is made that even within the transport sector, different methods of pricing generate rules that can mis-allocate investment:

> "A basic difficulty when comparing investments in different sectors or agencies is that to produce really valid results, the ground rules should be the same in all situations in which the comparison is made. Perhaps one of the least often fulfilled conditions is that the pricing policies in different situations should be similar . . . . . Unfortunately, in member states, pricing policies are not 'consistent'. For example, the taxation charge made for use of roads greatly exceeds the marginal cost of inter-urban road use; however, the charges made for the use of rural bus and rail services (and probably many inter-urban public transport services) fail to cover the marginal costs of those services. The problem is that the desirability of investments from a social cost-benefit point of view is determined by the use made of the services provided in relation to their capital costs. But the level of use is itself determined by the prices which are charged for the use of the facilities. Thus, any mode or system where prices are low in relation to marginal cost will appear to require (and, given the pricing policy employed, will in fact require) more investment than a mode whose prices are high in relation to marginal costs. Thus, the pricing system used in transport may have a distorting influence on investment requirements."
> (Commission of the European Communities, 1973, pp. 68–69)

These problems and difficulties multiply when comparisons across sectors must be made. Thus, the issue is not only one of cost effectiveness in relation to expenditure on particular public services, but also that expenditure requirements for individual programmes will have implications for budgetary decisions, including taxation and public borrowing. These fiscal implications must be taken into account in determining the allocation of public resources to individual programmes, and therefore there is a pressing need to assess priorities between and within the proposals. Subsequent sections of this paper examine these proposals with a view to selecting the most productive areas for investment in terms of securing the greatest benefits for the nation. This examination is undertaken in the context of current government policy and its objectives.

2. CURRENT POLICY OBJECTIVES

2.1 Employment Creation

One of the major objectives of current government policy is the creation of employment. The nature and extent of the unemployment problem has been the subject of a number of studies carried out recently. The Government in the recent White Paper, in arriving at the level of job provision to be sought up to 1980, took account of the available data and stated that an estimated annual net increase of

*In an analysis of economic costs and expenses in road and rail transport (Commission of the European Communities, 1976) Professor Ralph Turvey describes some of the complications and inconsistencies that may arise.

29,000 jobs in non-agricultural employment will be required. One of the ways in which the immediate problem could be alleviated is through selective investment in public building and construction programmes. These works would create employment opportunities suitable for the three occupational classes particularly prone to high unemployment – builders' labourers, contractors' labourers (mainly road workers) and general labourers.

It is difficult to estimate accurately the employment content of transport improvement schemes. Various attempts at such estimates would suggest that the figure lies between 100 and 150 jobs per £1 million spent for road construction. This is undoubtedly a high cost per job, but it must be remembered that the work results in the creation of a national asset. Moreover, the net cost of these jobs would be considerably lower than this figure when account is taken of, (a) the savings to the Exchequer of having people employed and paying taxes rather than drawing unemployment benefit or assistance, (b) the multiplier effect of the expenditure on the economy, and (c) other revenues and taxes such as company profit taxes, taxes on hydrocarbon oils, etc.

In considering public transport improvements, as opposed to road improvements, it needs to be borne in mind that public transport developments, while creating employment in the short term, often reduce the job opportunities within the public transport industry in the long run. This is because public transport investments are usually technologically oriented, increasing dramatically the capital intensiveness of the industry and consequently reducing manpower needs. (For example, the implementation by 1980 of the current CIE Main Line Rail Plan was estimated to reduce staff requirements in this service by 1,800). This naturally tends to militate against the advantages of public transport investment from a job creation viewpoint.

2.2 Avoidance of Constraint on Growth

If the Government is to be effective in pursuing complementary objectives designed to increase employment, reduce and contain inflation, raise the level of national output and promote efficiency in the economic system, then growth must not be constrained nor competitiveness weakened by deficiencies in infrastructural services, of which transport is an important component. An efficient and adequate transport system would make a vital contribution to economic growth and social progress.

In the recent Government Green Paper (p. 54) attention is drawn to the fact that investment in infrastructural services has been constrained over the years by the need to compete with many other demands on the Exchequer's resources. Further, it is recognised that the services may not be supporting development to the extent needed. In this context proposals are put forward in pages 55 to 57 of the Green Paper to accelerate investment in these services. However, this extra investment will be possible only to the extent that the necessary resources can be made available by taxation and government borrowing.

2.3 Regional Development

Allied to job creation a high priority in government policy is the balancing of economic development across the country, the raising of personal incomes and counteracting the depopulation of rural areas. The location of job opportunities

over the next twenty years must clearly reflect this objective and as such places a strong emphasis on job creation away from the better developed areas. Government will, naturally, try to encourage private development in the less well developed areas but it has also a very real opportunity itself to help restore the balance, in terms of directing public capital to these areas.

In terms of the role that transport investment might play in regional development, it is clear that road investment offers considerable job opportunities. Whereas increased investment in public transport invariably means less job opportunities in rural areas, for reasons already given, national roads investment generates an opportunity for expanding rural employment. While individual schemes come to an end there is a continuous flow of schemes which helps maintain jobs by local authorities and contractors. These jobs have the added attraction that they afford employment for the unskilled or semi-skilled worker.

2.4 Energy Conservation

The question of future energy availability and energy resources for the country as a whole must be taken into account in deciding on the strategy and in drawing up the priorities for government investment in the transport sector. This is a difficult problem beset with great uncertainty. Forecasting the lifespan of world oil stocks in not easy. Nevertheless, transport is a major user of energy, consuming approximately 24 per cent of net energy for final use. In recent years, the real price of petrol has been subject to considerable fluctuations. This dates from the oil crisis of the winter of 1973–1974, which provoked considerable debate concerning the future availability of energy and, in particular, oil resources. It is now anticipated that oil prices will have increased substantially in real terms by the turn of the century (Feeney, 1978, p. 1). This factor, along with the possibility of a scarcity in energy for transport, means that there is a very real need to maintain as much flexibility as possible in developing the transport system, and that a careful review of the overall investment programme must be made on a regular basis in the light of the changing energy situation and in order that changes in direction of that programme may be made when necessary.

In practical terms, it is unlikely that any major change in the mode of transport used will occur in rural travel (where approximately 80 per cent of the vehicle mileage occurs). In these areas energy conservation must depend largely on changes in the efficiency of transport vehicles and in particular the introduction of smaller, lighter diesel-engined or electrically propelled vehicles. As such the priority in the development if the inter-urban road system is unlikely to be affected by anything other than a major energy dislocation of such proportions that it would affect the overall economic growth of the country.

With regard to urban travel, it is possible that energy conservation can be achieved through both improved vehicle efficiency and changes in the mode of transport used. As far as changes in the mode of travel are concerned, the higher level of energy efficiency achieved by public transport means that every effort must be made to maximise its use for commuter and social purposes. Furthermore, it is likely that public transport will be encouraged eventually to use electric traction, as this can be provided from non-oil sources, e.g., coal and nuclear fuel. These are concerns that must be borne in mind in considering transport policy, and all investment will have to be continuously assessed and monitored as to its energy implications.

2.5 Budgetary Control

The balancing of a nation's budget is a practical reality which every government must face. This means that governments must of necessity carefully direct and control the limited capital available for tackling the wide range of services and activities that they wish to provide. Naturally, the supply of capital is never sufficient to meet all the competing demands and governments are forced to make trade-offs between the options open to them. They can of course make short term adjustments to capital spending, varying the amount they spend in a particular period, but whatever particular economic policies are pursued, in the end governments are forced to make choices. In periods of strong economic growth and prosperity the necessary compromises are less painful than those required in periods of economic recession, but nevertheless real trade-offs are required at any time.

Furthermore, the financing of transport development is almost entirely dependent on public funds. The discontinuance of road tax on most private cars effectively transferred the cost of road development to borrowing or general taxation. Public transport fares so badly, commercially, that it is unable to generate internal funds for development or to attract funds on commercial terms. For example, while the railways do generate some income it is so small in relation to total expenditure that even banks sympathetic to infrastructural investment may be reluctant to commit funds to investment in railways. In the future, transport investment is likely to be aided by EEC grants and loans which will provide help in improving certain sections of infrastructure. Nevertheless, Exchequer funds, limited as they are, will continue to provide the main source of finance for infrastructural development.

In this respect current government policy, as set out in the recent Green Paper, suggests at least a limited prospect of increased capital availability.

> ". . . the Government's aim will be to change the composition of expenditure so as to give greater emphasis to the growth of investment rather than current spending." (p. 16)

Even so, not too optimistic a view should be taken, since the Government's declared first priority is investment aimed at productive employment and only secondly at infrastructural improvements, and the total increase in capital expenditure expected is a rise from "12.5 per cent of GNP in 1978 to about 13 per cent in 1980 . . ." (*ibid.* p. 16). The increase expected is significant but modest and developments must be tailored accordingly.

Before concluding these remarks on financial resources it is worth mentioning taxation policy in relation to private transport. Taxes on private transport provide considerable exchequer revenue, and it is evident that private transport makes a substantial net contribution to public funds. Clearly, this taxation policy is relevant both to the financing and shaping of transport development. It is important, therefore, that it should be treated as part of a consistent public policy on transport so that it aids the achievement of a balanced and complementary transport system.

These then are some of the more pertinent considerations which must be taken account of in assessing transport policies and proposals, and in determining the main options.

3. THE MAIN OPTIONS

3.1 Inter-Urban Transport

3.1.1 Inter-Urban Roads

Recommendations for improvement of inter-urban roads for the country as a whole have been made by An Foras Forbartha and in the Road Needs Study a comprehensive review of the national primary route network has been completed (Devlin, McCarthy and McGuinness, 1974). This study analysed the volume of traffic expected on individual sections of the network in the future, the capacity of the system to carry such volumes, and the benefits to be obtained from different levels of investment.

Four different levels of investment were identified ranging from a high level of service which provided a comprehensive network of motorways and dual carriageways to a more modest level of service based on an extensive network of high class roads and still incorporating 109 miles of motorway and 348 miles of dual carriageway by 1995. The overall cost of these investment proposals was naturally large, the lowest level of service costing some £264 millions in 1973 prices, the highest some £518 millions.

The aim of this study was a commendable one.

> ". . . to offer the decision maker a meaningful choice of options which can be related to the availability of money and other national considerations." (*ibid.*, p. 2)

With this aim in mind the study investigated a range of traffic operating conditions which the report describes and also a matching range of road construction programmes to which it assigns estimated costs. The study was discussed at some length in a paper read before this Society in October, 1975 (Barrett, 1975). The rates of return achieved in the economic evaluation were "acceptable", reinforcing the study's own conclusion that certain sections of the existing network were highly deficient, given that such a large proportion of total transport in Ireland was carried by the road system.

A difficulty with this kind of exercise, however, arises from attempts at and assumptions which have to be made in quantifying the benefits. It is no mean feat to be able to arrive at generally acceptable and convincing monetary values that can be placed on time saved by lowering of travel time, or the saving of human lives, or the alleviation of human suffering and grief. It may well be argued that it is only by this type of investigation that analysts can assist decision makers in evaluating priorities. But how convincing is this argument for decision makers? Their problems are compounded by the fact that they must assign priorities not only within the transport sector but across all other sectors as well, where the results of similar analyses may not be nearly as reliable. Even where such analyses are carried out, the uncertainties associated with calculating the net benefits per £1 invested may be far greater and the assumptions quite different from those made in respect of the transport sector.

The minimum level of finance required for the most modest level of upgrading proposed in the Road Needs Study may well confront the Government with

serious problems of raising the required resources, especially when the other vital transport requirements in urban and local networks are considered. While economic evaluations may show that in terms of time savings such heavy investment is required, time savings will not balance the national budget to-day even if in the long run they can be converted into real income from faster economic growth.

Furthermore, in a recent paper, Feeney (1978) investigated the sensitivity of traffic levels to petrol price increases and suggested that if real petrol prices rose by 90 per cent (a not unlikely eventuality) there would be a reduction of approximately 18 per cent in the traffic levels predicted by the Needs Study. Such a reduction would cut the size of the investment programme necessary to achieve the minimum level of service by 24 per cent from £264 millions in 1973 prices to £201 millions. The milage of road to be brought up to motorway standard would be reduced from 109 miles to 67 miles.

In consequence of these points, there is a need to review and define more selectively the areas of priority and to limit the level of upgrading proposed for inter-urban roads. In particular, the following principles should be used to guide investment:

(i) Given that Ireland has such extensive secondary and tertiary roads and that considerable resources are spent on their maintenance rather than the improvement of national primary roads, there should be a general re-allocation of road expenditure to improvement work on the primary road system even at the expense of roads carrying less traffic. This would effectively increase public investment in inter-urban roads and reverse the now well established trend to increasing road maintenance and declining road investment.

(ii) Since maximum congestion on inter-urban roads occurs in certain towns along the primary road network, and because traffic passing through such towns creates environmental and pollution problems, investment should be concentrated on by-passing the more severely congested towns rather than on the upgrading of complete inter-urban road systems.

(iii) As the traffic movement at the approaches to the bigger towns and cities, particularly Dublin and Cork, is very heavy and growing faster than anywhere else, a selective programme of upgrading access roads in line with demand should be undertaken. In doing so priorities should be given to freight and business movements by channelling investments into developments that facilitate such movements at the expense of developments that facilitate commuter traffic. This is dealt with later in the section on urban roads.

In this way the most effective use of the funds available for inter-urban roads can be achieved. While the quality of service provided will be less than that offered with the lowest level of service of the Road Needs Study it will ensure that the best level of service attainable is achieved and that the policy objectives of the Government are most effectively implemented. Presumably, these points are taken into account in the Road Development Plan which was referred to in the Government Green Paper published this year (p. 56).

3.1.2 Inter-Urban Public Transport

As part of its strategy for improving inter-urban public transport, CIE has put forward mainline rail proposals which have already been endorsed by government, and much of the £27 millions (in 1974 prices) capital has been provided in past and current capital programmes. The system provides for improved inter-city train speeds, new rolling stock and an efficient freight service between the larger centres of population.

However, while the overall cost of the new system is relatively low, the size of the rail deficit (especially that arising from passenger travel) suggests that continuing investment in the railways must be viewed with some concern, at least when considered in economic terms. Furthermore, in terms of current government objectives the Rail Plan raises a number of issues. First, the plan with its drive to increase technology was to reduce staff requirements by 1,800 (Railplan 80, 1972, p. 16). This did not mean, however, that 1,800 people would be redundant but that considerable employment opportunities would have to be found elsewhere in CIE. Second, the withdrawal of rail services from some towns in the West of Ireland cannot help regional development. There is thus some conflict between the rail development plan and the national objectives of employment creation and regional development, a conflict that arises from another national objective, that of the control of public expenditure which requires the containment of the deficit on the railways. The trade-off between these various objectives of national policy is in the final analysis a matter for political decision. What is essential, however, is that the economic and social implications should be kept under regular review and should be viewed against the background of a consistent national transport policy. Only in this way will it be possible to assess realistically the required levels of service and the acceptable level of public subvention in the railway system.

In making such assessments the current and future role of inter-city express bus services will undoubtedly be considered. In recent years CIE has developed an inter-city express bus service providing links between cities and towns not linked by the railways except through Dublin. The orientation of this service is different from that of the railways. However, given that inter-city express bus services cater for the same type of demand as the railways and can do so in a more efficient and flexible manner, expansion of this system, rather than investing in the upgrading of the mainline trains for passenger services, must be an attractive option. Naturally the energy and employment questions would have to be set against the 'improved service' and the cost savings.

Concerning freight transport, the advantages and disadvantages of the railway system for freight haulage have been described elsewhere (Devlin, 1977, pp. 39–46). In this context the implications of a continued growth in road haulage using large vehicles are very serious. The environmental damage caused by large and noisy road vehicles and the cost of wear and tear on the roads will increase. Because of the environmental damage and congestion in towns and villages, extensive by-pass development will become necessary. Nor is energy conservation policy likely to be well served by unrestricted growth in road haulage, especially if more freight is diverted from the railway system. This suggests that a major effort is needed to develop freight traffic on the railways. The rail development plan is a step in this direction and it should help the railways to compete

in respect of the non-price aspects of quality of service. Regarding price competition, the issue arises as to whether subvention policy could be developed so as to become an element in competition policy. This would serve the long term interests of transport development. A policy of blanket subsidy of the railways, however, has little economic merit.

Overall, therefore, in dealing with inter-city public transport, review of service opportunities set against capital and running costs must be undertaken on a regular basis.

The general aims guiding these assessments should be:

1. To develop the freight traffic of the railways since the movement of such traffic by road can only increase infrastructural investment costs and increase congestion, environmental noise, pollution and energy conservation problems.

2. To continue to expand inter-city express bus services.

3. To reduce the railway deficit and raise railway efficiency as far as this is compatible with the provision of a minimum standard of passenger service and welfare needs.

3.2 Urban Transport

3.2.1 Urban Roads

In this section an attempt is made to deal with urban road network problems that affect the two major cities of Dublin and Cork. Dublin is dealt with at greater length because of its size and special problems. The road traffic problems facing Dublin and Cork cannot be resolved by an analysis of city traffic or centre city traffic alone. The traffic problems are in part regional in nature and have to do with the central role of these cities in having the major airports, seaports and ferryports in their regions, and the high proportion of the country's total output of transportable goods being produced in these regions.

Thus, a strategy must be developed for these regions which will avoid the most harmful effects of congestion with its consequent economic cost. Whatever that strategy, it must be at the least possible cost and must be formulated in the light of the following realities.

(a) The ports of Dublin and Cork are by far the most important in the State and there is no prospect, even if desired, that their functions could be transferred elsewhere. The ports require efficient road access to the North, West and South in the case of Dublin, and North, West and East in the case of Cork, during all normal working hours. An alternative of transferring goods by rail to other distribution centres would raise far more problems than it would solve, i.e., cost, delay, product loss, centre access, etc. It would also be particularly damaging to the majority of goods which are transported to and from close destinations.

(b) 'Across town' inter-suburban traffic movement which is becoming increas-

ingly important because of the location of amenities and facilities such as airports outside the city, must be facilitated. This should be achieved where possible without having to pass through the city centre where maximum social ill-effects in terms of pollution, noise and congestion would be caused.

(c) The core areas of these cities are likely to remain the major office commuting destination for people who live in the outer residential suburbs. Furthermore, they also have important functions as regional and as national shopping centres and by night as entertainment centres, e.g., theatres, cinemas, clubs. Failure to maintain these three functions– office, shopping and entertainment–means inevitable business and social decline, regardless of what steps are taken to entice people to live in and frequent the inner city.

A comprehensive transportation study of the Dublin Region was undertaken in 1970 by An Foras Forbartha. Although the Dublin Transportation Study (DTS) was published seven years ago, its principles and findings are by and large still considered relevant to-day by many planning authorities, provided the data and costings are updated. The study recommended a strategy of transport development which took account of the draft development plans of the various local authorities and the advisory reports which preceded them. "The recommendations cover road policies and programmes, bus and rail transport, parking and land development. They aim at co-ordinating major streets, motorways and public transportation facilities into an efficient overall system. They are intended, on a broad level, to prevent stagnation in the city centre and to foster the growth and development of designated centres on the perimeter of the city." (p. 8)

Unfortunately, there are a number of weaknesses in the Dublin Transportation Study which require consideration.

(a) It left very few options open for decision makers. It offered an integrated transportation package at a fixed sum. It would have been better had decision makers been left with a prognosis of the options available for other magnitudes and levels of investment.

(b) The nature of the models used was such that they were not sensitive enough to the level of provision of infrastructure.* As a result, the forecasts made are highly trend-oriented and are inadequate for an effective assessment of alternative and, in particular, cheaper alternative investment programmes.

(c) No serious attempt was made to assess the economic and environmental consequences of motorways and interchanges, e.g., visual intrusion, noise, vibration. This naturally has affected the ensuing debate.

(d) Since radically different options were not assessed, alternative energy con-

*For example, the modal split used in the study was based on a survey of people's preferences in 1970, so that no matter how good or bad the investment in private or public transport, the number of people using either mode would not change. Equally, the distribution model was not sensitive enough for those circumstances where the time and cost of journeys were likely to change enormously relative to the conditions of 1970. The study assumed the mode of travel, it did not allow destinations to change if bus fares or parking charges varied, and it did not allow changes in mode, if congestion levels increased or decreased.

sequences were not assessed either, and as such it is almost impossible to assess whether real conservation is possible.

The cost of the roads proposals of the Dublin Transportation Study has been estimated at £300 millions in 1976 prices. However, given the various competing demands on government finance, and given the very serious need to maintain as much flexibility as possible in transport investment because of the energy factor, an ambitious programme of this nature is unlikely to be seriously considered because of the difficulties envisaged in raising the required level of funding. Therefore, it must be decided what alternative strategies can be adopted to alleviate the problems referred to earlier in this section.

Financial considerations alone dictate that every effort must be made to attain maximum use of existing infrastructure. In particular, traffic management measures should be promoted further as they are both cheap and effective in reducing congestion, and greater consideration should be given to area traffic control and to the possibility of spreading peak demands through extensive introduction of staggered and flexible working hours.

Outside the city centre high capital intensive projects such as the construction of motorways should be postponed, which means that priority should be given to the improvement of circumferential roads to reduce through-city centre traffic and aid inter-suburban mobility. Such investments however will have to be kept to a minimum given the volumes of capital likely to be available and effort should be directed towards:

(i) widening existing roads where relief is needed, to ensure the maximum use of existing streets compatible with maintaining safety, environmental and pollution standards,

(ii) maximising the use of traffic management measures to control city centre traffic,

(iii) building only ordinary roads with restricted access where new road links are necessary as opposed to the more ambitious proposals contained in the DTS,

(iv) ensuring that use of circumferential roads for short distance trips are minimised by restricting access as much as possible in order to provide maximum capacity for through traffic, and

(v) improving port access facilities.

Interestingly, it is principles like these that have guided the road proposals of the recent Cork Land Use/Transportation Plan. In this plan, following the realisation of the futility of high investment proposals, a practical approach to the question of investment has been taken. The level of investment proposed is £55 millions in 1976 prices. The plan proposes a concentration on low-cost, two-lane, circumferential roads to reduce city centre congestion by through traffic and the use of abandoned railway lines to ease radial bottlenecks on the south side. City centre traffic is to be controlled by traffic management measures as well as an

area traffic control system. Expensive river crossing options, although recommended, are left open for decision at a later time.

Thus, while the proposed alternative plans were limited to three options and there is an air of finality about the preferred strategy, decision makers are in a much better position to assess alternatives and have further work carried out than was the case in Dublin.

3.2.2 Urban Public Transport

Urban public transport is the key to reasonable cost city centre travel. The cost of providing unrestricted car access to city centres has long ago been regarded as unacceptable by even the richest countries. The issue at stake therefore is the kind of public transport required and in Dublin the particular problem of whether or not to have a rail rapid transit system is in question.

Rail Rapid Transit

In general a rail rapid transit system is a good quality, high speed, almost luxurious form of public transport for those cities which can afford it and for those commuters who have reasonable access to stations. Its disadvantages are: high capital construction costs; it also attracts users from other modes of public transport with little impact on the growth of private car ownership and, thus, the satisfying of travel demand; and unlike road schemes, if public funds become scarce during the course of construction, little or no use can be made of partially completed sections.

As far as Dublin, in particular, is concerned the report of the Dublin Transportation Study concluded amongst its seven recommendations on the public transport side that "an immediate investigation should be undertaken to examine the feasibility and costs of constructing a short underground in central Dublin that would more effectively connect up the four existing rail links into the city" (p. 23). CIE commissioned a firm of consultants to carry out such a study and published the findings in April, 1975 (Voorhees & Associates Ltd.). Before examining and commenting on these findings, the other six recommendations of the Dublin Transportation Study on the public transport side are worth summarising.

The first of these recommendations is concerned with the development of a comprehensive system of high speed bus routes. The second recommends the provision of bus lanes during peak hours along major radial routes into the city centre. The third highlights the need to improve the existing suburban rail links by increasing peak hour capacity. The fourth recommendation supports the requirement of a central bus terminal in Dublin. The fifth recommends the opening of suburban passenger services on western and south-western rail lines as far as Blanchardstown and Clondalkin. The sixth, while recognising the dominance of peak hour capacity and congestion problems, supports the continuing emphasis being placed on improving the efficiency of all bus operations.

Thus, the public transport recommendations of the Dublin Transportation Study placed considerable emphasis on the promotion of exclusive busways and bus lanes, and not on a rail rapid transit solution to public transport problems.

The rail rapid transit system recommended in the report of the consultants is a more extensive one than that recommended in the DTS in four respects:

(a) Instead of opening up suburban passenger services on western and south-western rail lines and improving the existing suburban bus services to Blanchardstown and Clondalkin, it extends the rail rapid transit system to these areas.

(b) The Tallaght busway as proposed by the DTS is replaced by a rail rapid transit system link from Clondalkin to Tallaght.

(c) Ballymun is served by the rail rapid transit system instead of the "Busroute" given in the DTS. A spin-off from this is the rapid transit station (Violet Hill) on the Finglas Road, which cuts out the need for the Finglas busway (Broadstone to Mellows Road).

(d) The busway from the Airport Motorway (at Turnapin, north of Santry), through the north fringe development areas, Clonshaugh/Darndale/Donaghmede, has been dropped.

In carrying out the rail rapid transit study, one of the alternatives which was developed and tested (Alternative D), consisted of the busways proposed in the Dublin Transportation Study. This alternative was evaluated against two rail rapid transit alternatives (Alternatives A and B) and a semi-metro alternative (Alternative C). The method of economic evaluation used was social cost-benefit analysis which was undertaken by calculating the net present value of each alternative relative to an economic base system. The economic base system represented the transport situation over the study period, 1974–1991, if no rapid transit investment were to be made.

On the basis of the economic evaluation, the ranking of the alternatives was Alternative A, Alternative D, Alternative B and Alternative C, in that order. In other words, one of the rail rapid transit solutions came first, with the busways solution proposed in the DTS in second place. An examination of the relevant costs and benefits of the first two alternatives reveals the following points which are worthy of note.

(a) On the costs side, the rail rapid transit solution (Alternative A) would cost £106 millions in 1973 prices, compared with £41 millions for the busways solution (Alternative D), and £26.5 millions for the economic base system. Thus, Alternative D is an attractive solution when considered from an availability of capital resources viewpoint.

(b) On the benefits side, although Alternative A is more attractive than Alternative D, the major benefits accruing from the rapid transit investment would be time savings to public transport users, most of whom would have used public transport in both the base system and the alternatives under consideration. Private transport users would gain less significant advantages.

On further examination of the rail rapid transit study report, it appears from Table 12 of the report that two-thirds of all peak period trips in 1991 would be by private transport for Alternatives A and D, and from paragraph 13 of the

synopsis that 44 per cent of public transport passengers would use the rail rapid transit system in peak periods. This in effect would mean that during peak hour when congestion is at its heaviest the substantial capital expenditure associated with the rail rapid transit system would provide major benefits for only a fraction of the peak hour trip makers, while the remaining 80 to 90 per cent of travellers would have to be served by some other transport form, buses or cars. Furthermore, the estimated 1991 peak hour rapid transit passenger flows (see figure 81 of the report) are extremely low by the standards of other cities having rail rapid transit and the need for a continuing large operating subsidy must be in prospect.

There might be some justification for such a subsidy if it led to a significant change in the mode of travel, with consequential savings in the costs of road improvements and in the time spent by the public at large in travelling. If these savings do not occur, however, the case for such a subsidy is considerably reduced.

Since the need for consistent policies in the context of scarce capital resources is being advocated, it is necessary to consider the effects of not building the rail rapid transit system. The figures for the pattern of travel quoted in the rail rapid transit study report are based on the knowledge that restricted access to the city centre will have already occurred before the rail rapid transit system is operational, so that the major shift from private to public transport will have already taken place. The absence of a rail rapid transit system would then cause a re-allocation of public transport travel between rail and the congested bus service. The figures also assume that the major road improvements proposed in the Dublin Transportation Study are carried out. If these road improvements are not carried out, and if more modest improvements have to be accepted (which is likely), while at the same time city centre access has to be restricted more severely, is the case for the rail rapid transit system strengthened? Certainly this is an important question. However, all that can be said at this stage is that commuter congestion on the roads, whether by public or private transport, would be likely to increase if no other action were taken. But other action is possible as is suggested below. It would clearly require a massive shift in the mode of travel to raise the rail rapid transit share of peak hour trips above the level forecasted and there can be little confidence that such a shift will occur. Consequently, even in these altered circumstances the case for the rail rapid transit system does not appear to be very strong.

This means that new less expensive alternatives for the Dublin region should be given further consideration. In particular, a bus transit system must be a real alternative to the proposed rail rapid transit system. While it is difficult to judge without a full examination what type of bus transit system would prove the most beneficial, some discussion should prove useful.

Bus Transit

The most important feature that makes transit service competitive with private transport is the provision of an exclusive 'right-of-way'. Although buses can weave in and out of traffic during off-peak periods they suffer from the same disadvantages as other traffic during periods of congestion. To overcome the difficulties likely to be encountered a comprehensive system of high speed bus routes is usually developed in urban areas. These routes may be composed of busways (limited access roadways for buses), bus lanes (lanes reserved for buses during

peak hours), and reserved streets (streets for buses only during peak hours).

Exclusive busways and bus lanes are promoted when the option required is for low capital investment in the range between the extremes of rail transit and buses in mixed traffic. Busway systems are, for an equivalent network, cheaper than light rail transit avoiding the need to invest in track and overhead cable systems. Furthermore, the bus provides its own feeder service. It leaves the busway and picks up and discharges passengers on local streets and in suburban areas. The ability to operate on streets as well as on busways and bus lanes reduces cost and gives added flexibility of operation.

The recent Cork Land Use/Transportation Plan recommended in each corridor approaching the city centre, "that buses be segregated from the main stream of traffic by priority measures" (p. 9). In the Dublin Transportation Study it was recommended that high speed bus routes should operate within the new town areas and on three radial routes to the city centre (p. 22). Bus lanes were also recommended for peak hour operation along other major radial routes into the city centre.

Although bus operation suffers from the disadvantage of using oil as a fuel, in absolute terms the usage is likely to be quite small and more than offset by the savings which would result from avoiding the huge investment in infrastructural development which rail transit requires.

Suburban Rail Services

Because of the inadequacy of the existing infrastructure and rolling stock it is essential to upgrade the existing suburban line in Dublin. The issue is whether this should be done by electrification or by replacement of the existing system by new diesel engined rolling stock. In considering this issue, various factors must be taken into account, including the type of future transit system which the city is to have, the capital costs of the two methods of upgrading, the cost of conversion later to operation by electricity if diesel is chosen now, the savings in energy from electrification, and the security of the system from an availability of energy viewpoint. As of now the indications are that significant capital savings would result from replacement by diesel rather than by electrification and that the savings in energy usage which would result from electrification are small. Since the price of oil must rise faster than the price of electricity the savings in operating cost can be expected to increase, however. Assuming that availability of oil is not likely to be a constraint for the remainder of the century – since at the worst the railway system could get priority – the indications are that the diesel engined system may be cost-effective in both the short and the long term when capital and operating costs are balanced. What is clear, however, is that a decision on the suburban rail services is urgent.

Summary of Principles guiding investment in Urban Public Tranport

In general the principles guiding investment in urban public transport should be:

(i) To promote the role of bus lanes and bus priority schemes along radial and circumferential routes. The development of bus priority schemes, including priority at signals, bus lanes and busways, has not been effectively tested in Ireland, whereas in Europe generally it is regarded as an integral part of

urban planning. Furthermore, the promotion of the role of bus schemes in present circumstances offers the added flexibility of providing the option of a comprehensive electric transport system through the introduction of light rail transit at a later stage.

(ii) To minimise the disadvantages of public transport usage by linking cross city bus routes and providing adequate bus shelter and terminal facilities.

(iii) To upgrade the suburban line in Dublin in the light of the decisions that are likely to be made about the type of transit system to be adopted in the future. This work is essential due to the inadequacy of the existing infrastructure and rolling stock. However, what is recommended is that the existing system should be replaced by a simple cost-effective diesel engined system, incorporating new rolling stock with electronically operated doors. It should be noted that the total energy savings associated with electrifying the existing suburban line are relatively small.

(iv) To develop for Dublin whichever of the less expensive alternatives to the rail rapid transit system most adequately meets the needs of the travelling public within the limits of resources likely to be available.

4. THE CASE FOR FURTHER INTEGRATION AND CO-ORDINATION OF TRANSPORT POLICY

So far some of what are considered the main issues in the transport field have been discussed, and the various options available to policy makers have been presented in broad terms. In this section certain aspects of the policy and decision making process itself are discussed with a view to suggesting some possible explanations for the apparent lack of attention being devoted to transport proposals.

National transport policy raises in an acute form the twin problems of the co-ordination of national objectives and the allocation of national resources. The problems are perhaps more acute because responsibility for national transport policy is divided politically and administratively at present. The Department of the Environment is responsible for road maintenance and development, which in effect means private transport, and the Department of Tourism and Transport is responsible for public transport and the regulation of certain aspects of private transport. Effectively, then, co-ordination of transport policy is achieved at government level and this level is altogether too high at which to attempt co-ordination effectively. The Government, of course, has the right and responsibility to take the final decisions in relation to transport policy as in other policy areas, but in taking such decisions the Government also has the right to expect the best possible advice. Such advice can only be provided if there is a unified approach to transport with one body at policy input level capable of providing advice in a neutral manner, supported by high quality research and expertise and with the institutional means of resolving the complex issues involved.

The following reasons are given in support of this claim. First, the most obvious and important function of transport is that of relating population to land use by moving persons and goods from one place to another. Attempts to analyse the

factors that have brought about and continue to support the development of a transport system usually encounter several factors of an economic, social, political and technological nature often combining or overlapping to bring about a particular result. Basically, however, almost all transport development, public and private, is of economic origin. Transport's main function was and is likely to continue to be the most efficient and effective movement of persons and goods from one place to another.

Therefore, any attempt to plan transport development must do so by taking account of the often competing demands of private as well as public transport. This means that all government decisions to improve, develop and even maintain our transport system must consider all the options available to perform this function, and these options include improvements to the road system as well as improvements to the public transport system. If this is not done, then wasteful duplication of facilities and resources will occur. For example, decisions to electrify the mainline railways must take cognisance of investment plans for the national primary road network and vice versa. The success of electrification depends, in part, on the diversion of motorists to the railways. This will be less likely if investment in high capacity roads occurs. Failure to recognise this will lead and has in the past led to optimistic demand forecasts for each mode. The consequence of this is excessive demands being made on scarce capital. Consider the estimate of £900 millions in 1976 prices for the separate and complementary investment proposals contained in the Road Needs Study, the Cork Land Use/ Transportation Plan, the roads proposals of the Dublin Transportation Study and the Dublin Rail Rapid Transit Study, and, as already stated in section 1.4, this figure of £900 millions does not include the other investment needs in the smaller urban areas, or currently committed investment in the national rail network.

Second, economic efficiency within the transport sector is attained when the available resources are expended on those projects which provide the best returns in terms of social benefits and costs. Unless transport decisions are taken as a whole there is a very real danger that, for example a road improvement project will be initiated notwithstanding the fact that returns from investment in the public transport sphere could be much higher. If public transport and road investment are treated separately and if there are separate capital programmes, then there will be added difficulty in identifying the best set of transport schemes and in allocating monies to them.

Third, apart from economic efficiency, a comprehensive approach to transport would also contribute to the promotion of efficiency in other ways. If, for example, a public transport company knows that it must compete with private transport or, more specifically, if public transport proposals have to be justified in the context of alternative roads proposals then both the public transport company and the roads authorities may be encouraged to seek technical solutions that are also more cost-effective. A proposal to electrify the Dublin-Cork rail line might easily be changed to one of high speed diesel operation, if the change resulted in a more cost-effective technical solution which stands a better chance of being accepted when compared with road projects.

Fourth, there is a need to develop national data banks and computer systems for transport planning. In recent years American, British and other European transport planning practice has come to realise the need for large data banks to

analyse effectively the joint role of private and public transport. Using a limited amount of specially collected information, it is possible to synthesise from census data the basic information required for forecasting the levels of future traffic demand and for evaluating the national benefits to be obtained from different investment options for public and private transport. The framework for such a system has already been developed (Metcalf, 1978) but progress in developing the system, and in the implementation of the planning uses to which the data can be put, may be limited, by having to deal with the two separate administrative systems for private and public transport. There are enormous savings to be made in the systematic approach to data collection, and the ability to provide an updating and continuous monitoring of proposed plans. But above all, it is the need for a co-ordinated approach to transport planning in meeting national requirements that provides the most cogent argument for adopting such joint planning activities.

Finally, from a socio-economic viewpoint, it is necessary that the level of resources devoted to the transport sector compared with other sectors, such as housing, health, agriculture, etc., should be neither too much nor too little. It could be argued that failure to treat public and private transport as a single entity would result in excessive demands being made on scarce resources, which in turn would result in insufficient attention being given to transport problems and would contribute further to the current inadequacies of transport networks and services. There is in fact some evidence to suggest that this may have already happened.

For these reasons there is need for effective co-ordination and integration of policy relating to roads and private and public transport. If nothing more than mere co-ordination was required, then a unification of responsibility at ministerial and administrative level might suffice. This could be achieved by perhaps assigning responsibility for both private and public transport to one Minister. But the extent of the transport problems and the variety of expertise needed to tackle them are such that it may be unreasonable to expect that any government department could equip itself with the appropriate staff resources. Accordingly, there is a need for a specialist unit with its own expertise and a continuing mandate to tackle the job on a full-time basis and in an objective and neutral manner. Such a unit would be expected to provide the kind of input that is essential to sound policy formation.

There are three primary functions which a specialist unit of this nature could have:

(i) policy-oriented research and advice to government on resource allocation in the transport sector as a whole;

(ii) co-ordination of national policy for internal transport below government level and liaison with the authorities responsible for international transport;

(iii) preparation and continuous updating of a long-term national plan for internal transport development, public and private.

The establishment of a Transport Consultative Commission has been announced recently by the Minister for Tourism and Transport. The fact of its establishment is a recognition of the nature of the problems that have been outlined. However, there are considerable reservations as to whether it constitutes a sufficient response to these problems. The Commission has an investigatory role and its functions appear to be in some respects similar to that of a public enquiry body. It is an *ad hoc* body with a limited life, without permanent staff. As it stands, therefore, it is not capable of fulfilling function (iii) outlined above, and its contributions to functions (i) and (ii) are likely to be short-term ones. The Commission will no doubt do a good job within its terms of reference. But do those terms of reference place sufficient emphasis on private transport and, in particular, do they encompass road development and road planning?

The Commission may well conclude that there is a need for a permanent unit to undertake the tasks already outlined but, regrettably, some considerable time may thus elapse before the need is met. The main advantages of such a unit over any other arrangements would be in the availability of a permanent core of highly qualified staff who would be capable of giving independent advice and who would have the necessary role and responsibility for the integration and co-ordination of transport policy as a whole. While it is believed that a unit on the lines suggested is the ideal, the Commission deserves the good wishes of everyone in its very onerous task. It is suggested, however, that an early examination of the permanent institutional needs for transport planning and development should be undertaken.

5. CONCLUSIONS AND GUIDELINES

(a) The following principles should be used to guide investment in inter-urban roads:

(i) There should be a general re-allocation of road expenditure from maintenance work on secondary and tertiary roads to improvement schemes on the national primary road network.

(ii) Investment in the national primary road network should be concentrated on the by-passing of towns where more severe congestion occurs rather than on the upgrading of long stretches of existing road network.

(iii) A selective programme of upgrading access roads at the approaches to the bigger towns and cities, particularly Dublin and Cork, and in line with demand should be undertaken.

(b) The general principles guiding investment in inter-urban public transport should be:

(i) The freight traffic of the railways should be developed further.

(ii) Expansion of inter-city express bus services should be continued.

(iii) A minimum standard of rail passenger service consistent with welfare needs and current policy objectives should be provided.

(c) The following general guidelines should be followed in deciding priorities for urban road investment:

(i) The construction of motorways should be postponed in the light of existing resource constraints.

(ii) Circumferential roads should be improved to reduce through city centre traffic and aid inter-suburban mobility.

(iii) Access to circumferential roads should be restricted as much as possible in order to provide maximum capacity for through traffic by minimising short distance trips.

(iv) Existing roads should be widened whenever possible, where relief is needed.

(v) Ordinary roads with restricted access should be built where new road links are necessary.

(vi) Port access facilities should be improved.

(vii) More extensive use of traffic management measures should be made to control city-centre traffic.

(d) In general the principles guiding investment in urban public transport should be:

(i) The construction of the Dublin rail rapid transit system should be postponed.

(ii) The role of busways and of bus lanes and bus priority schemes along radial and circumferential routes, should be promoted.

(iii) The disadvantages of public transport usage should be minimised by linking cross city bus routes and by providing adequate bus shelter and terminal facilities.

(iv) The suburban rail line in Dublin should be upgraded by replacing the existing system by a simple cost-effective diesel engined system, incorporating new rolling stock with electronically operated doors.

(v) Less expensive alternatives to the rail rapid transit system in Dublin should be developed.

(e) A specialist unit with its own expertise and a continuing mandate is required to tackle the integration and co-ordination of transport policy in a neutral and objective manner. There are three primary functions which a unit of this nature could have:

(i) Policy-oriented research and advice to government on resource allocation in the transport sector as a whole.

(ii) Co-ordination of national policy for internal transport below government level and liaison with the authorities responsible for international transport.

(iii) Preparation and continuous updating of a long-term national plan for internal transport development, public and private.

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Appendix: TOTAL PUBLIC COMMITMENT TO INLAND TRANSPORT INVESTMENT IN IRELAND

Table A: CIE Government Subvention and Road Improvement Costs (£ millions)

Year	CIE	Roads	Total
Ended March 1972	4.9	10.3	15.2
Ended March 1973	5.7	9.9	15.6
Ended March 1974	7.5	12.5	20.0
Calendar 1975	8.8	18.7	27.5
Calendar 1976	11.0	16.5	27.5
Calendar 1977	12.5*	21.0*	33.5*

*Estimated

Table B: CIE Operating Deficits and Road Maintenance Costs (£ millions)

Year	CIE	Roads	Total
Ended March 1972	6.5	14.7	21.2
Ended March 1973	8.5	16.7	25.2
Ended March 1974	11.66	19.5	31.16
Calendar 1975	27.8	28.2	56.0
Calendar 1976	32.3	35.0	67.3
Calendar 1977	33.3*	44.0*	77.3*

*Estimated

Sources: CIE data: from Public Capital Programme various issues, and CIE Annual Reports.
Roads data: *Statistical Abstract of Ireland* and communication with An Foras Forbartha.

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DISCUSSION

Dr Thekla J. Beere: It gives me great pleasure to propose the vote of thanks to Mr Hall for his very interesting paper. Transport ranked high in the Society's priorities since this was the 32nd paper on the subject over the past century.

Mr Hall described his paper as a discussion document and this should provoke a lively debate. I, for one, differed from some of his conclusions in certain respects. I felt that there was a certain bias, possibly unintentional, in favour of private transport. The references to CIE's mounting deficits, for instance, did not take into account the fact that the net deficit in real terms had been contained over the last three years. The public service element of CIE was perhaps not fully recognised. This element is of course recognised in the Government subvention which, indeed, must comply with strict EEC constraints.

Mr Hall discusses the employment context of transport improvement schemes. Public transport certainly provides fewer jobs at the construction stage than road building—despite increasing mechanisation of road construction. When road works are completed, however, there is a relatively low level of continuing employment, whereas public transport is a labour-intensive service and, as the common experience of other countries shows, will remain so despite the best efforts to increase efficiency by means of productivity improvements and technology.

The author acknowledges the important considerations involved in the energy aspects, but he gives less weight to these considerations in his later conclusions when he comes down firmly in favour of dieseltraction as against electrification. For the Dublin Suburban Rail Services diesel replacement stock would, however, leave the system totally dependent on oil until well into the next century and thus exposed to the risks of escalating oil costs and possible interruptions in safety. In a paper read to the Chartered Institute of Transport last March, Dr R. Nicholl, Deputy Director of the IIRS came down very strongly in favour of a rapid transit system powered by electricity on the grounds that it would allow us some independence through supply choice.

I would be more optimistic than Mr Hall about the potential of urban rail systems to attract traffic from the roads. Experience elsewhere has shown that given an attractive service many car owners are prepared to use rail transport. On the Dublin Suburban Service the numbers carried have increased from 4.3 million in 1970 to 8.1 million in 1977, while over the same period the daily carryings on the Howth to Bray section increased from 11,000 to 25,000, an increase of 125 per cent. When there was a petrol shortage CIE were able to accommodate on the Dublin City Bus Services an extra 150,000 passengers per day without extra cost or additional buses. It is perhaps significant that the EEC has as one of its objectives for 1977 to 1990, the limitation of energy losses in transport, particularly urban transport. These facts, I feel, provide strong arguments for ensuring that we have a strong public transport system, or some day we may well find ourselves dependent on our bicycles or on our own two feet.

The "guidelines" might also give greater emphasis to the safety record of public transport, and also to the effects of air and noise pollution which many believe will become major restraints in transport planning for the future, to quote Dr Nicholl again. He says "The Dublin planners who make it possible for thousands of motorists to leave their cars at home and travel in full buses or trains will do far more for their society than those who try to 'liberate' the motorist and generate more journey miles at the cost of excessive fuel consumption and the destruction of the city".

On the basis of the analysis in this paper I could not accept that the construction of a Dublin Rail Rapid System should be postponed. The proposed system had not yet reached the stage of a firm proposal and as Mr Hall, himself, implies, there would be a number of variations which might be considered. Undoubtedly the heavily populated satellite towns of Tallaght, etc., will require fast and reliable transport services with the city. The Rapid Transit System should be able to use the existing infrastructure to the maximum extent and should be able to transport ever increasing numbers of commuters in peak periods without causing congestion. There would be the added advantages of energy, efficiency and safety. To many of us it is essential that there should be a better balance between public transport and private car use and to this end the attractiveness of public transport should be enhanced by investment in better facilities and by traffic management schemes.

Mr Hall's proposals for road development seem eminently sensible, also the suggestion that the role of bus-ways and bus lanes and bus priority schemes should be promoted. For long we have been too conservative about such proposals. I recall that when Dr Andrews was Chairman of CIE he had the idea that the scheduled bus services should not pass across the city centre, but that the services should be linked by a fast service of buses, free of charge, for standing passengers, but this idea did not even reach the experimental stage. Dublin is in fact about the only large city which does not provide for some form of exclusive bus-ways.

On the question of resources for capital transport works, some consideration might be given to a toll system on certain trunk roads, such as is common in at least some of the EEC countries. A toll system might also be used to relieve congestion, if heavy haulage traffic were to be relieved of paying tolls when travelling at night. We should also consider pressure for a substantial EEC contribution towards infrastructure costs.

I would agree with Mr Hall that there is a need for better and *continuing* co-ordination between the various authorities concerned, particularly regarding urban transport and traffic management schemes–Departments of Tourism and Transport and Environment, the Gardai, CIE and the appropriate local authorities would all be concerned. An independent chairman might be an advantage. The necessary expertise should be available from the staffs of the authorities concerned and from An Foras Forbartha and the recently-established planning unit in the Department of Tourism and Transport.

Finally, I draw attention to a small point in the Appendix. Table A is headed "CIE Government Subvention and Road Improvement Costs". The figures for CIE do not relate to the subvention (which are covered in Table B), but to CIE's capital expenditure programme as set out in the Public Capital Programme. Not all of CIE's capital expenditure is State provided. In fact in 1977 the estimate of £12.5 million included only £3.1 million from the Exchequer; similarly in 1976, the £11 million included £4.2 million from the Exchequer, the balance being found in each case from CIE's depreciation funds and from external sources, such as borrowing.

In conclusion I again thank Mr Hall for the immense amount of work which he has done in providing such an interesting and thought-provoking paper. It brought us up against the major problems facing the Government in determining the extent of the total investment which can be made in public transport in the light of all the other competing demands, and further the extent of the investment which can best be made in the various forms of transport, rail, road, diesel or electric. It is with pleasure that I propose this vote of thanks to Mr Hall.

Dr Sean D. Barrett: Mr Hall has earned the thanks of this society for the quality of the analysis which he has brought to bear on the wide range of transport topics in his paper. This is of course a quality which we have come to expect because of the calibre of research in the Roads Division of An Foras Forbartha where Mr Hall previously worked and the transport research of Mr Colm McCarthy under Mr Hall's supervision at the Institute of Public Administration.

The paper contains the first public analysis of the proposed Dublin Rapid Rail Transit System. Sections of the study have appeared in the press on a regular basis under inflamed headlines about the standard of the present services. The specialist unit on transport policy proposed by Mr Hall would be an important gain were it to ensure that major policy decisions on transport were approached in a more reasonable way. This might include full examination of all alternatives and publication of the rationale for both policy options chosen and rejected. At present the Department of Tourism and Transport publishes nothing on transport policy through means such as Green or White Papers or an annual report on the Department's activities.

In a small open economy independent macroeconomic policies are difficult to operate. This makes even more important having the right choices in areas such as transport policy where government could be a force in improving resource allocation.

The Dublin Rapid Rail Study

Mr Hall's view is that "the case for the rapid rail transit system does not appear to be very strong". His reasons are the high cost of the scheme, its low share of passenger movements even at peak periods, its low volumes of traffic by international standards and the likelihood of financial losses. In addition the study assumes a rigid parking restraint policy which might be difficult to enforce and might further increase the number of private car parks in the city, and seeks also to eliminate bus services where these run parallel to the rapid rail system.

The alternative strategies in the study are compared with a base system which has not yet been adopted. Savings from this base system are however listed as benefits from the options studied. The base system includes the expenditure of £9.6m. (at 1973 prices) on a city centre bus station, £10.1m. on new diesel suburban trains, and £5.7m. on track, stations, and signalling on existing track. These are separate projects requiring separate analysis rather than part of a base system.

There is little difference in the number of public transport trips in the base system or any of the alternatives examined. The capital cost of the busways in alternative D is only £11m. compared to almost £100m. for the rapid rail sections of the alternative A recommended in the Report. The internal rate of return on alternative D, called a busways option although only £11m. of its £41m. costs would be incurred on busways, is 19.9 per cent compared to only 13.1 per cent on alternative A, the rapid rail option.

The revenue to cost ratio on Dublin city bus services at present is 0.85 compared to 0.16 for the suburban train service. In view of the low use of the line beyond Bray by mainline trains perhaps the return on converting the Dublin-Bray line to a busway might be examined?

The study assumes that the demand for rapid rail transit is price inelastic to a real price increase of 4 per cent a year. This would increase fares in 20 years to 2.2 times their base level in real terms and is an unprecedented rate of price increase for transport in Ireland.

Interurban Transport

The suggestion by Mr Hall that the expansion of the interurban bus services would be an alternative option to upgrading the mainline trains for passengers is an attractive one which might be examined on a line by line basis. Even with their heavy subsidy rail fares are significantly in excess of the bus fares charged by independent bus operators on the intercity routes. At present the latter charge £4 return from Dublin to Cork compared with a normal rail fare of £20 and excursion fares of £8 to £10. The independent operators are restricted to carrying groups by the Department of Tourism and Transport and a legislative change would be necessary before the lower fares could be enjoyed by the general public.

The point has been made of course that these operators of low cost bus services would not provide a regular service but would just "cream off" business at peak periods. The present independent operators of scheduled bus services serve areas where the statutory transport companies chose not to take up their option to compulsorily acquire the services. This is precisely the opposite of "creaming". Perhaps a moratorium on prosecutions of the operators would be the appropriate way to test whether the independent bus operators are averse to providing a full service or merely averse to the penalties attached by law to these operations?

Interurban Roads

Mr Hall recommends that "the quality of service provided will be less than that offered with the lowest level of service of the Road Needs Study". The operating speed at the lowest level in the Needs Study was 35 m.p.h. and the indications are that the return on this investment would be high (1). Since then the COBA methodology used to evaluate the benefits of road investment has been broadly endorsed by the Leitch Committee (2).

Examples of routes which do not reach the lowest level of service in the Road Needs Study are the main routes from Dublin to Dundalk, Kilcock, and Newtownmountkennedy, Cork-Mallow and the main southern route from south of the Naas dual carriageway to Monasterevin. These routes hardly set a standard for the rest of the network.

A route which does reach the desired level of service is the Naas dual carriageway. O'Keefe estimated in 1962 that the benefits from this route exceeded costs at a daily flow of 2,500 vehicles. The current daily flow is almost 20,000 (3).

Road and Rail Freight

The paper recommends " a major effort to develop freight traffic on the railways" and that this "would serve the long term interests of transport development". I would urge some caution on this and be more selective in the development of rail freight. The McKinsey Report showed that the revenue-cost ratios for categories of rail freight varied from a loss of £1.021m. on revenue of £3.227m. from wagonload traffic to a profit of £0.213m. on £0.524m. from bulk trains in 1969–1970 (4). In my view the railways should develop only their bulk and company train freight and get out of sundries and wagonload traffics.

It is of course appropriate that the social costs of road freight should be considered in addition to its commercial cost. The National Prices Commission has estimated that trucks in Ireland more than cover their infrastructure costs including policing, lighting, administration, road maintenance and road investment. This calculation does not mean that taxes on road use should be reduced or road expenditure increased but does indicate that there is no case for the development of rail freight on the basis that road freight

does not cover its infrastructure cost (5).

Pryke and Dodgson extend the framework of the Prices Commission calculation to include environmental costs such as noise, congestion, air pollution, and vibration. They include the subjective costs of accidents whereas the Prices Commission took into account only the public costs. They estimate that these costs would have required an increase of between £25m. and £43m. in the tax revenue of £395m. paid by heavy goods vehicles in Britain in 1973. The additional tax burden seems unlikely to achieve a significant transfer of freight from road to rail (6).

Increases in energy prices will penalise forms of transport which are energy intensive. I wonder sometimes why further action is needed by transport planners when the market is quite able to transmit information on higher fuel prices.

Pryke and Dodgson estimate that in 1973 British Rail achieved an average of between 120 and 175 ton miles of freight for each gallon of diesel fuel consumed by its locomotives. The maximum ton mileage per gallon of diesel which could be achieved by road haulage would vary between 120 and 150 ton miles with goods vehicles over three and a half tons unladen weight running fully loaded with no empty running. Some transfers to rail might therefore increase fuel costs.

Transport and the Economy

In my view the best contribution the transport sector could make to overall employment prospects in the country would be to cut its costs. This requires that the Department of Tourism and Transport drop its anti-competition stance towards transport operators and that transport itself should not be required to provide an excessive number of jobs. Where private capital is willing to invest in transport rolling stock and in toll roads this should be facilitated especially at a time when public sector borrowing must be curbed. I would not seek to justify investment on a make work or regional policy basis.

Mr Hall's paper has presented us with many interesting propositions for debate. It merits serious consideration by the Government. I am pleased to second the vote of thanks for this Society's 32nd paper on transport.

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(4) McKINSEY AND CO., INC., 1971. *Defining the Role of Public Transport in a Changing Environment,* Table B-4.

(5) NATIONAL PRICES COMMISSION, 1973. Occasional Paper Number 10, p. 128.

(6) PRYKE, R., and DODGSON, J., 1975. *The British Rail Problem: A Case Study in Economic Disaster,* Robertson, Chapter 10. USA: Westview Press.

(7) PRYKE and DODGSON, *op. cit.,* p. 245.

D. Mangan: When I first received this paper I read it a number of times to establish what might be called its most striking features. I would list these as follows:

(i) The dogmatic approach of the paper in suggesting solutions to problems–this is remarkable given that a discussion paper on issues of policy is being presented.

(ii) Numerate analysis of the issues raised and decided is almost completely absent. The main area where data are used is in pages 43 and 45 but unfortunately the analysis is meaningless because the terminology is unclear and the numbers themselves are not comparable. For example the statement that the CIE deficit was 50 per cent more than the sum available for road improvements is incorrect.

(iii) Facts are quoted selectively to bolster a particular view. Here I would refer to Appendix B where operating deficits for all CIE, road, rail and other services are compared with partial maintenance costs for roads only. These appendices are incorrect and misleading.

(iv) The financial analysis is unclear and in particular confuses capital and operating costs for public transport and its financial objectives.

(v) The tendency to use emotive language when quantification would be more appropriate. For example rapid transit is "luxurious" and diesel trains are "simple and cost effective".

Employment Creation: With regard to employment creation the paper contends that a better return is obtained from money spent on road building than invested in public transport. To support that view, reference is made to the fact that investment in public transport reduces jobs in the long term. I suggest that the short and long term consequences of investment have not been adequately considered.

(a) Short Term: A figure of 100 to 150 jobs per £1 million generated by road building is considered high. There appears to be a lack of awareness of recent work by An Foras Forbartha which indicates that a figure of 70 to 80 jobs per £1 million for new road works should apply or that rapid transit construction which has a heavy civil engineering content can generate 100 jobs per million pounds.

(b) Long Term: In the long term there is no doubt that investment in public transport tends to increase overall efficiency. Also the need to reduce the deficit is a point clearly made in the paper (pp. 43, 44, 46). Furthermore, the quotation on page 41 "the Government will give first priority to expenditure directed at enlarging employment and maintaining existing employment in the *directly productive sectors* of the economy" has this aim. Surely therefore investment in public transport is consistent with rather than contrary to this objective. Generally speaking investment in roads should also eliminate bad roads thus reducing the maintenance (and job) requirements as in public transport. In fact on page 51 of this paper a reduction in road maintenance and presumably, jobs is sought.

Regional Development: In this section (page 47) public transport is criticised for reducing

jobs in rural areas and this I have already dealt with. In addition investment in public transport increases the overall efficiency of transport and thus our national efficiency. This helps encourage regional development while releasing funds for productive investment.

Energy Conservation: The future of energy is a very uncertain area and I am sure all are aware of the danger of extrapolating past trends particularly when considering the longer term fuel supply situation. However. mention should be made that railway investment can have a life span of thirty years and road investment even longer. The work of the Energy Group of the National Science Council (now the National Board for Science and Technology) which indicates that Ireland could have oil supply problems as early as 1985 appears to have been ignored in this paper.

I note that reference (page 48) is made to the need to encourage electric traction in public transport. This is consistent with present policy in Britain where the Government are seeking to extend railway electrification even in cases where it is difficult to justify in financial terms. Abroad, the future fuel supply situation is a major concern throughout EEC. Yet in this paper the case for railway electrification is eliminated without analysis.

Other Financial Economic Considerations: A large section of the paper is devoted to these issues and I have already mentioned the unsatisfactory use of data. The other points made are quite varied. For example it is said (page 49) that "railways income is so small in relation to total expenditure that even banks sympathetic to infrastructural investment may be reluctant to commit funds to investment in railways". Can the author support this view? CIE's experience is contrary to it. On page 49 Mr Hall says "Taxes on private transport provide considerable exchequer revenue and it is evident that private transport makes a substantial *net contribution to public funds.* Clearly this taxation policy is relevant both to the financing and shaping of transport development".

The meaning of this statement is not clear. Perhaps it means that investment in roads should be related to the amount of taxation paid by road users. Or perhaps that investment in other transport areas should be *inversely related* to the amount of taxation paid by road users. I am not aware of any indication that taxation policy is to be directed in this manner.

The views on public transport catering for a minority are interesting. Surely when transport in urban areas is concerned it may be the mode of the majority. This form of generalisation in the paper indicates a lack of understanding of transport. I feel I should ask if a level of 400 cars per 1,000 people (page 43) means that the minority is the remaining 600 non-car owners? The effects of imports of vehicles and fuel on the economy are notable omissions in the paper.

Inter Urban Roads (page 50): The paper refers extensively to the Roads Needs Study but does not comment in detail on that report. The validity of the study appears to be accepted unquestioningly. No mention is made of the quality of the data or the fact that the feasibility of the proposals was not examined. Some of the assumptions made are so heroic that the value of the "acceptable" rates of return must be seriously questioned. For example, the Roads Needs Study points out "the inclusion of cost data is made solely to assist the choice between options and is not intended to give a reliable guide to construction cost". Yet these figures are accepted by the author as actual costs. A 20 per cent variation in these figures, which would not be unusual in this form of analysis would add another £80m. (in 1976 prices).

Inter Urban Public Transport: It is surprising to read the completely unsubstantiated and extraordinary *guideline for transport policy* that only a minimum standard of passenger service should be provided on the railway. Is it seriously suggested that this conclusion is valid without any analysis? Would the author distinguish between this recommendation and a proposal to run down and eventually close the national raliway? This in common with the other areas I have mentioned is a topic on which I would welcome an opportunity to elaborate more fully.

No recognition appears to be given to the fact that the consideration in a decision to electrify mainline railways could be wider than energy (page 61). In particular, maintenance and operating costs as well as the level of service are important. Perhaps the most striking aspect of the comments on national transport is the absence of any reference to the role of the differing modes of travel or the varying travel markets.

Urban Roads: The discussion of port facilities (page 53) notes that "an alternative of transferring goods by rail to other distribution centres would raise more problems than it would solve". I would suggest that there are many more factors to the decision than those listed in the paper. How would the road be built? How much would it cost? What, for example, does it mean for the Royal Canal? Surely in a discussion paper on transport policy these are options.

There are extensive comments on the DTS and a reduction in road sizes is recommended. While the urban planners may raise the same question I would ask what is proposed for those areas where the smaller roads now recommended cannot handle the projected flows. Is the alternative not a change in the modal split with public transport services playing a greater role in meeting the demand? Surely the reason why the DTS did not give options is because no variations in the land use plans were considered. Is it now being suggested that we should reconsider the land uses? This is also relevant nationally where a lower standard of roads is recommended. Will the mainline railway be required to play a greater role? If so how relevant is the minimum standard of passenger service referred to. Why is no mention made of roles for differing modes of travel?

Extensive reference is made to the Cork study. There are two important public transport recommendations not mentioned:

(a) the proposal to extend the surburban railway services in Cork and the following recommendation: "The traditional approach to public transport financing has been that the operating deficit is financed by means of a subvention at the end of each year. This appraoch has some disadvantages. The public transport services are not seen as an integral part of the transport system but rather as a peripheral loss-making operation. Also the responsibility for the decisions on the level of public transport services to be provided is left solely to the public transport operator. In order to overcome these disadvantages, it is recommended that an approach which is common overseas be adopted, whereby the public transport operator is paid in a revenue manner, and clearly seen to be so paid, for providing a desired level of service. This approach would more correctly reflect the contribution of public transport and should encourage and facilitate more informed discussion, both nationally and locally, on the level of service which the community requires and the payment which this implies. It would also have the advantage of establishing services criteria to be met by the operator". Surely these issues are important.

Urban Public Transport: This section is devoted mostly to the Rail Rapid Transit proposals. I would make the following comments:

(i) It is not correct to say that the rapid transit system is more extensive than that shown in the DTS. The DTS recommended a study of rapid transit as it was outside the scope of the DTS itself. The proposed system is remarkably similar to that shown in the DTS. This was asknowledged by the City Engineer in 1976 when he said that the Rapid Transit was "broadly in line" with the DTS and went on to make the four points which appear on page 57 of the paper. The selectivity in quotation to change the original meaning is unfortunate.

(ii) It is not correct to say (page 56) that no use can be made of partially completed sections of the rapid transit system. The proposals are designed so that each part can be used as soon as completed.

(iii) While one of the alternatives considered in the rapid transit study was the busways of the DTS it was apparent during that study that many of these busways could not be implemented. In the intervening years these difficulties have grown and it is now unrealistic to talk of Alternative D as a viable option.

(iv) Selective data is used to further enhance the author's views on rapid transit. For example it is implied that the time saving benefits of rapid transit are not attractive. Yet time savings are accepted as sufficient justification in the Roads Needs Study. The major benefit of rapid transit is in reducing the public transport operating costs and this is ignored in the paper. On page 58 a further conclusion of the Rapid Transit Study is ignored when the author implies that a "continuing large operating subsidy would be required". It is regrettable that a consistent approach has not been adopted to the inter-relationships of capital and operating costs and the role which public transport is required to play in the long term. An interesting part of the paper however is contained on page 58. It asks "if these road improvements are not carried out, and if more modest improvements have to be accepted (which is likely), while at the same time city centre access has to be restricted more severely, is the case for the rail rapid transit system strengthened".

Quite obviously no matter what previous view one holds the answer must be yes. In fact the Rapid Transit Study looked at that very issue and reached that conclusion. Yet in this paper the author says "certainly this is an important question". All through this paper the most categoric statements are made with very little evidence. Yet this one question, where the need for data does not even arise, is not answered. I think the approach here should be borne in mind in evaluating this paper particularly where railways are concerned.

Furthermore, after avoiding that issue the conclusion is made that "a bus transit system must be a real alternative to the proposed rail rapid transit system. While *it is difficult to judge without a full examination what type would prove useful some discussion should prove useful.* We must be aware that we are not talking about building a few housing estates but a city with a population increasing from 900,000 to 1.3 million. We also must be aware that buses are currently moving at 4 m.p.h. in central Dublin and

that by recommending less roads and less public transport the future outlook for movement in Dublin is pessimistic. Why are the land use implications of these proposals not discussed? The fundamental requirement of a transport policy is to provide systems to meet the demand for travel arising from particular land uses. If we are not to provide these systems in Dublin I would like to hear the author outline the planning and land use policies that should be pursued.

Bus Transit: On this issue there appears to be confusion between traffic management and the provision of transportation facilities. Bus lanes and reserved streets are common traffic management techniques used widely throughout the world. They are not an alternative to investment in new facilities. In fact it is notable that cities with extensive rapid transit have also used these techniques.

The provision of busways, which of course suffers from the same difficulties as road construction in urban areas, is not a widely used technique. No city comparable to Dublin is proposing busways as its major form of transportation. It is not correct to refer to equivalent networks (page 59)– it is now not possible to provide busways even in the new towns to the west of the city. The extent to which the existing rail network in Dublin should be used is one of the major issues in transportation policy in the city. This is important given that the extensive use of commuter railway is consistent with the current development plans. The more fundamental question raised in this paper is can we or should we change the development plans now and ignore the railway assets available?

Also it is not correct to imply (page 59) that the balance between oil used by buses and the capital cost of rapid transit are the only relevant factors in the choice of system.

Suburban Rail Services: Mr Hall notes the need to upgrade the present suburban rail services although I am not clear what his view might be of rail services to Blanchardstown and Clondalkin. Some of the points that should be considered in the upgrading decision are also indicated. Then without evidence the claim is made that significant savings would be achieved with a diesel system. The decision to adopt electrification was taken by the Board of CIE after complete examination of all the alternatives. These included the cost effectiveness of both systems, the operating costs, capital costs, energy, environment, etc. It is quite wrong to say that a diesel system is more cost effective and I would challenge Mr Hall to produce his figures and to substantiate his claims. A further point I would make here is that once again it is not correct to compare increasing oil prices and operating costs. Operating costs which include maintenance and servicing costs etc. are far greater than the fuel costs and should have an important influence on cost effectiveness. It must be added that a diesel decision will not be reversible for about thirty years.

Finally, reference is made to the need for integration and coordination. I would only comment on the author's suggestion for a new approach to "tackle the job in an objective and neutral manner". I am unable to find any evidence that this has been done in this paper. Instead of the numerical analysis which could be undertaken we are unfortunately left with unsubstantiated opinions and I feel this is regrettable.

I apologise for taking so long to comment and I would be pleased to elaborate fully and provide the background analysis to which I refer.

Mr Colm McCarthy: Mr President, ladies and gentlemen, it is a pleasure to congratulate Mr Hall on his paper here this evening. I happen to agree with nearly all of what he says.

The economic policy debate in Ireland has a rather pronounced macroeconomic and short-term bias. Exchange rates and budgets are important, but in the long run, building the roads in the right places may matter more. I hope that the paper we have heard this evening will serve to stimulate a review of national transport policy, and will contribute also to shifting the emphasis in the policy debate in the direction of longer-term, and more microeconomic, issues.

The first point I wish to raise concerns car ownership forecasting. Mr Hall suggests that the saturation ownership rate might be 400 per 1,000 population. In the Road Needs Study, the figure used was 450 per 1,000, also a popular figure with UK forecasters. I have argued recently (3) that Ireland's low population densities yield higher car ownership levels, other things equal. Whether the Irish saturation level will be higher or lower than the British will depend also on whether Irish average family size continues to fall towards the British level. If it does, saturation levels for car ownership in Ireland should be no lower than those elsewhere. Since levels in excess of 500 per 1,000 population are already common in parts of the United States, Mr Hall's figure of 400 per 1,000 is at the lower end of the range of possibilities.

It is also quite important to know how quickly saturation will be approached. The Roads Needs Study forecasts were for 1985 and 1995, so it is too early to check on performance. But the forecasts in an earlier Foras Forbartha report (4), for the same assumed saturation level, were given for 1976 and 1981, and should be virtually identical to those implicit in the Needs Study. The ownership rate for 1976 was predicted to be 191 per 1,000 and this was a five-years-ahead forecast, based on data up to 1971. Not surprisingly, given the intervening recession, the actual 1976 figure was lower, at 175 per 1,000.

However car sales have boomed since the end of the recession and the 1977 ownership rate increased to 180 per 1,000. The 1978 Annual Vehicle Census is not yet available, but with car sales estimated at an all-time record of about 110,000 for 1978, the figure for the car stock on 30 September, when the census is taken, should top the 600,000 mark fairly easily. This would give an ownership rate of over 190 per 1,000 for 1978. The 1981 forecast in (4) is 243 per 1,000 and, unless there is another recession in the meantime, the actual figure should not fall short of this level by very much.

Long-term forecasting is bound to involve the risk of large errors, but at this juncture, it would appear that the Road Needs Study forecasts are not seriously out of line, the oil crisis notwithstanding. In his comment (6) on Dr Barrett's paper (1) to this Society in 1975, Mr McIlraith described the Road Needs Study forecasting procedures as "logically absurd and meaningless". This is strong language, particularly when neither supporting arguments, nor alternative procedures, were being offered. I have no doubt that the car ownership forecasting procedures used by An Foras Forbartha could be improved; however Mr McIlraith's remarks, particularly in the light of the forecasting record through the choppy economic conditions of the nineteen-seventies, are surely a little too negative.

It is a pity that Mr Hall has excluded air and water borne traffic from his review of the transport sector. There are close linkages between inland and external transport in practice and I would hope that any consultative body that might be set up in response to Mr Hall's suggestion would cover the whole transport sector and not just an arbitrary, albeit large slice of it. Indeed, even in terms of topicality, an opportunity has been missed, since the level of air fares seems to be the most newsworthy aspect of Irish transport policy at

the present time.

Internal air transport is already of some significance and is a major potential competitor with the railways. It appears to be official policy to discourage the development of internal air services, notwithstanding both the availability of airports in the regions and the willingness of operators to provide the flights. The only routes on which scheduled services compete with the railways are Dublin-Cork and Dublin-Limerick (Shannon). On the Cork route, the number of flights is small and the timetable rather inconvenient. On the Shannon route, the timetable is better, but this is a reflection of the regulation requiring both eastbound and westbound flights between Dublin and North America to make a compulsory stop at Shannon. This regulation is itself a curious form of regional aid. But between Dublin and, say, Tralee-Killarney or Dublin and Castlebar, no scheduled air services at all are permitted. It seems a fair bet that they would be popular if they were allowed to go ahead and could contribute to making these parts of the country less remote, with consequential benefits for their industrial development and tourism prospects.

The retardation of internal air transport may be a mistake and the whole area is one which is worthy of careful research and policy analysis.

Economists regularly berate engineers for their tendency to recommend the highest technology solution they can think of to any problem. I was particularly pleased to hear Mr Hall, who is an engineer by training, recommend the development of bus passenger transport, both for the provincial inter-urban system, and for Dublin. It appears obvious that, in a low density country, which moreover has low-density cities, the cards are stacked heavily against fixed-line transport. In particular, the proposal to construct an underground railway system in Dublin, one of the lowest density cities in this part of the world, seems premature. It appears that people who own cars will use rapid transit instead only if it is highly convenient, and this in turn means that they will walk only a few hundred meters at each end. In a low density city, this means that large numbers of stations must be provided if the rapid transit system is to be "in the market" as it were. But this makes the cost prohibitive.

In Dublin, perhaps, we should plan for higher densities in the longer term, hoping that real incomes will eventually be high enough to make a rapid transit system something we would buy to ice our transport cake. But rail rapid transit does not look like a cost-effective solution to Dublin's transport problems in the shorter term and one wonders why it was recommended.

We must not concern ourselves solely with transport investment. Taxation and pricing policies are important too. Mr Hall mentioned the energy problem at several points in his paper and I wish to offer just one observation on the taxation and pricing of energy. We seem to lack coherence in energy taxation policy at present. Oil used for home heating, or to generate electricity for home heating, is not taxed. Oil burnt in cars is taxed heavily. Diesel oil, burnt in trucks, is taxed fairly lightly. Town gas is subsidised. There is a national commitment to reducing our dependence on imported energy sources, and taxation policy seems the most effective way of achieving this objective. The differential treatment of different forms of energy consumption is difficult to understand on purely rational grounds and has the look of a state of affairs that "just happened".

Mr Hall argues that the cash cost of creating jobs on transport improvement schemes would be reduced in practice by increased income tax receipts, reduced dole payments and multiplier effects generating further indirect and direct tax revenue. Unfortunately it is possible, through ignoring labour supply responses in particular, to be too sanguine

on this point–see (5) and (7).

We already invest a substantial volume of resources annually in transport equipment and infrastructure. One of the features of the Road Needs Study which intrigued me most was the way it showed up, not just deficient sections of the network but also sections which, in the early seventies, already had adequate capacity for 1995 traffic volumes. The investment had quite simply been put in the wrong places. We need to rely less on proposals by interested parties and more on disinterested cost-benefit assessments. Cost-benefit is seen by some as a technique for justifying projects. Particularly when cost-benefit studies are commissioned by an interested party, there must always be a presumption that a positive result will be announced. One would like to see just the occasional thumbs-down from cost-benefit practitioners. One way of ensuring that this could happen more often would be to adopt a rule, if it is not in operation already, of excluding consultants who do feasibility studies from tendering for any resultant design contracts.

Mr Hall, in promoting by-passes as against stretches of inter-urban road as the investment priority, is anticipating the results of cost-benefit studies that have yet to be done. I am sure there are some good by-pass projects, but there must be some bad ones too and many which might be inferior to inter-urban projects. Cost-benefit is also relevant to optimising road-design–see (2).

I must apologise for speaking at such length, but I trust my volubility will be interpreted as a tribute to a very realistic and down-to-earth review of transport policy.

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John Markham: My compliments to the author and to the Society for making this opportunity available to discuss Transport Policy. This contribution must not be taken as reflecting the views or policy of the Board or Management of Coras Iompair Eireann (CIE).

There are six points I wish to make.

(1) The paper deals in a confused way with inland surface transport and attempts to compare roads, a conglomerate of private cars, goods vehicles, roads and Local Authorities with CIE, a corporate identity with rail, road and other activities. There is a dearth of statistical material in the paper and what does appear could bear some improvement. The Public Capital Programme is cited as a source for the data provided in the Appendix. Table A purports to deal with the "CIE Government Subvention" but it would appear that the figures cited are the "Expenditure on

Public Capital Programme" or amounts of capital authorised for CIE in the various years. In Table 1 below I give a valid comparison of the capital expenditure on Roads and CIE from 1971 on. Since 1978, Roads' capital consists of a voted grant from the Exchequer. CIE total capital requirements come from three sources, non-voted repayable advance from the Exchequer (shown in brackets in Table 1), internal source such as depreciation and external sources.

Table 1: The Public Capital Programme and Outturn for Roads and Coras Iompair Eireann (rail, road, others) between 1971 and 1978 expressed in 1977 constant prices.

	Outturn in Constant 1977 Prices (£m)		Percent of Total Public Capital programme		
Year Ended	Roads	CIE Total (Exch. Source)	Roads	CIE Total (Exch. Source)	Total Pub. Cap. Prog. Current £m
March 1972	17.7	11.0 (2.7)	3.7	2.3 (0.6%)	214
March 1973	18.3	11.7 (4.5)	3.6	2.3 (0.9%)	249
March 1974	25.9	13.8 (5.7)	4.4	2.3 (1.0%)	322
9 mths. 1974	18.2	10.3 (1.4)	4.0	2.2 (0.3%)	290
Dec. 1975	18.5	11.8 (1.4)	2.9	1.9 (0.2%)	470
Dec. 1976	13.2	12.6 (4.8)	2.1	2.0 (0.8%)	547
Dec. 1977	18.8	11.5 (2.1)	2.9	1.7 (0.3%)	658
Dec. 1978 (est.)	21.0	11.5 (2.3)	3.0	1.6 (0.3%)	766

Source: Public Capital Programme 1978 (Prl. 6875) Table 3, 4 and 6; and earlier editions, also Department of Finance. (Consumer Price Index was used to derive 1977 Constant Prices).

In the seven full years since April 1971 the capital outlay on roads averages £19.1 million at 1977 constant prices and this contrasts with the CIE Exchequer source average of £3.4 million. It must be emphasised that the CIE capital was and is being used to service both vehicle and infrastructure for rail, road and other needs. The paper refers to the "actual public financial commitment to inland transport" in para. 1.4, page 45. I would suggest that values in Table 1 more fairly reflect the capital commitment to surface transport. When the amounts (in current terms) are expressed as percentages of the Total Capital Programme it is seen that the roads proportion fell in 1975 and has remained at the lower level. CIE's share from the Exchequer source varies considerably. Paragraph 2.5, page 49, on Budgetary Control gives a grossly misleading account of public transport's ability to generate funds. A study of the "Public Capital Programme 1978, Table 3 or 4" or the earlier years will show that CIE's capital requirements are self-financing for the major part. In addition CIE is required to pay interest on the repayable Exchequer advances.

(2) If the intention was to compare expenditure on the rail mode to the road mode I would put forward Table 2 as being a more valid basis for comparison than either Table in the Appendix in the paper. The road data (Table 2) is the actual cost of doing the work and *considerable central and administrative costs are not included.* If one was to broaden the perspective to include what the paper refers to as the "public commitment" to transport then the marginal cost of the Department of Health and Justice services must also be added to these road values to cover accident, safety, legal, etc. costs associated with "Roads". The rail data on the other hand includes overheads and this mode could not be seen to impose on the Health and Justice resources to anything like the extent of the road mode. Since 1 January

Table 2: Expenditure in constant 1977 prices (£'m) on the Maintenance and Improvement of Public Roads, on the Maintenance and Renewal of Railway Lines and Works, and on CIE's Rail Subvention and Rail and Road Deficits between 1971 and 1978.

Year Ended	Public Roads M'tnce.	Impv'ts.	CIE Road Sub/Def.	CIE Rail M'tnce	Renw.	CIE Rail Subv.	Deficit
			£'000,000 in 1977 prices				
March 1972	33.1	23.0	(0.9)	6.1	2.8	–	15.1
March 1973	34.5	20.4	0.4	6.1	3.0	–	15.9
March 1974	35.7	23.0	2.2	6.2	2.5	–	17.6
9 mth. 1974	30.9	22.1	5.2	4.8	1.6	–	16.8
Dec. 1975	37.8	24.4	8.9	6.6	3.9	17.8	9.2
Dec. 1976	47.3	22.0	8.2	6.3	3.5	17.1	10.4
Dec. 1977	not available		5.3	6.7	3.9	17.4	9.9

Sources: Statistical Abstract of Ireland, 1971 to 1976: *CIE Annual Reports,* 1971 to 1977. Brackets signify profit in 1972.

1975 a new subvention structure for the railway and road passenger services was introduced in order to comply with EEC Regulations, No's 1191/69, 1192/69 and 1107/70 (see page 26, CIE Annual Report 1977 for particulars). Great emphasis is placed in the paper on the deficit associated with public transport. The "public service obligation" and "level crossing control and maintenance" are two of the matters covered by subvention payments. Such payments are shown "below the line" in CIE's accounts and so exaggerate the "deficit" situation. A more practical approach would be to show these payments "above the line" and this does in fact occur e.g. in British Rail's Annual Accounts.

(3) Private cars per 1,000 persons were 179 in 1977. This figure has risen from 47 to 103 to 174 in 1956, 1966 and 1976 respectively. The best available projections suggest values of 226 and 315 for 1986 and 1996. If, however, the population is reduced and only those aged 20 to 69 years are included in the denominator then the ratios read 86, 196, 334, 499 and 708. Put another way in the 1990's only 3 out of every 10 in the driving age bracket will not own a private car. Surely some policy can be introduced to maintain car ownership levels at an acceptable level.

For example the author advocates the restriction of car access to city centres. Indeed perusal of Feeney's paper "Energy and Road Transport" (*Irish Engineers,* Vol. 31, No. 2) in which he puts forward a number of conservation measures might also prove beneficial. In paragraph 1.3 the advantages of the private cars are presented. Better balance would have been achieved if the disadvantages such as accident and safety requirements and costs in monetary and other terms had been included.

(4) The author appears to be unaware of the considerable work done by CIE in an attempt to establish the factors underlying the car owner's decision to use his car for the journey to work (see "The Journey to Work: a Behavioural Analysis". P. N. O'Farrell and J. Markham, *Progress in Planning,* Vol. 3, Part 3, Pergamon Press, Oxford, 1974). This work was done as part of the Dublin Transportation Study although not used in the final models. The main finding was that excess time, i.e. the times associated with walking and or waiting for train, bus or car was a significant factor in the choice of mode.

(5) In para. 1.1.1, (c), percentage shares for passenger miles and ton miles are cited for the roads. These are at best reasonable guesses and it is sad to reflect that it is only the rail and CIE road portions that are being measured with any degree of accuracy. The need for a central agency such as the Central Statistics Office to undertake some form of measurement of the levels of personal travel (passenger miles) and freight haulage (ton miles) is paramount.

(6) The paper strongly pleads for a specialist unit in possibly the best written paragraph, 4, dealing with integration and coordination of Transport Policy. Twenty one years ago the "Committee of Inquiry into Internal Transport 1975 Report" (Pr. 4091) similarly recommended a Transport Consultative Council to "deal with broad questions of transport policy and to keep under review trends and developments in both public and private transport". Such a Unit or Council must first make good the considerable data deficiencies already referred to and then draw up and agree a set of objective rules by which the use of the rail and road modes may be validly compared.

Mr P. J. O'Keeffe: said that he would like to be associated with the vote of thanks to Mr Hall for a very interesting and valuable paper. The paper was a valuable contribution because Mr Hall had suceeded in pulling together, in a macro sense, the principal findings and recommendations that had emerged from the various land transportation studies completed in Ireland over the past 10 years. More importantly, he had identified many of the key problems that have now to be faced by the Government and other authorities concerned. He had, bravely, put forward his own conclusions and suggestions as to how these problems should be solved.

The most difficult of all the problems in this field is, as Mr Hall points out, what to do about the chronic traffic congestion in the Dublin region. Traffic experts from abroad, who had visited An Foras Forbartha in recent years agreed that Dublin's problem was more serious than any comparable city in Europe or North America. Mr Hall had focussed attention on one of the major issues involved namely the need to decide whether the proposed peripheral motorway or the rapid rail system should be tackled first, assuming that funds for one or the other were available. To resolve this problem we need to look at the basic element of land transportation, that is the nature and extent of the trips that are made by households on a working day. If we do, we find that the travel patterns and the travel budgets of tens of thousands of households in the Dublin region are now anchored to the motor car. If you say to these households you must travel by bus or by train remember that you are seeking to direct a very basic element of household activity. You are therefore on very dangerous ground. In a democratic society you cannot force people to make radical changes in their day to day activities. Congestion may do it to some extent but at enormous cost, but regulations and enforcement on a scale that is likely to have a significant impact will not succeed.

Dr R. Nichols has been quoted widely in the media in recent months as stating that if the present trends in car ownership are allowed to continue, Dublin will have an enormous pollution problem before the end of the century. Yet, a few weeks ago a researcher from his own Institute (IIRS) had predicted, in a paper on "Future Air Pollution Trends and Energy Demand to 2000 AD" presented at the National Board for Science and Technology Seminar on Air Pollution Impacts and Control, that Dublin's Air Pollution levels in 2000 would be below current EEC Standards. The prediction allowed for a continuation of present trends in car usage. Dr Timoney's paper at the same seminar has shown

that motorways reduced air pollution because speed was increased and travel time reduced.

Mr O'Keeffe then referred to remarks made by a previous contributor concerning the employment content of road works. The study referred to which had been carried out by An Foras Forbartha was now being considered by its Board of Directors. The figure of 84 man years per £1m of expenditure referred only to direct employment; the total direct, plus first round indirect employment is substantially higher than this.

Declan McIlraith: I wish to be associated with the vote of thanks to Mr Hall for his paper which covers the general field on transport planning issues in this country.

There are a number of points raised in the paper that I would like to refer to. It appears that what Mr Hall is proposing is in fact a policy, or set of policies, based primarily on minimum capital input. This appears to be so both on the roads and public transport sides. At the same time he is advocating the use of benefit cost analysis. These two are not necessarily compatible particularly if incremental benefit/cost analysis were to be used.

The second point is the statement by Mr Hall that no motorway construction should be proposed. This would appear reasonable if we were proposing in this country a national motorway network as in the UK or many European countries. We are not however and any motorways that are proposed are relatively short lengths as part of the general improvement of the network. A motorway is just another standard of road which happens to be much safer and can carry more traffic than any other. There are cases where such is the best solution and I would hesitate to issue a blanket constraint on construction.

Mr Hall comments that the Dublin Transportation Study did not offer alternatives. In 1970 the new draft development plan was being prepared and the land use development of the Dublin region for the following 20 years had been decided. Within such fixed land use DTS was asked to develop the most suitable transport strategy. Many alternatives were considered and tested, and are described in the Technical Appendices before the recommended scheme was proposed. It should be noted that DTS did not agree with the Schechterle proposals, as again stated here by Mr Hall, of widening existing streets. To do so would be environmentally damaging and financially prohibitive.

Lastly Mr Chairman I would like to refer to Mr McCarthy's reference to car ownership growth and my own comments in 1975 on Dr Barrett's paper. I agree with Mr McCarthy that the potential for growth in car ownership in Ireland is higher than Mr Hall sets out. However in my previous criticisms of the Needs Study approach I said that the use of growth curves and an assumed saturation level is logically absurd. I still feel so. In order to estimate car ownership in say 1995 to first estimate the ownership in 2020 and work backwards is I feel without logical reason. I would like to add that though I made these criticisms in 1975, Leisch, in his report in the UK has reached the same conclusion since.

Mr Alan French: There is a growing body of opinion which would prefer to see a transport policy which places an emphasis on public transport for carrying passengers, and more reliance on railways and water transport, rather than roads, for carrying goods. We must ask why this sort of approach is not being adopted whole-heartedly by all concerned, considering that it would offer substantial economies, especially after the energy crisis.

One of the most misleading methods used by transport planners—and qualitatively by public opinion—is to regard the volume of traffic, now or in any future year, as inevitable, so the planners' role is seen as catering for this volume by increasing the capacity, whether

of roads or public transport.

This has been the traditional approach to road planning, and is used in the Dublin Transportation Study (1971) and Mr Sean Barrett's cost-benefit analysis of the primary road network. It has also been used by CIE where the demand for public transport has fallen, and services have been cut back. The decline was considered inevitable, and never related to any fall in the quality of service provided.

The normal approach by CIE is to try to make services attractive (whether or not they succeed), and to advertise them, since they recognise that good quality attracts passengers, some of whom would otherwise go by car, and some who would otherwise not travel. This immediately contradicts the traditional road planners' approach, which regards the numbers of travellers as inevitable.

Notice how different the approaches are. Only this week the *Irish Press* (4 December) had an article which talked of "a growing body of opinion that if you build more roads you encourage more cars; and if you build motorways running through a city, you merely aggravate congestion in the city centre". This should not be a matter of opinion—the fact is that roads do encourage traffic, and the question "how much?" needs to be answered. Assuming the answer is zero is a false assumption, and to base plans on it is bad planning.

Similarly, experience shows that good public transport attracts motorists away from their cars. To assume that they will always go by car, regardless, is a false premise—not just a different opinion—yet this very attitude has probably stifled much-needed improvements to public transport.

So an essential feature of understanding transport is to estimate how the quality of any mode of transport affects the amount of traffic using it—instead of regarding all changes as inevitable. We can never know with absolute certainty what causes what; but the methods of statistical significance can be a help. We may need to collect data which was previously not measured—e.g. how much does an improvement in one bus route increase traffic on connecting routes?

Turning to the question of assessing projects, it follows that some cost-benefit analyses have missed the point, in ascribing most of the benefit to time savings e.g. many road plans do this; so does the McKinsey report when talking of mainline railways.

The social benefits of public transport include the following:—

1. Pooling of resources into larger units—not always reflected in prices.
2. Economy in energy and land use.
3. Greater value added within the State.
4. Much of the cost is labour, so it is not a real cost to society.
5. Regional development and tourism—this must be judged by the same standard as road-building.
6. The high inter-dependence of public transport means that individual parts that made a loss may still act as feeders to the rest of the system, thus having a marginal positive effect.
7. Time-savings, by contrast, are probably over-estimated. The main effect of shorter journey times is the new traffic they generate, which affects the whole performance of the system, before social benefits are counted.

Think about these, and you will find that a system relying more on attractive railway and public transport services is the most cost-effective approach to transport.

Mr. M. J. Walsh: I would like to compliment the author on his topical and controversial paper. The recognition of finance as a major constraint in all transport policy is especially worthwhile, but issue may be taken over some of the arguments put forward, especially in relation to Dublin.

1. City Planning and Development

Until very recently, most of Dublin's development has been radial, with major travel corridors, well served by public transport, extending from the centre. In a dispersed city, by contrast, activities are located at random, with few concentrations, and most journeys must be made by car, since public transport cannot provide the diffuse network required. Los Angeles is a fairly successful example of a dispersed city but New York is quite different. The 1,000 miles of motorway built in that city during the 1950s were largely irrelevant to its real transport problem, which arises on the radial routes to Manhattan. More recently the vital role of the railways on these routes has again been recognised and new equipment provided.

More dispersed development in Dublin would lead to deprivation for non-car-users and could be unwise as energy becomes scarcer and more costly. Such scarcity and increased cost could also upset traffic projections based on the assumption that increased car ownership necessarily entails a pro rata increase in car usage. In advocating more traffic management to cope with increased vehicular movement, the loss of amenity suffered by non-car-users is under-estimated. The past effects of such measures can be seen in the circuitous and inconvenient re-routing of the central area bus routes, while widened roads have created increased hazards for those requiring to cross and made access to bus stops more inconvenient.

Contending with energy scarcity and coping with Dublin's growth would seem at least as deserving of public investment as providing jobs. Thus the author's emphasis on maximising the use of public transport is to be welcomed, but the methods favoured seem open to question. Public transport performs best on busy radial routes. To encourage its use, city development must to a large extent continue to be based on radial travel corridors, but whether bus transit could provide the necessary level of service on these is debatable.

2. Buses

Bus priorities are certainly promoted and used in circumstances similar to Dublin, but does any comparable city rely wholly on such priorities as the backbone of its public transport, with no non-highway, rail operation whatever? In advocating bus transit for Dublin, is the mileage of bus priorities required appreciated? Reliable bus operation cannot be guaranteed unless practically all points of serious congestion can be circumvented by the buses.

As long ago as 1963, in 14 West German cities, tram priority schemes amounted to between 14 and 60 per cent of the systems' total mileages. The 60 per cent figure represented 70km. (Verkehr und Technik, special issue, "Die Zweite Ebene", 1964). Up to 1939, 14km. of Dublin 100km. of electric tramways were segregated from other traffic.

More cross-city bus routes could aggravate erratic running. Transfer tickets could achieve the same result for the passenger, with less problems for the operator. "Commuter Tickets" already facilitate such interchange. Tax concessions against the purchase of these would seem an obvious measure to encourage use of public transport.

3. Railways

The arguments put forward against the Dublin Rapid Transit rail plans do not all appear to be entirely well-founded. The only major argument against it would appear to be its cost, but if there is no cheaper alternative, then it must be the only option. Such was the case with Philadelphia's Lindenwold line. For a city of Dublin's size and growth rate, it is not seen that any viable cheaper alternative exists.

The paper's descriptive terms are open to challenge. Rail is said to offer good quality transport, but the author does no expand on this. Efficiency is mentioned in regard to public transport but is not defined. Rail speeds are not necessarily high, but the private right-of-way permits continuous progress. Partially completed sections of a system can be used long in advance of completing the whole network, as in Oslo and London.

Traffic Flows

Rapid transit is a term which covers a multitude of concepts. The Dublin scheme is for a central area link between essentially suburban lines, and is similar to the S-bann schemes of Germany and Scandanavia. It should not be compared to the New York subway. Dublin is not too small for such a system. Oslo (500,000 passengers) has a comprehensive suburban network, with two central area links under construction. Helsinki (500,000 passengers but growing rapidly) has both an urban underground railway and electric suburban lines. There are numerous other examples.

It is not true to say that peak hour flows for the proposed Dublin system are extremely low, if the comparison is a fair one, drawn against comparable systems in similar cities. While the maximum theoretical passenger flow is about 40,000 per hour on a single track in one direction, this level of traffic is not essential to justify a railway. A more meaningful figure is *average passenger flow per km. of route per day* over a system as a whole. A worldwide sample of electric suburban and urban railways gave a range of 200,000 to 4,000 passengers per km. of route per day. (Janes "All the World's Railways", 1972). The difficulty in being dogmatic should be clear.

A key system is London; a complex network, one-third in tunnel, and having sections with multiple tracks, but the average passenger flow per km. of route per day is only 40,000. Yet London Transport and its predecessors have been financially viable throughout most of their history. Dublin comes in at 24,000, not surprisingly below London, but on a par with provincial cities in Britain, and with some in Europe and North America.

DTS Recommendations

If the DTS is trend-oriented and has inherent major pitfalls, it is hardly logical to regard it as gospel in criticising the rail study. Four bus recommendations versus three rail can hardly be called more emphasis on bus. If there was such emphasis, it has not revealed itself in action. The only recommendation accomplished has been the rail study.

It is said that the rail scheme is more extensive than the DTS recommendation, but if the DTS only recommended a study, then surely the proposed scheme is a valid answer! If the answer was known, why a study? The comments on the scheme are largely playing with words, e.g. how is extending rapid transit service different from opening up the Blanchardstown and Clondalkin lines?

The busways option (alternative D) depended on some central area priorities and on the motorways being built. Is it feasible without these? These measures were also assumed in the base situation against which the benefits of the rail scheme were calculated, along with some others, also unfavourable to rail. If these assumptions were wholly or partly inapplicable, the rail benefits should be enhanced.

Clearly the rail scheme will not benefit everyone, but that is not an argument against it. Such a philosophy would exclude practically all public investment. Stress is laid on increasing the rail share of the trips, but is this vital, if rail is shown to be worthwhile under the pessimistic assumptions of the study?

Comparison with other cities suggests that a congestion-induced shift to public transport should already be occurring in Dublin. Apart from the rise in traffic on the suburban railway, this does not appear to be the case. It is doubted whether this shift will occur without the provision of a reliable public transport network, segregated from other traffic.

Diesel vs. Electric

Few railway engineers would agree with the description of diesel traction as "simple and cost-effective" for services of the nature required around Dublin. The performance and reliability of diesel traction, especially diesel-mechanical, is inferior to electric, on services with frequent stops, and is likely to be also more expensive.

The references to "electronically-operated doors" presumably relate to power-operated doors, generally driven by air or electric motors, and controlled from a central location on the train. The control system may embody electronics but this is not essential. Power doors are not necessarily advantageous—they are costly and waste energy and heat. Slam doors can be perfectly satisfactory where passengers cooperate in closing them. For Dublin, power doors are essential!

Reply by Mr P. A. Hall: I wish to thank Dr Beere, Dr Barrett and all the other speakers who helped to make this discussion such a lively one. My paper was written as a discussion document and judging by the wide-ranging and lengthy debate, and by the occasional display of emotion it seems to have achieved its purpose.

Although the main emphasis in my paper was on the principal transport options facing government in the context of stated policy objectives, I also referred to certain aspects of the policy and decision making process itself with a view to suggesting some possible explanations for the apparent lack of attention being devoted to transport proposals. A number of speakers including Dr Beere, Mr Mangan, Dr Barrett and Mr Markham referred to this aspect of my paper. I suggested that the problems were perhaps more accute because responsibility for national transport policy is divided politically and administratively at present. The Department of the Environment is responsible for road maintenance and development, and the Department of Tourism and Transport is responsible for public transport.

This division of responsibility in an area such as transport, which should be dealt with in a homogenous manner and where the approach should be co-ordinated at research, planning and policy making level, has, in my view, a detrimental effect. This is because organisations, through no fault of their own, tend to form a 'corporate identity' or 'image' of themselves, which serves the purpose of engendering commitment to the organisation and its goals among its members and distinguishing it from other organisations. If you like a kind of 'micro-nationalism' attends organisational life. For example, the public transport people here this evening are quite understandably determined to defend their own company's public transport solutions to Dublin's transport problems.

Now I realise that a great deal of inter-departmental and inter-agency communication and consultation occurs between staff members at all levels; and the transport sector is no exception. I also realise that when research and planning studies are being carried out that project advisory committees and technical consultative committees are usually

formed to advise on the conduct of these studies. These advisory committees in the transport field usually include representatives of the relevant departments and agencies, public and private. However, consultation and advice at this level is a far cry from what I am referring to. Anyone who has served on an inter-departmental committee or one of these project advisory committees knows exactly what I am talking about. For one thing, advice can be ignored or rejected outright and for another consultation can be for the 'optics'.

I believe, as I have already stated in my paper, that what is required is a specialist authority with its own expertise and a continuing mandate to tackle the job on a whole-time basis and in an objective and neutral manner.

Dr Beere and Mr Mangan both referred to my comments on employment creation. I still contend that a better return is obtained from money spent on road building than invested in public transport and I wish to thank Mr O'Keeffe for pointing out to Mr Mangan that his (Mr Mangan's) figure of 70 to 80 jobs per £1 million for new road works only refers to direct employment and that the total direct, plus first round indirect employment is substantially higher than this. To argue that in the long term "investment in roads should also eliminate bad roads thus reducing the maintenance (and job) requirements" means that Mr Mangan wishes to overlook the effects of climate and heavy commercial vehicles on the design and types of road material likely to be available in the foreseeable future.

Dr Beere, supported by Mr Mangan mentions the important considerations involved in the energy aspects. She points out that I have come down firmly in favour of dieseltraction as against electrification despite the risks of escalating oil costs. I wish to emphasise that as far as urban travel is concerned, it is a mistake and a source of distraction from the main issue, i.e., cost considerations, to make much of the energy aspects. The same is not true for inter-urban travel. As I have stated in my paper the indications are that significant capital savings would result from replacement by diesel rather than by electrification and that the savings in energy usage which would result from electrification are small. Mr Mangan goes on to state that CIE has undertaken a cost effectiveness study of diesel operation versus electrification and in the light of that study as well as other considerations decided to adopt electrification. In view of the major impact of such a decision on the public, not to mention the public purse, should not CIE be expected to publish details of all such examinations?

Dr Beere states that she would be more optimistic about the potential of urban rail systems to attract traffic from the road than I would. In support of her point she mentions the experience elsewhere and the growth in numbers carried by the Dublin Suburban Service from 1970 to 1977. However, the reasons for my lack of optimism are contained in the Dublin Rail Rapid Transit Study Report which was commissioned by CIE and which is used by CIE in support of its case for rail rapid transit. Turning to figure 81 of the Dublin Rail Rapid Transit Study Report, it is worth noting that the peak hour passenger flows for the year 1991 are all lower than 10,000 passengers for peak hour, in fact, considerably lower as you move out from the centre city area. Referring now to a paper by Lehner of the Federal Republic of Germany, published in Special Report 161 of the Transportation Research Board, Washington, DC, the capacity of rail rapid transit is stated on page 41 as ranging from 10,000 passengers per hour to 40,000 passengers per hour. With an estimated peak hour passenger flow of less than 10,000 for the Dublin Rail Rapid Transit System for the year 1991 it is very difficult to avoid the conclusion that a continuing large operating subsidy would be in prospect.

Dr Beere then goes on to quote Dr Nicholl in support of her claim for a strong public transport system. On this point Dr Beere and my paper are in total agreement. Where we differ is in the kind of public transport system which is best suited to the needs of Dublin. One got the impression listening to some of the earlier speakers that a bus transit system is not public transport at all, that only trains are capable of moving passengers.

Dr Beere suggests that some consideration might be given to a toll system on certain trunk roads. Dr Barrett also favours private investment in toll roads. The toll road concept has gained in popularity in Europe, Asia and the United States during the past few decades. Countries such at Italy, France, Spain, Austria, Belgium, Japan, The Philippines, Brazil and the United States make fairly extensive use of toll road facilities. Generally speaking, they have proved popular and have resulted in many benefits of an economic, local, financial and developmental kind. There are also some potential problems in toll roads. They usually involve the overcoming of inherent resistances of certain groups and organisations and also some toll roads have given rise to financial difficulties. As far as the applicability of toll roads to Ireland is concerned, my own view is that the concept should be tested in a limited and experimental way but only after a careful economic assessment of the feasibility and practicality of the concept. However, it is an appraoch worthy of consideration in this context.

Mr Markham and Dr Beere are right to point out that figures in Table A of the Appendix to my paper represent the capital commitment to rail and road transport. The title of the table should be amended to exclude the term subvention which may tend to mislead. However, Mr Markham's deflation of the figures to constant prices in Table 1 does not impinge on the central point argued in the paper – that the proposed expenditure on inland transport is totally out of keeping with that which has taken place heretofore. Furthermoie, Mr Markham's Table 2 is not directly relevant to the argument which was not based on comparing the rail mode with the road mode.

Mr. Markham gives car ownership forecasts of 226 per 1,000 population for 1986 and 315 per 1,000 persons for 1996. He states that these are the best available projections but he does not give the source for them. The most recent An Foras Forbartha projections indicate mean values of 264 for 1985 and 332 for 1995 (C. McCarthy, Car Number Projections by County 1985/1995. RT. 115, 1974). Whichever set of projections is correct, they both indicate rapidly increasing car ownership figures which is in keeping with international experience. The rest of Mr Markham's comments appear to be in agreement with the paper's argument for restriction of the private car and improvements to public transport in urban areas.

Mr Mangan accuses me of providing only partial maintenance cost in Table B of the Appendix. In fact the only road maintenance costs not included are overhead costs. The reason for their exclusion is that in the *Statistical Abstract* they are not apportioned as between improvement and maintenance expenditures. Presumably for the same reason Mr Markham does not include road overhead costs in his Table 2.

Mr Mangan asks rather sarcastically if a level of 400 cars per 1,000 people means that the minority is the remaining 600 non-car owners. While realising that Mr Mangan is in public rather than private transport, it certainly ought not to be outside the scope of his imagination to realise that 400 cars per 1,000 persons means that the vast majority of households have a car. Therefore, the 600 non-car owners to whom he refers are in fact housewives, children and other dependents who have access to the family car.

In my paper I have strongly opposed a rail rapid transit solution to Dublin's transport problems. My opposition derives from a number of considerations which I have tried to

outline in my paper. Because of the discussion here this evening and in particular Mr Mangan's reaction to my position, there are two further points worth elaborating upon.

First, there is the question of the high capital cost of the rail rapid transit solution compared with other public transport solutions. Although rail rapid transit may be a necessity for many cities, including some that do not have it, far too little attention has been paid to its economic justification on an operational basis. Capital and subsidies are not unlimited even if traffic congestion is. Too many plans assume an unlimited need for subsidy and, in so doing, place rapid transit planning at the personal whims of the designer instead of under the self-policing and accurately guiding hand of the market place.

I am not saying that there is anything wrong with tax support for a desirable and necessary public facility, but a non-elastic yardstick is necessary to measure the effectiveness of the planning and design work.

Secondly, rapid transit serves large cities. Of course the need for rapid transit depends greatly on the specific travel patterns, topographical constraints, and character of the city. But there are at least thirty cities in Europe with modern high-quality light rail systems and this type of system is a less ambitious form of rail transit, with much lower investment costs than that envisaged for a full rail rapid transit system. Most of the cities using light rail have a population between 300,000 and 1,500,000. In fact, many cities are staging their rapid transit construction by using light rail as an interim mode, e.g., pre-metro in Brussels and Stadtbahn in Hanover and Frankfurt. In the case of Amsterdam, which planned its system in 1970 at a cost of £405 millions, by 1974 the city was commited to one line and the cost of the system has more than doubled. At that stage the city had a complete change of mind and has now gone for an extension of the tramway system.

On the 16 August 1975, G. Hulbert, chairman of the Toronto Transit Committee writing in the Toronto Star stated and I quote, "we have to face the fact that the price tag of full metro is getting beyond our means ($50 million per mile). We have to look to light rail transit, meaning tramways".

Both of these cases are reported in the April 1978, issues of *Modern Tramway and Light Rapid Transit.*

Mr McIlraith makes the point that what I am proposing is a policy, or set of policies, based primarily on minimum capital input and at the same time advocating the use of benefit cost analysis. He goes on to say that these two are not necessarily compatible. This is not quite true. What I have argued in my paper is that any practical transport investment programme must be based, realistically, on levels of finance that are likely to be available. This is the overriding constraint. Within that constraint, however, it is possible to use cost benefit analysis as a means of deciding on priorities.

I take Mr McIlraith's point that a motorway is just another standard of road which happens to be much safer and can carry more traffic than any other. However, when you get into the business of building motorways you are then into a new and much more expensive transport investment league. Of course if we could stop at building a few short lengths of motorway where the investment is clearly justified then this would be alright. But would this really happen in practice? It is much more likely that as soon as a few short lengths were constructed the pressure would come to build more, and then more.

Finally, I wish to thank the Society and in particular, Professor O'Connor and Dr McGowan, for their encouragement and help in presenting this paper.