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<th>Transport infrastructure</th>
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5. INFRASTRUCTURE

5.1 Transport Infrastructure

5.1.1 THE PROPOSALS IN TRANSPORT 21

The Government launched, on November 1st, 2005, a long-range transportation plan called Transport 21. This included an extensive range of projects for the road network, the interurban rail network and for rail projects in cities, principally in the Greater Dublin Area, as well as provisions for both Dublin and provincial bus development. The total capital cost of the plan has been estimated by the Department of Transport at just over €32 billion for the years 2006 to 2015 inclusive. Their projected breakdown is as follows.

Table 5.1: Breakdown of Transport 21 Capital Spending to 2015 in €bn.

<table>
<thead>
<tr>
<th>Category</th>
<th>€bn</th>
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<tbody>
<tr>
<td>National Roads</td>
<td>16513</td>
</tr>
<tr>
<td>Dublin Fixed-Line of which</td>
<td>11530</td>
</tr>
<tr>
<td>Exchequer Luas</td>
<td>1355</td>
</tr>
<tr>
<td>Exchequer Rail</td>
<td>4140</td>
</tr>
<tr>
<td>PPP Luas</td>
<td>2168</td>
</tr>
<tr>
<td>PPP Metro</td>
<td>3867</td>
</tr>
<tr>
<td>Dublin Bus</td>
<td>529</td>
</tr>
<tr>
<td>Rail Provinces</td>
<td>1926</td>
</tr>
<tr>
<td>Bus Provinces</td>
<td>407</td>
</tr>
<tr>
<td>Regional Airports</td>
<td>100</td>
</tr>
<tr>
<td>Other including Unallocated</td>
<td>1284</td>
</tr>
<tr>
<td>Overall Total</td>
<td>32289</td>
</tr>
</tbody>
</table>

Source: Department of Transport
Notes: The Dublin Exchequer Luas figure and the PPP Luas figure include an element of VAT, which is not strictly an economic cost. The figure for ‘Other including Unallocated’ includes some items, such as ticketing and traffic management projects, which may be capable of allocation among the categories shown.

The biggest single item, accounting for approximately one-half of the overall total, is the continuing investment in the National Primary and Secondary road networks. A total of €11.5 billion has been proposed for fixed-line investments in the Greater Dublin area, including improvements to facilities and new lines in the
surrounding counties. A further €1.9 billion is to be spent on provincial rail (including provincial cities). Bus services outside Dublin will attract €0.4 billion under the programme as envisaged. Of the total to be devoted nationally to public transport, over 90% is to be spent on rail projects.

The overall phasing of the programme sees a gradual build-up of spending to a peak in 2012 at roughly double the 2007 level, followed by a sharp decline to 2015.

While the Government has indicated its commitment to the various components of Transport 21, all Government capital projects costing €30m. or more must be subjected to a cost/benefit appraisal in accordance with guidelines issued by the Department of Finance in February 2005. We understand that none of the components of Transport 21 has as yet been through this process. In his speech at the launch of Transport 21, the Minister for Finance, Mr. Brian Cowen TD, stated:

‘All projects in the framework will be appraised and implemented in line with my Department’s Capital Appraisal Guidelines and the additional Value for Money initiatives as set out in my recent speech.’

The substantial PPP element of over €6 billion in non-Exchequer capital funds is of course predicated on the private sector choosing to invest these sums in the construction of urban rail projects. These elements of the programme will not be funded privately unless the tenderers are satisfied that operating profits adequate to remunerate capital, having covered operating costs including depreciation, can be earned. We understand that the financial target for Luas is to cover direct operating cost, not to cover depreciation nor to cover remuneration of capital. Thus the challenge involved in the €6 billion PPP funding target for Dublin rail projects is substantial.

We comment below in Section 8.4.2 on certain aspects of the investment appraisal process which requires to be undertaken in connection with the components of Transport 21.
The principal components of Transport 21 are

- The completion of the National Primary road network, mainly to motorway or dual carriageway standard.

- Substantial further upgrading, mainly as undivided roads, of the National secondary network.

- A further substantial programme of investment in mainline rail.

- A largely rail-based approach to public transport provision in Dublin. This includes new suburban rail lines notably to Navan and Dublin Airport as well as radial lines and a Western orbital line, new stations including a new centre city station, new city centre underground sections, electrification of existing suburban lines, and extensive further light rail (Luas) lines.

- New suburban rail lines outside Dublin, including the Midleton-Cork project and the construction of a Western Rail Corridor involving a new line, which would serve *inter alia* as a Galway suburban line, on the alignment Athenry to Claremorris. No line or station closures or withdrawals of service in the provincial rail system are envisaged.

5.1.2 PRIORITIES FOR THE NEXT PLAN

The potential capacity of the civil construction industry, addressed earlier in this report, is a factor in assessing the scale of investment which can be undertaken in the various economic sectors, including the transportation infrastructure. So too are the merits of the individual projects making up the transport programme. All projects with a capital cost in excess of €30m must be appraised in accordance with the February 2005 Department of Finance guidelines.

The long-run goals of policy in relation to transport infrastructure, whether provided directly by organs of the State or through private investment, ought to be to;

- Ensure that optimum use is made of infrastructures, not just of new facilities constructed as part of the programme but also the extensive networks of existing infrastructure assets and vehicles, and with due attention to environmental objectives, particularly the minimisation of harmful emissions. Optimum use in this context requires close attention to congestion and to the incentives for
users, through the structure of taxes and charges, to reduce congestion-creating behaviour.

- Ensure that, given the system of user charging, the best choices are made regarding transport investment.

Sub-section 8.4 below considers the issues of optimum usage, including taxation and pricing issues. The next National Development Plan will address directly the second of these concerns, that is, the identification of investment priorities. In this sub-section, we wish to discuss in broad terms the considerations affecting the selection of priorities in the principal sub-sectors of the transport network. This needs to be done against a background where the current pattern of transport usage is known to be sub-optimal, since the structure of taxes and charges does not incentivise the user to minimise congestion and other externalities. A comprehensive discussion will be found in Kain (1999).

Airports and Commercial Seaports

It is established Government policy that the principal commercial air and sea ports should no longer be recipients of State funding for capital works, and that they should be financed, as to both operating and capital costs, by charges to users. We endorse this approach, which internalises the costs and also provides market signals to guide investment.

The Government is embarked on a strategy which will split the former Aer Rianta into three distinct entities operating Dublin, Cork and Shannon airports. This mirrors the position which already obtains in the commercial seaport sector, where the main ports are State-owned but distinct. These measures are designed to maximise the degree of competition between sea and airports, and to ensure that their finances are transparent. Any moves toward consolidation in the commercial seaport sector in Ireland (including Northern Ireland) should be subject to review by the competition authorities.

We are aware that there are pressures from time to time for new regional airports around the country. Every region of Ireland is now served by a national or regional airport, and the Government, through the Department of Transport, subsidises regional air services, and thus indirectly the regional airports, to the tune of approx. €15m. per annum. Capital grants continue to be available to them also.

We recommend that any pressures which may emerge for new regional airports should be resisted. Moreover it is important that Government should subject requests for capital subvention from existing regional airports to the same project appraisal procedures as are applicable to other transport projects.
Mainline Rail Investment

In its transport policy statement *Transport 21*, the Government has listed a range of mainline rail improvements, additional to the significant spending on track, stations, rolling stock and signalling already undertaken or under way.

None of these projects has, we understand from the Department of Transport, as yet been subjected to economic appraisal as required by the Department of Finance guidelines.

It is important that the most cost-effective public transport technology is chosen for each route. Bus-based alternatives are available in all cases, and will often offer higher frequency than train-based schemes for the same overall volume, better ability to penetrate target markets, as well as lower capital and operating costs. It should be a requirement that appraisals of public transport investments be technology-neutral, assessing bus against rail options, with due allowance for the strengths and weaknesses of the two technologies. The practice, as in the Booz-Allen-Hamilton Strategic Rail Review, of comparing rail projects only with other (Do-Minimum or Do-Nothing) rail alternatives runs the risk of overlooking superior bus-based projects, should such exist.

For example, on short suburban routes such as Midleton to Cork, a fleet of approximately five buses will deliver the same daily capacity as a DMU twin-set, at a modest penalty in terms of speed and with a considerable superiority in terms of frequency. This is not to argue that the bus-based option is self-evidently superior, but only that it should be explicitly included in the analysis.

We recommend that, in the evaluation of all fixed-line public transport investments, whether mainline or urban/suburban, a bus-based alternative be included as a matter of routine in the range of options considered.

Urban and Suburban Rail Projects

The proposals for Dublin involve a decisive preference for fixed-line as against bus-based technology. In view of the well-documented tendency of both population and employment to sprawl away from the traditional city core with consequent suburb-to-suburb, as distinct from radial, commuting, the traffic potential for the lines proposed is critical. The total anticipated capital cost of the Dublin fixed-line system, at €11.5 billion, makes this by far the largest single project ever proposed in Ireland. We consider that the economic appraisal process for this project and its components represents an enormous challenge, and we discuss how this task might best be approached in Section 8.4.2 below.
Suburban rail construction is also proposed for Midleton to Cork and Claremorris to Athenry and Galway. In both cases, the economic analysis will need to contrast the rail proposals with bus-based alternatives. We note that no economic appraisal of the project was commissioned by the Expert Working Group on the Western Rail Corridor, whose terms of reference included consideration of ‘The costs and benefits of the proposal and options for its phasing, should such a strategy be adopted’.

The Expert Group’s report contains capital cost estimates, with the Ennis to Claremorris section put at €168m. But there is no quantification of operating costs, traffic, nor of overall project benefits.

(Expert Working Group on the Western Rail Corridor Report (2005)).

**National Primary Roads**

We are in agreement with the priority accorded in *Transport 21* to the completion of the National Primary route system to standards adequate for predicted traffic volumes. We reiterate the concerns expressed in the *Mid-Term Review* of the 2000-2006 National Development Plan that care should be taken to ensure that road design be matched to potential traffic volume in a manner designed to eliminate risks of excess provision of capacity or level-of-service.

(Additional material will follow meeting with NRA).

**National Secondary Roads**

The National Secondary routes, numbered N51 and upwards in the road classification scheme, serve mainly non-radial routes around the country, with traffic volumes distributed across a wide range. This network consists almost entirely of undivided two-lane roads of varying quality. There have been extensive improvements on certain routes but there are also numerous unimproved sections. Some sections show traffic volumes below 2,000 vehicles per day, but others reach 10,000 and above.

The National Secondary network is a critical component in the overall road infrastructure, and is particularly important in serving and connecting the smaller market towns to one another and to the bigger centres served by the National Primary network. We recommend that a specific and comprehensive programme of National Secondary road improvements should be included in the next National Development Plan.

We note from the documentation accompanying *Transport 21* that certain National Secondaries have been identified as priorities for improvement. These are;
- N52 Dundalk-Mullingar-Tullamore-Birr-Nenagh
- N80 Tullamore-Portlaoise-Carlow-Enniscorthy
- N61 Athlone-Roscommon-Boyle
- N56 Donegal-Letterkenny coastal route
- N59 Mayo-Galway coastal route
- N67 Clare coastal route
- N69 Limerick-Tralee and N86 Tralee-Dingle
- N70 Ring of Kerry
- N71 West Cork coastal.

The decision process leading to these choices has not been detailed in the Transport 21 documentation, and we would note that certain routes not included (such as the N62 North-South route through the Midlands, from the N8 Dublin-Cork road at Horse and Jockey through Thurles-Templemore-Roscrea-Birr-Athlone) cater for substantially higher traffic volumes than certain of the coastal routes which have been selected. It would be valuable to know the basis on which prioritisation of National Secondaries for Transport 21 has been undertaken.

Non-National Roads

The National Primary and National secondary networks are the responsibility of the National Roads Authority which reports to the Department of Transport. Many roads classified as R (Regional) roads, and some classified as C (County) roads carry substantial volumes of traffic, particularly in the East of the country. These roads are the responsibility of the local authorities, and are financed through block grant and also through certain centrally formulated programmes, all administered by the Department of Environment, Heritage and Local Government. Expenditure on non-national roads under all headings is currently running at approx. €500m. per annum. In many cases, roads classified as Regional roads, and in some cases even as County roads, carry traffic volumes well in excess of the less busy National Primary and Secondary roads.

In the context of a review of road classification or otherwise, we recommend that consideration be given to the transfer to the Department of Transport and the NRA of responsibility for the busier non-national routes.

Finally, should the Government opt at some future point for a pay-as-you-drive system of road user charging nationally, something we
believe it is now opportune to consider, this would have implications for the national route systems, and a review of the Road Needs Study would be desirable in that context.

Provision of Bus-Stations and Intermodal Stations

Provincial long-distance bus services, including those operated by private companies as well as by the CIE Expressway unit, carry passenger numbers comparable to the numbers carried by mainline rail. Further liberalisation of the market is contemplated, and the end-to-end journey times are beginning to benefit as major road schemes are completed. There has been only limited investment in bus station facilities in many towns and cities. We believe that a national review of bus and intermodal station (bus/rail) opportunities, including proper provision of taxi ranks at all major termini, would be worthwhile. A seamless transport system is promoted by intermodality, and taxi service is a key supplementary complement to the long-distance bus or rail offering. It is unfortunate that taxi service at Connolly has sustained collateral damage as a result of the Luas construction, and a cohesive overview at national level could be beneficial.

5.1.3 SUPPORTING MEASURES

Transport infrastructures have several distinctive features from the economic standpoint, and these have lead for calls to reconsider the manner in which the use of these infrastructures is charged for. These features also affect the manner in which investment appraisals should ideally be conducted.

Paying for Transport - Taxes and Charges

The road network in particular is free at the point of use, excepting only a small number of point tolls and the fuel tax which, while a user charge, is only tenuously related to economic or social costs of road use. This means that the congestion externality is not properly charged for, and hence that, especially in cities, road space is under-priced. The amount of congestion generated is accordingly in excess of the social optimum. In virtually all economically advanced countries, the policy response has been to subsidise public transport, which results in a situation where all modes of vehicular urban transport are too cheap, especially at peak. The result is extensive peak-time congestion, and public demands for capacity expansion to meet peak demand.

Even in the absence of externalities, it is not economically rational to expand capacity to eliminate peak congestion, especially where peak usage is inadequately priced. To do so liberates currently suppressed demand, and can make the peak sharper, as the peak-spreading effect of current congestion is diluted. Since peak users are not faced with the full economic and social costs they impose,
peak demand is not a real indication of the level of activity that should optimally be catered for. Procedures, including cost-benefit-type calculations, which take the existing pattern of demand, or extrapolations there from, as an indication of need to be met, accordingly run the risk of recommending excessive investment in peak-time capacity. An analogy would be a sports stadium proprietor who priced the most attractive fixture of the year at the same price as all others, and who proceeded to expand capacity to meet this supposed level of peak ‘demand’. The result would be expensive, but idle, additional capacity, the result of a perverse pricing rule.

In many areas, including components of the transport system, there is resort instead to peak-load pricing, for example in parking charges differentiated by city zone, time of day and day of the week. Transport operators also practise peak-load pricing, through, for example, higher air and train fares at busy times such as Friday or Sunday evening. This peak-load pricing permits operators to avoid the heavy capital and operating costs of idle fleets and crew, unnecessary outside the relatively infrequent peaks. The same principle applies to the calculation of optimal capacities for transportation infrastructure.

There is however a further and important feature of these infrastructures when access is free, or under-priced, at the point of use. At peak, when the system is congested, each additional user imposes delay costs on other users which he or she is not required to take into account. This is the congestion externality, and is distinct from, and additional to, the peak-load pricing question. There are of course other externalities, including atmospheric emissions. Economists have long recommended that the use of transportation infrastructures should be charged on a user-pays basis, with charges reflecting all externalities including peak congestion, a recommendation which has been taken up in only a handful of cities around the world.

The reluctance to embrace user charging for roads has been due in part to concerns about the distributional impact – there would necessarily be winners and losers. But technologies to implement efficiently anything beyond crude approximations such as flat cordon fees, area licenses or point tolls have until recently been unavailable. Technologies which would make highly sophisticated charging systems feasible at affordable costs are now believed to be imminent, involving Global Positioning Systems and smartcards in vehicles. The UK Government has recently announced its intention to explore a nationwide pay-as-you-drive charging system to replace most existing motoring taxes. The time horizon to implementation could however be a decade or more. It is worth spelling out in some detail what might be involved if a similar departure were to be contemplated in this country.
The Irish system of taxation on private motoring and on commercial road vehicles has three components:

- Purchase taxes, in the form of the two-rate ad valorem Vehicle Registration Tax and Value Added Tax;
- Annual circulation taxes differentiated by vehicle type and size (commonly referred to as ‘Road Tax’; and
- Fuel Excise Duties, differentiated (to a limited degree by fuel type).

The purchase taxes consist of the ad valorem Vehicle Registration Tax, paid once on new cars. To the resultant price is added VAT at the so-called standard rate of 21%. This is actually the highest of four VAT rates, the others being 13.5% and the Exempt and Zero rates. This is the procedure for the tax calculation. To the pre-tax price is added VAT at 21%. To this is added the VRT, at 22.5% of the final price for cars up to 1400cc, at 25% for cars in the range 1401 to 1900cc, and at 30% for cars of 1901cc and upwards. A new mid-range saloon of 1800cc, costing €25,000 retail, would have the price made up as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-tax Price</td>
<td>€15,496</td>
</tr>
<tr>
<td>VAT at 21% of Pre-Tax</td>
<td>€3,254</td>
</tr>
<tr>
<td>VRT at 25% of Final Price</td>
<td>€6,250</td>
</tr>
<tr>
<td>Final Price</td>
<td>€25,000</td>
</tr>
<tr>
<td>Tax as % of Pre-Tax Price</td>
<td>61.3%</td>
</tr>
</tbody>
</table>

Table 5.2: Purchase Tax Build Up on a New Car

Source: Calculated from information on Revenue Commissioners’ website.

Total purchase taxes work out at €9,504 for this example, corresponding to a tax mark-up of 61% on the pre-tax price. A portion of this purchase tax should not however be regarded as a tax on motoring, but rather as a part of general indirect taxation. We take this portion to be about 15%, roughly the average rate of VAT. Thus this particular motorist is paying €25,000 instead of €17,820 (not the tax-free price of €15,496) for the new car, and the motoring component comes out at €7,180 in specific ‘motoring’ tax under this heading. Over an expected ten-year life for the vehicle, the motoring tax component would work out at €718 per annum out of the €950 per annum total tax take. The rest is deemed to be ordinary, non-motoring tax levied on goods in general.

Annual Road Tax is more straightforward. For cars, the rate at 1001cc is €227, rising to €1343 above 3 litres. For the 1800cc model assumed above, the annual charge is €484. All of this amount can reasonably be seen as constituting a specifically ‘motoring’ tax.

Finally excise duty on fuel is levied at the rate of €442.58 per 1,000 litres of unleaded petrol, and 21% VAT is then added. Thus
unleaded petrol costing €1.05 per litre at the pump has a price build-up as shown in the Table 5.3.

**Table 5.3: Price Build-Up for Unleaded Petrol in cents**

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<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Pre-Tax Price per litre</td>
<td>42.52</td>
</tr>
<tr>
<td>Excise per litre</td>
<td>44.26</td>
</tr>
<tr>
<td>VAT at 21%</td>
<td>18.22</td>
</tr>
<tr>
<td>Final Price</td>
<td>105.0</td>
</tr>
<tr>
<td>Tax as % of Pre-Tax Price</td>
<td>59.5%</td>
</tr>
</tbody>
</table>

Source: Calculated from information on Revenue Commissioners’ website.

Total tax is 62.48c per litre. Again, a portion of this fuel tax should be taken as part of general taxation, rather than as a specific imposition on motoring. We compute the motoring element as 57.28c, allowing for a presumed average VAT rate at 15%. The next part of the motoring tax calculation requires an assumption about average annual fuel consumption, and we take this to be 1,500 litres per annum (corresponding to 15,000 kilometres, a modest mileage) for our mid-saloon driver. This would give an annual tax take on fuel which could be regarded as a ‘motoring’ tax of €859.

The total of all three taxes paid each year by this illustrative motorist comes to €2,371. However we have chosen to regard the slightly lower figure of €2,061 as corresponding to ‘motoring’ taxes. Motoring lobby groups who draw attention to the substantial tax revenues from these sources tend to quote numbers corresponding to the higher of these two figures, failing to allow for an average VAT rate on cars and fuel. The annual ‘motoring’ tax payment we have calculated for this illustrative motorist needs to be seen in the light of the enormous levels of State expenditure on road construction, maintenance and policing, and there can be no presumption that the overall tax figure is necessarily excessive.

Finally we need to add a small item as an estimate of direct payments by motorists for road use in the form of tolls and on-street parking charges. (Off-street charges are not relevant). Total tolls and relevant parking charges we believe now exceed €200m per annum, with most of this sum collected in the East region. We estimate that €50 per annum would be a reasonable estimate for the illustrative motorist. The overall picture is thus
For the privilege of clocking up 15,000 kilometres, this motorist would pay €2,111 per annum, corresponding to a charge of 14.1c per kilometre. Thus for a 15-kilometre return daily commute, the motorist pays about €4.32 in motoring taxes. But the largest portions, 57%, are actually fixed taxes, invariant to road use. Moreover only the tolls and parking fees correspond to a form of peak or congestion charging. Fuel taxes are invariant to time of day, day of week or traffic intensity on the road chosen, and approximate only very poorly to an optimal tax.

Thus while our hypothetical motorist is paying significant taxes and charges, these are either fixed, and thus achieve no policy objective beyond the raising of revenue, or are (aside from the small element of tolls and parking fees) only poorly related to an economic charge for road use. If all of these taxes could be turned into pay-as-you-drive charges, targeted at peak usage of congested routes, the effect on driver behaviour, and hence on peak demand and capacity requirements, could be dramatic.

We recommend that current road tolling plans should be seen as preparatory to the ultimate introduction, subject of course to technical and economic feasibility, of countrywide pay-as-you-drive charges as the principal form of road user charging in Ireland.

This would permit, we believe, the abolition of VRT and of annual vehicle license fees. It is possible that fuel taxes could also be reduced, and that all existing point tolls would become unnecessary. Most importantly, a system of this type would reduce peak demand sharply through bringing private and social costs into line. An immediate result would be a reduction in the capacity requirement of the system, and a move away from the current wasteful provision of capacity to cater for socially sub-optimal traffic peaking.

In their report on demand restraint options, Booz, Allen, Hamilton (2004) consider inter alia a system of traditional cordon charging for Dublin. We believe that a more radical review of emerging technology options would be a valuable supplement to their work.
Project Appraisal of Transport Investments

The Department of Finance guidelines require that a post-project analysis be undertaken whenever a major project is completed.

We recommend that a high priority should be given to the prompt completion of comprehensive post-project analyses of all major projects.

Particularly where large once-off projects are concerned, a premium must be placed on whatever lessons can be learned from Ireland’s own experience. However we understand that no post-project analyses have in fact been undertaken. An analysis of Luas is due to commence shortly, and it ought, in order to inform the analysis of future light rail schemes, include a post hoc cost/benefit analysis, as well as a review of the ex ante evaluation studies undertaken on the original light rail schemes during the 1990s. Any lessons available would be invaluable going forward. As soon as practicable, a similar exercise should be undertaken with the Dublin Port Tunnel, in view of the presence of further Dublin Tunnel projects in Transport 21.

Baseline Traffic Flows Sub-optimal

In the project appraisal of urban public transport projects, it is important, in preparing traffic forecasts and other ingredients in the quantification of benefits, to acknowledge the non-optimality, from the social standpoint, of current measures of peak traffic. Thus an approach which measures and extrapolates current road congestion, seeks to eliminate or mitigate it through allocating new rail or other capacity to cater for the resultant traffic levels, is attributing benefit to the reduction of congestion which ought not to be targeted at all. This is the consequence of current mispricing and resultant non-optimality of peak flows. These concerns are not always properly reflected in cost benefit appraisals.

The Compound Project Problem

A further concern revolves around the mixture of traffic management and new construction components in the Dublin proposals. Traffic forecasts appear to be based on the presumption that extensive road pricing and similar measures will be taken, resulting in a ‘push’ factor towards public transport and higher patronage levels for the new facilities to be provided.

It is important to understand that the project being analysed is now a compound project, either of whose components could be undertaken separately. In particular, since we know that current pricing, for peak time road access in particular, is too low, and quite likely far too low, demand management measures such as road
pricing constitute a policy option which can be seen as an alternative, rather than as a complement, to capacity expansion.

The logical sequence in which to proceed with an economic evaluation in these circumstances is to consider first the component (road pricing) which addresses directly the weakness of current arrangements and the source of congestion, namely under-priced access to the road system. Having designed and modelled a suitable road pricing scheme which accounts for congestion and environmental externalities, and which also serves as a peak-load pricing instrument, the analyst can be more confident that the predicted (and, at peak, lower) traffic flows which result are the ones which it is socially optimal to cater for. The alternative suburban rail, light rail or bus public transport options should now be evaluated as projects incremental to the road-pricing component. Not to do the analysis in this way runs the risk that the benefits computed for the compound project are erroneously attributed to its elements. A specific risk is that the infrastructure components get credited with benefits, which actually flow from the pricing measures.

This separation of compound projects is an essential requirement of cost-benefit analysis, and the analyses of Dublin proposals in particular ought to be required to take account of this.

The Cost-Benefit Task

The analytical cost-benefit task to be undertaken in connection with Transport 21 is daunting, and will need to be adequately resourced. The programme envisages in excess of €30 billion in capital projects, many of them exceedingly complex and requiring extensive and technically challenging modelling of project benefits. Capital cost estimation has proven difficult with major projects undertaken in Ireland in the recent past, and greater credibility for capital cost estimates will require intensive analytical work too. We believe that the scale of cost-benefit work required to meet the Department of Finance guidelines in connection with Transport 21 exceeds anything which has been contemplated in this country up to now.

We are aware that the Department of Transport has engaged advisers who have begun preliminary work on evaluation methodologies. In view of the size and complexity of the evaluation task,

We recommend that the Department of Transport should prepare a Project Appraisal Plan for Transport 21, detailing the procedures and quantifying the resources that will be required.
The Department of Finance must oversee compliance with its guidelines, not just in connection with *Transport 21* but throughout the Public Capital Programme.

The Department of Finance should ensure that it has adequate technical economics resources to oversee compliance with its Capital Appraisal Guidelines.

In the Mid-Term Review of the 2000-2006 NDP, we discussed the conduct and quality control of project appraisals, and considered what might be the best institutional arrangements for carrying them out. We drew attention in particular to the difficulties, which may arise where appraisals are carried out by, or commissioned from consultants by, the project promoters.

In order to ensure consistency across the diverse constituents of the Public Capital Programme, and bearing in mind the pressures on Departments and State agencies asked to evaluate projects to which there is already (and arguably premature) political commitment, we favoured a single centralised unit, possibly based in the Department of Finance, charged with the task of undertaking the cost-benefit studies. This remains our advice. If the Government wishes to delegate this function to line Departments or to State agencies, such as, in this instance, the Rail Procurement Agency, the Dublin Transportation Office, Irish Rail or the National Roads Authority, there remains a requirement to ensure comparability and consistency in technical approach and generally to ensure that the studies are technically competent and in compliance with Department of Finance requirements. Thus the Department of Finance, even should the conduct of these studies be delegated, will still need to ensure that it has adequate technical resources in this area.