

Social Audit and Australian Transport Evaluation

Report

This Report covers the interpretation of the social audit concept, the methodology for its application and potential areas of application to Australian transport. The Report also considers possible guidelines and proposals for promoting the social audit approach.

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Social Audit and Australian Transport Evaluation



Transport

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FOREWORD

In July 1983, the Minister for Transport, the Hon. Peter Morris, M.H.R., directed the Bureau of Transport Economics to undertake a detailed study of the use of social audit as an evaluation procedure and its application to Australian transport issues.

This Report covers the interpretation of the social audit concept, the methodology for its application and potential areas of application to Australian transport. The Report also considers possible guidelines and proposals for promoting the social audit approach.

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SUMMARY

The Commonwealth Minister for Transport has proposed the application of 'social audits' to Australian transport issues. The Minister has described social audits as being akin to social cost-benefit analyses, but involving a greater emphasis on social and environmental impacts and distributional effects than has been common in past evaluations.

The Bureau of Transport Economics was asked by the Minister to undertake a detailed study of evaluation procedures appropriate to transport issues in Australia. The Terms of Reference stated that the study should cover the interpretation of the social audit concept, the methodology for its application, the potential areas of application to Australian transport, and the development of guidelines and other proposals for promoting its use.

A summary of the Bureau's findings follows.

Social audit should be regarded as a general evaluation procedure suitable for application to a range of industries and activities, but with particular relevance for transport issues, where the social impacts of decisions can be very important. It is not a new technique, but involves some development of existing methodologies and a change in emphasis.

The call for a methodology such as the social audit arose from a perception that existing evaluation procedures did not give adequate attention to the social, environmental and distributional aspects of policies. In addition, the results of many past evaluations were not seen to be in a form designed to facilitate public understanding, and so provide for growing public interest and involvement in decision-making.

In order to address these deficiencies, evaluation techniques need to aim at encompassing all major effects which substantially influence social welfare, including non-monetary and income distribution effects, provide a means for generating wide-ranging information on all impacts of proposals, and incorporate a method of presenting this information in an ordered and effective way.

Although traditional social cost-benefit analysis, properly practised, allows for, and in fact requires, the inclusion of all relevant social impacts, the importance of these is often overshadowed by the results of the extensive monetary calculations and the prominence which they tend to receive in the presentation of the analysis.

A review of evaluation practices adopted in Australia and other countries revealed a common trend to amend traditional cost-benefit analysis approaches to include elements of planning balance-sheet and multi-criteria analysis in the evaluation framework. These changes have clearly been aimed at broadening the analytical framework and overcoming the above deficiencies.

While much has been written about the virtues of one methodology relative to another, this study emphasises the basic similarity that exists between the various methods in use, and the scope for using aspects of several techniques to best meet the objectives of a particular evaluation. It also notes that adequate and accurate information will usually have a more important bearing on the outcome than the choice of technique.

Overall however, social cost-benefit analysis with planning balance-sheet presentation is the general approach which it is felt comes closest to providing an

appropriate format for the application of social audit procedures in Australia. It preserves the disciplined approach to evaluation of social cost-benefit analysis, while providing scope for the full exposition of a wide range of non-monetary effects and distributional impacts. In so doing, it tends to offset a possible bias in many evaluations which highlight a single benefit-cost ratio based on those effects typically measured in monetary terms.

Because different projects have an impact on different groups and have wide-ranging effects, planning balance-sheets are likely to vary considerably from case to case, and no unique format can be described. However, a check-list of effects and affected parties based on a consideration of objectives of transport policy has been prepared as a broad guide in the preparation of planning balance-sheets for project appraisal. This list will need to be expanded and refined with experience in particular areas of evaluation.

The use of a predetermined set of weights in the evaluation to assign values to objectives or effects which cannot be compared in monetary terms does not appear generally desirable. While this may allow a more precise indication of the extent of goal achievement and greater consistency of treatment of some effects, it is considered that in most cases, the assessment of the relative importance of monetary and non-monetary benefits and costs requires judgment which most appropriately rests with the decision-maker rather than the analyst.

Constructive public participation can provide a valuable input for social-audit type evaluations, and an effective contribution to political decision-making. However, care is needed to ensure that participatory processes do not involve costs and delays which may not be warranted in terms of the benefits to be gained from more accurate information and a more informed public.

There are a number of avenues open to the Commonwealth Government for publicising and initiating the application of social audit procedures. These include consultation with groups involved in the transport field, and use in the Commonwealth's own direct sphere of responsibility. The Commonwealth's area of responsibility however, spans only a small segment of total transport decision-making. In addition, these studies may involve substantial costs, especially where public involvement is considerable, and will not necessarily be justified by the gains to flow from improved decision-making. Preliminary studies may be required to determine whether comprehensive social audits are justified.

American experience suggests that strong political support and legislative backing may be required to ensure a desired level of commitment to social impact assessments. Otherwise, while they may allow a better informed public to be more effectively involved in the political process, they may be resisted by public agencies responsible for transport operations and ignored by decision-makers.

Increased use of social audit methodology is likely to be a gradual process where reliance is placed on persuasive means to encourage its application. The alternative would be some kind of mandatory approach such as making social audit evaluations a necessary condition for Commonwealth specific purpose grants. Difficulties exist with any attempt to introduce mandatory requirements, although these have been applied consistently in other countries for some time.

The social audit approach is directed towards a more comprehensive evaluation of a wider range of effects than has been included in practice in many assessment processes. It is not clear whether the increased costs of such evaluations will be justified by benefits, and it is probable that the form of analysis used will reflect the nature of the project and the likely magnitude and type of its effects. A key influence is likely to be the extent of public demands for greater involvement in transport decision-making.

CHAPTER 1—INTRODUCTION

In July 1983, the Commonwealth Minister for Transport, the Hon. Peter Morris, M.H.R., directed the Bureau of Transport Economics to undertake a detailed study on the use of the 'social audit' as an evaluation procedure and its application to Australian transport issues.

The Terms of Reference stated that the study should cover the interpretation of the social audit concept, the methodology for its application, the potential areas of application to Australian transport, and the development of guidelines and other proposals for promoting its use.

THE ROLE OF EVALUATION PROCEDURES

The function of an evaluation procedure is to assist in the decision-making process by providing a standardised method of analysis which can be applied to a particular proposal or to a number of alternative proposals to determine their worthiness according to some predetermined set of criteria, or to allow them to be ranked in order of preference.

A number of recent developments in the social and political environment has given rise to some concern as to the adequacy of the existing decision-making process in transport and other areas of major social impact.

These developments include:

- increasing recognition of the complex effects of many investment decisions and the lack of a clear economic mandate (for example, due to conflict between commercial objectives and community service obligations);
- the slower rate of economic growth, and hence the need for greater selectivity and more emphasis on the determination of priorities;
- the pressures for smaller government, reflected in the tighter market for public finance for transport and competing expenditures, in increased demands for greater accountability of public transport enterprises or in calls for their privatisation, and in moves towards less government regulation of transport activities;
- demands for greater emphasis to be given to social and environmental issues; and
- greater demands for public participation in the decision-making process and for the presentation of technical evaluations in a manner understandable to the public.

This concern has been manifested, in both Australia and overseas countries, in reviews of the decision-making process and in particular of the evaluation procedures which are part of that process.

In Australia, there has been a number of important initiatives in national evaluation procedures. This includes the Economic Summit in June 1983 and the establishment of the Economic Planning Advisory Council and new Industry Advisory Councils. In addition, the 1983–84 Budget introduced procedural reforms aimed at improving the efficiency of budget outlays, by providing more information to Parliament and to the public to facilitate real debate on economic policy, by continuing examination and review of Government programs, and by requiring Ministers to include, where possible, information on the impact of their proposed legislation on industry and other sections of the community.

The idea of the social audit as an evaluation procedure is related to these initiatives. Its key characteristic is that it should contribute to improved decision-making by ensuring that in the evaluation of alternatives, information should be sought on, and full consideration given to, all major effects that influence social welfare, including non-monetary and income distribution effects as well as those which can be measured in monetary terms.

A social audit might therefore be contrasted to a traditional financial audit, in that whereas the latter provides a measure of financial performance, a social audit would attempt to measure 'social performance'.

The decision-making process, ideally, involves a number of steps:

- identification of objectives;
- determination of alternative means of achieving objectives; and
- selection of the alternative or combination of alternatives which best contributes to the achievement of the stated objectives.

This process involves extensive information gathering to ascertain which alternatives are available and to determine the impacts of these alternatives and hence their effect on goal achievement.

Evaluation procedures are required for the assessment of alternatives, and some methodologies include goal specification as an inherent part. These procedures are discussed in Chapter 2. They include financial analysis, cost-benefit analysis, cost-effectiveness analysis, goals-achievement analysis, multi-criteria analysis, planning balance-sheet analysis, and cost-benefit analysis with planning balance-sheet presentation.

These techniques are all concerned with balancing the benefits and the costs of proposals in some way, to determine that with the largest net benefit. However, the range of benefits and costs considered differs according to the interests involved. A financial analysis is confined to benefits and costs of the firm, whereas social cost-benefit analysis attempts to determine net benefits to society as a whole. Some methodologies rely on market prices, others attempt to establish the cost of resources involved where these differ from market prices. Some rely more heavily on money measures than others, and some are designed to treat a broader specification of goals than others.

With the exception of financial analysis, the evaluation procedures are generally concerned with determining a desirable outcome from the point of view of society as a whole, and the main differences between the individual methods lie in the use of monetary values, the extent to which different impacts are separately treated (for example, employment or energy) and the treatment of distributional effects.

It is pointed out in what follows that accurate and comprehensive information and analysis based on consultation and the best available information are in fact more important than the choice of technique. Hence a social audit, if it is to constitute an improvement on other procedures, must provide the means for generating wide-ranging information on all impacts of proposals, and a method of presenting this information in an ordered and effective way.

APPLICATION TO TRANSPORT ISSUES

Social audit is a general evaluation procedure which can be applied to any industry or activity, but it is particularly relevant to transport issues where the social impacts of decisions are often of critical importance. This reflects two characteristics of the transport market. Firstly, due to externalities, monopoly elements, taxes and subsidies and constitutional conditions, a total reliance on market-determined values is not appropriate, and market values should not exclusively determine the type, location and quality of transport services. Secondly, the distributional or equity effects of transport decisions can be very important.

The Commonwealth Minister for Transport sees the use of a social audit methodology as an important element in fostering the development of efficient transport services in Australia.

He has indicated that a social audit should have the following important features (ALP 1983 and Morris 1982):

- it should be 'akin to a social cost-benefit analysis of projects and investments';
- social and environmental aspects of transport should be placed on a more equal footing with economic aspects; and
- the public, in particular transport users and employees, should be involved in the evaluation process to ensure that full social, environmental, economic and defence costs and benefits are revealed.

Key areas of potential application of the social audit methodology in the transport area appear to be for investment project evaluation, decisions with respect to output, pricing and cost recovery, or evaluation of regulatory and deregulatory proposals.

In general, the methodology would serve as a guide for resource allocation within the transport sector, in judging the merits or relative merits of solutions to various transport problems. These solutions may be short or long-term and may entail new investment or more efficient utilisation of existing resources, including reductions in services offered, regulatory changes, rationing, subsidies of production or consumption, price changes or variations in the method of charging for services.

ORIGIN OF THE SOCIAL AUDIT CONCEPT

The present interpretation of the social audit concept has little in common with the initial usage, which dates back to 1940.

Early social audits were concerned with measuring the social performance of individual business firms, and developed to report on a wide range of issues such as racial and sex discrimination, environmental practices, health, safety, labour training, philanthropic contributions, taxes paid, wage levels, productivity, and contribution to knowledge. These audits, however, were generally ad hoc, designed for public relations purposes or to provide managerial information, and the associated 'balance-sheets' did not indicate the 'net social value added' or 'contribution to society' by the enterprise concerned.

The term appears to have been first used in the United States by Kreps (Carroll and Beiler 1975), and most development has occurred in that country. This has been paralleled by developments in the measurement of market performance using concepts such as the competitive performance audit and the marketing audit. Other countries have also adopted the practice, and in France submission of social audits by firms has now become compulsory, though limited in scope principally to a report on staff employment and living conditions.

STUDY OUTLINE

Chapter 2, which follows, contains a review of transport evaluation practices in Australia and other countries, while Chapter 3 develops a possible methodology for a social audit. Chapter 4 considers the application of social audit procedures to two transport proposals, and Chapter 5 deals with the means of and problems associated with applying a social audit approach.

CHAPTER 2—PRESENT EVALUATION PRACTICES

There are two aspects of evaluation practices. The first relates to the procedures to be followed for the conduct of the evaluation, for example the procedures for deciding when an evaluation should be conducted, whether it should be mandatory, who should do the evaluation and at what stage of the decision-making process. The second aspect relates to the choice of evaluation technique employed.

This chapter first describes the main techniques which have been employed in economic evaluation studies. These techniques are general evaluation tools for assessing the costs and benefits associated with a proposed project or policy; they are not unique to transport studies.

The second part of the chapter examines the procedures adopted for transport evaluation studies in a number of overseas countries and in Australia, and the associated techniques employed. This outline of transport evaluation procedures is not intended to be comprehensive. Rather, it reports on general conditions and on some selected studies which appear to be indicative of current procedures in the countries concerned. It is primarily concerned with highway evaluation because that is the area where most recent studies have been undertaken.

Evaluation techniques have been the subject of thorough investigation in several overseas countries, particularly the United Kingdom. Considerable attention is therefore given to the United Kingdom assessment procedures, followed by briefer comments on the distinguishing features of procedures in other European countries and the United States. Though the formal mandatory evaluation procedures applied to transport in some countries have not been adopted in Australia, some comprehensive analyses have been conducted particularly by the Commonwealth Bureau of Roads and the Bureau of Transport Economics.

The final section of the chapter discusses factors affecting the choice of evaluation technique in the light of overseas experience with transport studies, and this provides a basis for developing an outline of a social audit methodology in Chapter 3.

EVALUATION TECHNIQUES

Formal evaluation techniques adopted include financial analysis, social cost-benefit analysis, social cost-benefit analysis with planning balance-sheet presentation, multi-criteria or multiple objective analysis, cost-effectiveness analysis (including analysis of useful values), and goals-achievement methods. These procedures have certain similarities, and actual practices may include combinations of method or aspects of more than one method. Only broad definitions are therefore appropriate and these are provided below, together with a description of the key characteristics of each approach.

Financial analysis

Financial analysis is an evaluation technique directed towards calculating the commercial profitability of an option. Benefits and costs to the firm accruing over the life of the proposal are frequently discounted to yield the present worth of the proposal. Alternatively the internal rate of return may be calculated: this is the rate which, if used as a discount rate, would make the present worth of the stream of benefits just equal to the present value of the cost stream.

The analysis takes no account of effects that do not bear directly on financial flows.

Social cost-benefit analysis

In contrast to financial analysis, social cost-benefit analysis attempts to determine the social worth, or the value to society as a whole, of particular proposals. It recognises that a policy may generate good or bad effects beyond those which accrue to the individual firm or decision-maker, and that the benefits and costs of a project from a social point of view may not be reflected in the market prices relevant for individual firms' analyses.

Hence all significant effects of a proposal should be included in social cost-benefit analysis, valued in monetary terms where feasible, and described in some other way where monetary values are not appropriate. If the social benefits are then found to be greater than the social costs, or alternatively, if the gainers from a proposal could compensate the losers and remain better off, then the proposal is judged to be efficient.

Social cost-benefit analysis has long been recognised as an important technique for the evaluation of transport issues, where the social implications of investment, pricing, and regulatory decisions frequently extend well beyond the supplier and purchaser of the transport service in question. These social implications arise in particular from the public goods nature of much transport infrastructure and the resulting absence of market pricing, and from the social costs associated with accidents, pollution and traffic congestion.

Social cost-benefit analysis is primarily concerned with the determination of economically efficient solutions, which by definition would permit an overall increase in economic welfare. Theoretically, it is less concerned with the distributional or equity effects of decisions; the criterion for efficiency being only that it should be possible for the gainers from a change to compensate the losers. In practice, however, analyses often include information on these effects where they are significant.

An outline of the procedures involved in social cost-benefit analysis is included in Appendix I.

Social cost-benefit analysis with planning balance-sheet presentation

Planning balance-sheet analysis is not a distinct evaluation procedure but a variation in the method of presentation of social cost-benefit analysis. Instead of describing intangible and incommensurable effects in the prose accompanying the cost-benefit arithmetic, planning balance-sheet analysis includes a statement of such effects in the same table as those for which monetary valuations can be established. It involves representation in matrix form of all the impacts of projects; there may be sets of tables for each impact and a summary table. The result for monetary items is shown separately, though monetarised items such as accident costs may also be represented in non-monetary terms, for example, number of deaths. No attempt is made to weigh the non-monetary benefits and combine them with the monetary benefits to provide a single value for the social worth of a project.

Planning balance-sheet analysis is of particular use in multi-sector studies where large numbers of groups are affected and the repercussions of proposals are wide-ranging. It provides those responsible for decision-making with a convenient summary of all information so as to permit greater consideration of those items which cannot be quantified or measured in common units. It also permits greater consideration of the distributional and equity aspects of proposals by emphasising the incidence of gains and losses on the various groups within the community.

The technique was developed by Lichfield and is described as follows (Lichfield, Kettle and Whitbread 1975):

The first task is to enumerate the various groups who play a role in establishing and running the various projects. These groups are collectively termed "producers/operators" and are listed vertically in balance sheet form. Each producer/operator

is, as far as possible, paired with the appropriate groups of individuals who will be consuming the goods and services generated by the projects. Each linked, or associated, pair of producers and consumers is considered to be engaged in either a notional or a real "transaction", whereby the former produces services "for sale" to the latter. These transactions are obviously not confined to goods and services exchanged in the market. They would extend, for example, to include visual intrusion imposed upon residential occupiers by the builders of an urban motorway. Thus the balance sheet aims at presenting a comprehensive set of social accounts. In addition to the "transactions", which embrace all outputs, estimates are made of the resource costs involved in generating the goods and services.

Multi-criteria analysis

Multi-criteria analysis, cost-effectiveness analysis and goals-achievement analysis are similar in many respects. Like planning balance-sheet analysis, they are designed to focus attention on distributional effects as well as on a range of non-quantifiable effects. The distinguishing feature of these approaches is that they generally involve prior identification of goals or objectives, and a ranking of projects according to the extent of goal achievement. Weighting schemes are frequently used to arrive at a unique solution; this allows the effects of assigning explicit values to different objectives to be identified.

Multi-criteria analysis involves a matrix presentation or cross-classification of projects and effects, which indicates the impact which individual projects have on the selected goals or effects.

The impacts may be represented in quantitative terms, for example, number of households affected, or may be shown by some kind of ranking of the projects, with respect to the chosen effects. This ranking may be in terms of Project A preferred to Project B with respect to particular effects, or scale rankings such as, 'good, bad or indifferent', 'positive, neutral or negative effect', or some number in a scale 1 to 5, as illustrated in Table 2.1. This table ranks two projects, A and B, according to their respective impact on household disruption, noise pollution and equity. The numbers may correspond to quantitative data, for example, '3' may represent 'between 50 and 60 homes disrupted', or may simply be a reflection of the seriousness of the impact in a scale where '1' corresponds to 'very bad', and '5' represents 'very good'. The numbers are not additive, unless the areas of impact are assumed to be equally important. Some analyses have adopted such crude weighting systems in an attempt to summarise the overall effects, or have done so by, for example, indicating the number of times Project A ranks more highly than Project B.

TABLE 2.1—ILLUSTRATION OF MULTI-CRITERIA MATRIX

Project	Project impact		
	Households disrupted	Noise pollution	Equity
Project A	3	1	5
Project B	2	2	4

Multi-criteria analysis has generally made less use of weights than similar methods, and has not always used defined goals, relying instead on a list of impacts. Where this is the case it is more akin to social cost-benefit analysis than to cost-effectiveness or goals-achievement analysis.

Cost-effectiveness analysis

Cost-effectiveness analysis requires the initial formulation of policy goals, such that the level of achievement of the goals can be revealed for each project. Presentation is again in matrix form, and as with multi-criteria analysis there are variations in procedure.

Monetary costs are identified, and contributions to non-monetary goals are recorded in terms of (ratio scale) achievement points. The goals receive a weighting, and an overall cardinal ranking of the options is obtained with respect to their contribution to the non-monetary goals.

A variant of this approach termed 'analysis of useful values', also assigns a weighting to the monetary values so that a single value or worth is estimated for each option.

The simple example in Table 2.2 describes a cost-effectiveness assessment for various ways of charging heavy vehicles for their use of the roads. Figures used in the table are purely illustrative.

TABLE 2.2—ILLUSTRATION OF COST-EFFECTIVENESS MATRIX

Pricing scheme	Objectives				Total points	Ranking
	Cost recovery (.3)	Efficiency (.4)	Equity (.2)	Administrative simplicity (.1)		
Fuel tax	3	2	2	1	2.2	1
Registration fees						
intrastate	3	1	2	2	1.9	2
interstate	1	1	1	2	1.1	4
Driver's licence	3	1	2	2	1.9	2

The pricing schemes are ranked in terms of achievement of the specified objectives on a scale 1 (poor) to 3 (good). The objectives in turn receive the weight shown in brackets, and the overall points score is then calculated to indicate the assessed value of each pricing option.

Goals-achievement analysis

Cost-effectiveness analysis might be regarded as a form of goals-achievement analysis which includes a variety of methods ranging from those using simple rankings and weighting systems to those with sophisticated performance measures and complicated weighting systems.

Perhaps the most sophisticated of these is the goals-achievement matrix developed by Hill (1968), which is distinguished by the attention given to equity considerations, and the rationale for selection and weighting of objectives. The objectives are derived from a set of ideals and are valued for their contribution towards these ideals. As regards equity considerations, the analysis records the incidence of gains and losses on community groups selected on the basis of some relevant criterion for assessing the justice of the proposals, and seeks to weigh these incidence effects according to community preference.

PROCEDURES IN OTHER COUNTRIES

United Kingdom

In the United Kingdom, as in other European countries, the area of economic evaluation in the transport field which has probably received the greatest attention is that concerned with trunk roads and motorways. The current methodology applied to this area in the United Kingdom encompasses many of the key aspects which appear relevant for social audits and it is therefore discussed in some detail.

The United Kingdom Department of Transport stated in 1980 (DoT 1980, p.9) that three factors were important in making decisions about roads:

- the way a scheme contributes to the economy
- the environmental effects
- the way people feel about the scheme.

The standard cost-benefit analysis evaluation methodology then in use in the United Kingdom was seen to be deficient in providing information on these points and dissatisfaction from various quarters led to an inquiry into methods of trunk road assessment. This inquiry was conducted by the Advisory Committee on Trunk Road Assessment chaired by Sir George Leitch, which reported in October 1977 (ACTRA 1978).

The inquiry led to recommendations which have now been assessed and put into practice. The result is an assessment procedure which is probably best described as a planning balance-sheet presentation of social cost-benefit analysis, although it contains aspects of multi-criteria analysis. It relies heavily on formalised public participation procedures to supply information on socio-economic impacts, and to assist policy-makers in understanding and valuing community desires and aspirations, and hence in establishing corresponding sets of values.

The dissatisfaction with former motorway assessment procedures resulted from a number of factors.

- Difficulties were being experienced by laymen and decision-makers in understanding the cost-benefit analysis studies.
- There was concern that a single cost-benefit analysis result in the form of a benefit-cost ratio or a net present value tended to receive undue weight compared with supporting detail on non-monetary effects.
- A tendency existed for the cost-benefit analysis to involve extensive detail, lengthy preparation and often high cost, and to give the impression that the factors covered by the cost-benefit analysis were worthy of such detailed investigation, whereas those which remained for qualitative comment and were given less attention, were in fact less important.
- There was growing interest in and concern over environmental and social issues generally, and also over the possible incorrect valuation of certain economic effects which could have an important bearing on the cost-benefit analysis results, for example energy and employment effects.

The Leitch Committee, in addressing these issues, considered the suggestion that assessment procedures might be simpler and more democratic if the formal cost-benefit analysis evaluation procedures involving monetary aggregation of benefits and costs were dropped altogether. The Committee rejected this suggestion and concluded that the formal cost-benefit analysis approach

is an appealing, rational and defensible way of simplifying complex problems. Where it is impractical to obtain values in this way, we believe that it is nonetheless good discipline to quantify the effects in whatever units are appropriate, and thus reduce the number of arbitrary value judgments which would otherwise need to be imported into the assessment. We therefore conclude that a formal appraisal, where possible, is in principle desirable. (ACTRA 1978, p.90).

The Leitch Committee established the following criteria for an adequate assessment procedure:

- it should be generally comprehensible to the public and command their respect;
- the public should be able to identify how different groups of individuals would be affected by the scheme;
- it should be comprehensive in terms of the different kinds of effects of the road scheme;
- it should allow effective control of decentralised minor decisions;
- it should not be expensive to use; and
- it should balance costs and benefits (however described) in a rational manner, (ACTRA 1978, p.91).

Concerning the second criterion, the Committee wrote:

the assessment should recognise the different groups of people affected by the scheme. This is no easy task. Those immediately affected by the scheme may not be the people who eventually benefit or suffer. A lorry driver may benefit from a road scheme through time savings (initial incidence) but some of that benefit will normally accrue to his employer through increased productivity, and will eventually pass into the economy in general (final incidence). This diffusion makes it important to avoid counting one effect several times. It is necessary to choose one incidence level and work to this throughout. The initial incidence level is the clearest and easiest to understand, although it inevitably implies a narrow definition of group interest.

We believe that, to be comprehensive, the assessment should take account of the effects of a scheme on five initial incidence groups:

- (a) road users directly affected by the scheme, who are concerned over the whole network to reduce accidents, save time and vehicle operating costs, and perhaps to increase their general comfort and the attractiveness of the view from the road;
- (b) non-road users directly affected by the scheme, including occupiers of land and buildings adjacent to the route, whose objective is to minimise the environmental disadvantages it might entail whilst ensuring that any associated benefits are maximised. For example this group clearly includes those on a route which is by-passed affected by reduced traffic levels as the result of a scheme;
- (c) those concerned with the intrinsic value of the area through which a scheme passes, whose concern is that it should disturb that area as little as possible or in some cases—for example an area of industrial dereliction—actually enhance it;
- (d) those indirectly affected by a scheme, whose concern is with its general land use effects, with resource consumption and with its effects on other modes of transport; and
- (e) the financing authority—whose objective in this context is to ensure that the best possible programme is completed at the least net cost to public funds.

Current techniques of cost benefit analysis recognise many of the effects on road users, and on the financing authority, and trade off their interests. The other three groups have so far received less attention, although many of the effects on non-road users directly affected by a scheme are considered using the techniques we have described in Chapter 5. (ACTRA 1978, p.91).

The Committee went on to recommend that some form of multi-criteria analysis would be most appropriate to fulfil the established criteria, and included an example of a framework which they believed would provide for adequate assessment procedures. It was intended for use both for deciding between options within a scheme (for example, alternative routes for a town by-pass) and for deciding whether a scheme should be implemented and, if so, its relative priority.

The Committee concluded:

Whilst current methods of scheme appraisal, based on COBA¹, are sound as far as they go, we believe the assessment to be unbalanced and we suggest a shift of emphasis in the whole approach. It is unsatisfactory that the assessment should be so dominated by those factors which are susceptible to valuation in money terms, and we believe it to be inadequate to rely simply on a checklist to comprehend environmental factors. We believe that the right approach is through a comprehensive framework, relying on judgement, which embraces all the factors involved in scheme assessment. We believe, too, that such a framework should be employed from the earliest planning stages of a scheme.

Finally, in view of the importance of full public understanding of the system involved we recommend that there should be the fullest consultation with interested Government Departments, local authorities, national and local interest groups and the general public in the preparation of the framework, and that its results should be made publicly available and carefully explained to all concerned. (ACTRA 1978, p.95).

The Committee also introduced a note of warning about the costs of appraisal:

The fifth criterion set for an appraisal methodology is that it should be reasonably inexpensive to use. We have been told that the ratio of design staff to miles of road constructed has risen substantially over the past 15–20 years as scheme appraisal has grown more complex and as public involvement and consultation has increased. This is a trend which must be monitored. Any new appraisal method should not unjustifiably increase the Department's staff. However, this must be put into context. Design and appraisal on average account for some 3% of the cost of a scheme and it would be unfortunate to make small savings in appraisal costs if this might lead to substantial increases in total cost. (ACTRA 1978).

The Leitch Report's suggested framework was subjected to experiment by the Standing Advisory Committee on Trunk Road Assessment (SACTRA) which reported in 1979. The Standing Committee concluded that the Leitch Committee's proposal constituted an effective format for experiments, and early trials convinced the Standing Committee that the type of framework suggested²:

could provide an intelligible means of presenting comprehensive information to the public, and can help them to identify how the different groups will be affected. It can also provide a basis for designers and decision makers to reach rational judgements on schemes, taking into account the full range of benefits and disbenefits. (SACTRA 1980).

The framework was seen to be applicable at three stages, for initial consideration of alternatives, for public consultation following the preparation of alternatives, and for final investigation results and public inquiry. The Standing Committee recommended minor modifications to the Leitch Committee's format, and their amended form is described as follows:

The framework is a form of environmental impact statement and lists all the main impacts of the Do Something Options and the consequences of the Do Minimum. An important feature of the framework is that it identifies the groups of the community affected by the trunk road proposals—both those who benefit and those who are adversely affected. The impacts are listed under six headings or groups: Travellers; Occupiers; Users of Facilities; Policies for Conservation and Enhancement; Transport Development and Economic Policies; and Financial Effects. The framework does not produce a ranking of options or an aggregate net benefit figure. It is neither feasible nor desirable to aggregate the diverse effects on the different groups listed in the framework. The assessment or trade-off between the various impacts must always be a matter of judgement. (DoT 1981).

1. COBA is the United Kingdom's computer model for assessing costs and benefits of road investments.

2. An essential feature of this framework is the attempt to classify impacts in terms of the group affected. The alternative of initially grouping impacts by type such as environmental, economic, danger, severance or land-take, while allowing trade-offs to be readily seen, was considered inferior.

The Committee recommended against monetary evaluation of environmental effects, and against the inclusion of weights. It was stressed that there could be no standard rules about the precise form of the framework. The amount of detail needed would vary according to the stage reached for any particular scheme and according to size and complexity. Its development should therefore be regarded as an evolving process.

An example of the Standing Committee's framework as applied to an urban by-pass is provided in Appendix II. The example is a hypothetical case relating to four options for a by-pass road around Barchester, indicating the traffic, social and environmental effects on the groups involved. The example illustrates the likely size and complexity of evaluations which seek to identify and quantify all significant effects and account for the views of all social groups.

In summary, the outcome of the United Kingdom's considerable experience with highway evaluation has been the development of a firmly established and tested methodology with the following key features:

- the use of standard social cost-benefit analysis for calculation of user benefits;
- a planning balance-sheet framework for overall scheme appraisal;
- a strong emphasis on the groups affected, especially those not well covered by traditional social cost-benefit analysis, notably the non-users directly and indirectly affected, and those concerned with intrinsic values of the schemes;
- the coverage of all significant social, environmental and distributional effects;
- an attempt to achieve a better balance between effects which can and cannot be evaluated in monetary terms;
- opposition to the inclusion of specific weights to generate a unique outcome;
- opposition to valuation of environmental effects in monetary terms; and
- arrangements for extensive public participation at several stages of the evaluation process.

Other European Countries

The European Conference of Ministers of Transport has reported on the investment criteria used in transport planning in member countries (ECMT 1981).

The Conference agreed that there was a need for appropriate overall economic or socio-economic assessment methods for application to transport investment decisions. This requirement resulted from the increasing social, environmental and energy effects of transport investment, and from the need to apply uniform principles in assessment of projects in the various branches of transport which were becoming increasingly interdependent. While there was basic agreement on this need, member countries held different views on assessment methods and other individual parameters involved in the assessments. Some of the key features of evaluation practices identified in the study are summarised below, although it is clearly very difficult to generalise about evaluation procedures for a number of countries and applications.

The evaluation technique most commonly used in Europe is cost-benefit analysis, and this has been applied mainly in the case of motorways and trunk roads. As indicated in the previous section, the United Kingdom has adopted social cost-benefit analysis with planning balance-sheet presentation in this area, while the Federal Republic of Germany includes some cost-effectiveness analysis, and this is discussed in more detail subsequently. Larger-scale projects relating to the major road networks tend to be decided on the basis of demand analysis and regional considerations, though the most suitable variants may be determined on the basis of economic efficiency.

In the case of railways and inland waterways, the main emphasis is on commercial profitability and standard financial analysis is used. The larger railway deficits have

generated an obligation on railway companies to aim at a reasonable rate of return on investment. The use of cost-benefit analysis in this area has been confined to the assessment of new line projects.

With urban and regional transport, decisions are taken primarily on the basis of social objectives, and the need to keep public transport deficits within limits. The decision criteria thus approximates a form of cost-effectiveness analysis which indicates how given social objectives may be achieved with least cost to the public transport authority.

Differences of opinion existed among the members of the European Conference concerning the extent to which the effects of investment should be valued in monetary terms. In the Federal Republic of Germany, the tendency was to express all effects as far as possible in monetary terms, whereas other countries were more hesitant, and tended to present indirect effects in a cost-effectiveness, useful values or multi-criteria framework. France and the United Kingdom limited monetary evaluation of transport benefits to time, safety, running costs and in some instances comfort.

There were also major differences of opinion on the values to be assigned to individual parameters used in economic evaluations. This was particularly evident with respect to travel time, the treatment of the employment effects of transport decisions, the choice of discount rates (which varied from 3.5 to 10 per cent), and the treatment of inter-modal effects¹.

Federal Republic of Germany

One aspect of the system operating in the Federal Republic of Germany with respect to trunk road assessment is unusual in that it uses a weighting system to achieve an overall ranking of projects. This places greater emphasis on the identification of goals and their importance than most other assessment procedures.

A sophisticated forecasting technique is used to determine future trunk road needs, and priorities, and the results are incorporated in law.

Appraisal is carried out in the pre-legislative phase and this involves ranking schemes according to three sets of criteria: traffic, regional development objectives, and miscellaneous goals including construction of bypasses, avoidance of accident black spots and level crossings, and improvement of roads carrying international traffic. Points are awarded for each scheme (1-100) according to achievement of these objectives, and the results are weighted in two stages to provide an overall priority index. A form of cost-effectiveness analysis is also used subsequently to determine design standards.

Environmental assessment is limited. Certain legal conditions relating to the distance of the trunk road from residential areas are applied to minimise adverse effects. However, developments are occurring to increase the extent of environmental appraisal.

United States

Transportation planning in the United States, particularly in the urban areas has been subject to change in recent years, and the new pattern and new methods are not yet firmly established. Hence it is difficult to be precise about current transportation practices (Lee 1982). The main changes occurring appear to be:

- a move to return authority and responsibility to State and local governments and so to reduce the red tape and delays of excessive Federal involvement;
- an attempt to reduce and co-ordinate legislation relating to transport evaluations;

1. Details of the evaluation practices in all European Conference countries are contained in ECMT (1981, pp. 73-74, Tables 6-10).

- a change in emphasis from long-range comprehensive planning with heavy involvement in long-term demand forecasts towards shorter-range, incremental planning, focussing more on the need to obtain better utilisation of existing facilities;
- an increased emphasis on social and environmental issues; and
- increased public questioning of the money values allocated to such effects as travel time, accidents, noise and health in the standard evaluation procedures.

The latter two developments have prompted reconsideration of standard forms of analysis and stimulated interest in alternatives such as cost-effectiveness analysis.

There are indications of increased interest in, and some use of cost-effectiveness analysis, with dollar values being used only where they are obvious, as in capital outlay and vehicle operating costs, and the valuation of other effects including time being made in qualitative or other non-monetary quantitative terms. However, there is not general support for this approach, and a recent review of the emerging transport planning practice advocates the traditional cost-benefit framework with emphasis on efficiency and equity, and argues that 'cost-effectiveness analysis is rarely adequate or even applicable.' (Lee 1982).

Traditional methods still appear to operate in respect of highway evaluation. These involve a sophisticated cost-benefit analysis similar to that used in the United Kingdom, supported by highly detailed analysis of social and environmental effects. The preparation of these evaluations is made mandatory through Federal control of grants to the States.

The requirements of the *National Environmental Policy Act* 1969 provide a mandate for environmental impact statements and social impact assessments on a range of actions including transport. In addition, the Department of Transportation requires that States submitting specific funding requests report on 'economic, social, environmental and other effects of the plan.' (Rohe 1982).

The extensive requirements for transport evaluations in the United States have developed over a period dating back to the 1930s. However it was the increasing concern over environmental and social issues in the late 1960s and the 1970s which led, as in other countries, to a proliferation of regulations designed to ensure adequate coverage of these effects in transport and other project appraisal.

The National Co-operative Highway Research Program Report No. 122 contains a detailed exposition of highway assessment procedures, and provides a reference source for details about specific types of social, economic and community consequences of highway design and use. This reference source extends to seventy effects in addition to those included in the monetary analysis, namely, highway capital, operation and maintenance costs, vehicle operating costs, accident costs and travel time (Winfrey and Zellner 1971, pp. 224-324).

Despite the detailed framework presented in the 1971 Report, the 1970s saw a further growth in regulations requiring environmental and social impact assessment. The preparation of related documents became excessively time-consuming and the documents themselves excessively long, such that in 1977 the Leitch Committee in discussing United States experience wrote that 'the importance of the economic rate of return on a highway project is now being overshadowed by other considerations, particularly the environmental and social effects of the project.' (ACTRA 1978, p.43).

The Leitch Committee summarised the United States environmental impact statement procedures for transport proposals as follows:

The draft Environmental Impact Statement constitutes a project report which is available to the public. It contains traffic information, information on the current deficiencies which have led to the proposal, the alternatives considered, the terrain, natural and cultural features of the country crossed by the proposal, on safety, employment and land use planning. (ACTRA 1978, p.43).

The procedures are strictly regulated, and if requirements are not strictly complied with, the project can be challenged in the courts. This risk of litigation, heightened by the need for projects to comply with the large number of regulations, standards and procedures introduced under various Acts¹, appears to have led to very lengthy environmental impact statements, designed to ensure that all possible impacts have been covered irrespective of whether they have any real effect on the eventual decision.

Moreover, the larger number of requirements imposed under these Acts and Regulations led to a situation where it was becoming impossible to analyse the trade-offs involved. As a result, considerable attention has been devoted to co-ordinating the various regulations imposing requirements on States seeking transport funds, and to reducing the volume of material required for environmental analysis so as to reach a better balance between environmental and economic effects.

This has involved limiting the size of environmental impact statements, specification of a standard format, establishment of a single set of procedures for highway and urban transport projects, and integration of environmental impact statement and alternatives analysis procedures².

Concurrently changes have been introduced to decentralise control and authority and to reduce Federal intrusion into local decision-making. While goals may be specified at the Federal level, planning how to meet them is to devolve on States and local authorities.

The United States experience suggests a potential dilemma with the imposition of mandatory requirements for social-audit type evaluations. While they may lead to excessive and partly misdirected evaluation efforts, in their absence, opposition to this type of evaluation may effectively block its use.

In an article on experience with social impact analysis (SIA) in the United States, Rohe (1983) discusses the latter problem.

He claims that the pervasive use of these procedures may be hampered by reluctance on the part of government agencies to adopt them. 'The performance of a transportation department is primarily based upon the number of miles of new highway constructed rather than upon the number of communities spared disruption.' He argues also that increased subservience to public opinion may be looked on as an insidious transfer of power from responsible agencies.

Rohe recommends the lessons of United States experience to other countries:

Although SIA procedures would have to be uniquely suited to the governing structure of other countries, the US experience suggests several lessons for those wishing to implement a SIA process in other countries. First, without clear legislative standing, SIAs are often ignored by decision-makers. Legislation should not only clearly specify when and how impact assessments should be performed, but include provisions for stopping projects which would have severe social impacts. Secondly, SIA in the US has been effective in informing and educating citizens about proposed projects, thereby allowing them to become more effectively involved in the political process. Public education and involvement is an important function of SIA and should be facilitated through formal procedures. Thirdly, in that SIA requirements represent a shift in power from public agencies to citizens, resistance to the adoption of SIA requirements can be expected from public agencies. Thus, strong political support will be necessary to institute SIA requirements. Fourthly, given the many potential sources of bias discussed above, it is desirable to invest the responsibility for undertaking SIAs with an independent board or panel rather than with the sponsoring agency. This should result in more objective impact assessments.

1. For example, *National Environmental Policy Act 1969*, *Environmental Quality Improvement Act 1970*, *Clean Air Act Amendments 1970*, *Urban Mass Transport Assistance Act 1970*, *The Federal-Aid Highway Act 1970*. The President's *National Urban Policy* and *The National Energy Act 1978*.

2. The alternatives analysis process has been developed by the Urban Transportation Administration for the evaluation of metropolitan transportation alternatives.

Australia

In Australia, both Commonwealth and State Governments have commissioned a large number of studies into specific transport issues from government advisers, research bodies and consultants. The evaluation methodologies adopted have been predominantly financial analysis and social cost-benefit analysis. Many of the evaluations carried out have been extremely detailed, and have involved a substantial effort to measure social, environmental and other indirect effects.

In the main, however, formal evaluation procedures have not been applied to transport issues on a consistent basis, and generally appear to have had a lesser impact on decision-making than in the countries reviewed in the preceding sections. The main reason for this appears to be the absence of any comprehensive legislative requirements for such studies. Major transport issues have not automatically involved the public participation procedures which characterise similar proposals overseas, and the results of evaluation studies have not been binding on governments. The main exceptions to this generalisation concerning legislative requirements for evaluation are the recent Australian Bicentennial Road Development (ABRD) legislation and the environmental impact legislation. The ABRD legislation is discussed in the following section. The environmental legislation has not been a major source of transport evaluation studies. In the eight years since the *Commonwealth Environment Protection (Impact of Proposals) Act 1974-1975* was passed, only 14 environmental impact statements have been prepared under the Act for transport proposals. A list of these is contained in Appendix III.

The Australian road system, including national, arterial and local roads, has been subject to extensive formal evaluation by the Commonwealth Bureau of Roads and the Bureau of Transport Economics. Other major areas of evaluation include mainline upgrading and electrification of railways, urban public transport, airports and port facilities. Some examples of studies undertaken in these areas are discussed below to illustrate the main features of evaluations for these areas. No attempt is made to cover the large number of analyses which have in fact been undertaken in all areas of Australian transport, especially in the 1970s, some of which included those factors considered of importance in social audit evaluations.

Roads

The studies undertaken by the Commonwealth through the Commonwealth Bureau of Roads and the Bureau of Transport Economics have, for the most part, been concerned with evaluation of national programs of road expenditure involving allocation of funds among different road categories and States. In general the States have not been required to present evaluations of individual road projects financed from Federal funds. The recent ABRD legislation does make economic evaluations mandatory in State requests for assistance, though the evaluation requirements are only broadly defined. Details of the ABRD requirements are contained in Appendix IV. The emphasis in the Commonwealth evaluations on national programs has also meant that social and environmental factors can be treated only in a broad way. Detailed analyses of many of these factors will only be relevant at the individual project level.

The Commonwealth Bureau of Roads first reported on the Australian road system in 1969, but its first full analysis covering community and environmental effects appeared in 1973. This report established the pattern for future studies. The Bureau of Roads adopted a traditional cost-benefit approach, endeavouring to measure all effects as far as possible in monetary terms.

These effects included changes in vehicle operating costs, travel time, accident costs, and road maintenance costs, and other effects which varied according to the class of road. These 'other effects' were, for urban roads, loss of recreational land, uncompensated residential displacement and disruption costs, and some air pollution effects. For rural roads they included a reduction in dust and delays, reduced production losses and the benefits from generated trips.

In the case of rural roads the indirect benefits accounted for 25 per cent of total benefits, and gave rise to considerable questioning as to whether effects such as these could realistically be assigned monetary values.

However the Commonwealth Bureau of Roads also devoted a great deal of attention in the course of its studies to various social, environmental and distributional effects which did not lend themselves to monetary valuation (CBR 1973, MSJ Keys Young Planners 1974, ACBR 1975). These effects were documented in reports supplementing the cost-benefit analyses, as well as in independent publications, and covered such areas as impact on other modes, physical measures of disruption, accident reduction and fuel savings, environmental effects, and in particular the impacts on communities affected by urban and rural roads and town bypasses.

The indirect effects of road projects have also been examined in Bureau of Transport Economics studies, for example, that on the Canberra connections to the Sydney-Melbourne National Highway (BTE 1979). This evaluation explored the impact of proposed alternatives on towns on existing routes and on rural areas liable to become future road sites. It covered economic dependence effects, danger, noise, property severance, access changes, housing acquisitions, land-take, community disruption, and a wide range of environmental impacts of ecological, aesthetic and historical significance.

Regarding the social impacts of roads on local communities, the Commonwealth Bureau of Roads stressed the need for detailed study of neighbourhood boundaries, community interests, and compensation requirements, and the characteristics of social groups affected by transport decisions. A particular aim was to identify and increase the awareness of groups with a marked incapacity for coping with sudden change.

The Bureau of Transport Economics has undertaken some related work in this area. It has recently published a study on roads in the Gunning Shire (BTE 1983) which includes a survey of the reactions of users to these roads, and is currently conducting a study on the social aspects of Australian roads based on information derived from continuing feedback from various groups of people in a variety of locations. The aspects being researched include attitudes to road construction funding, residential street safety, freeways, road standards and other issues identified from a search of the print media, contact with organisations concerned with roads, from search conferences and a small household survey.

Outside the Commonwealth sphere, the Warringah Transport Corridor Inquiry provides a further example of a cost-benefit study with extensive inquiry into non-monetary effects, including land use, noise, air quality, visual effects and accident numbers. The monetary effects analysed included the impact on residential land values both in the corridor and in alternative development areas (DMR 1981).

Urban Public Transport

Commonwealth involvement in this area in the early 1970s led to a vast amount of evaluation work on urban public transport issues. The Commonwealth initiated a program of investment in urban public transport through the *Transport Planning and Research Act 1974*. The evaluation of project proposals formed a necessary basis for investment decisions with evaluations being undertaken by the Commonwealth or by State authorities with vetting by the Commonwealth. Evaluations typically estimated benefit-cost ratios, where system benefits were represented by operating cost and time savings, and system costs by capital investment and maintenance costs. Although very little quantitative analysis of identifiable intangible benefits and costs was generally carried out, there was some concern with the effects of projects other than those that were readily quantifiable, and a listing of these was often provided.

Urban public transport evaluations conducted by the Bureau of Transport Economics have used standard cost-benefit techniques, with little treatment of intangible effects.

These studies covered various alternative projects proposed by State governments. They compared project costs with benefits accruing from operating cost savings, travel time savings, benefits to converted and generated traffic, and to passengers continuing to use other services.

Airports

Evaluation studies have been undertaken for a number of major airport developments and environmental impact statements have been required under the *Commonwealth Environment Protection (Impact of Proposals) Act 1974-1975* for Brisbane, Perth and Adelaide airports. Whilst in some of these studies, for example Townsville international airport, social and environmental effects have not been very important, others have involved extensive treatment of these aspects. For example, the Brisbane Airport Study (BTE 1975) included an analysis and summary report on non-quantifiable effects including noise, curfews, building heights, limitation of general aviation movements, airspace restrictions and physical standard of terminal facilities. The Major Airport Needs of Sydney (MANS various issues) study has probably been the one with the most detailed analysis of environmental and social effects and with most public involvement. Separate studies were carried out on economic effects, financial effects, environmental effects, incidence effects on industries and households, and general aviation effects, and information papers on each aspect were prepared and made available for the public participation process.

Rail

A considerable number of studies has been undertaken on various rail investment proposals, but the nature of these has been such that, in general, social and environmental effects have not been especially important. This was the case with those relating to electrification, conversion to standard gauge track, and mainline upgrading. In many studies the emphasis has been on financial profitability. In others standard cost-benefit techniques have been adopted.

Where social and environmental effects may have been relevant, as in the case of new links, in some instances they have not been accounted for, but in others, their consideration has been unnecessary given the outcome of the economic analysis. This may occur, for example, where a proposal which is uneconomic on all other grounds also has unfavourable social and environmental effects.

In the recent study of the Alice Springs to Darwin railway conducted for the Commonwealth Government, a social-audit type evaluation was required to ensure adequate consideration of social and environmental effects. This involved public hearings to assist in the determination of these effects; however the inquiry concluded that overall they were not very important.

The provision of passenger rail services, and the community service obligations associated with these services, have in most cases not been subjected to formal evaluations. Also the social effects of significant switches in the freight task from road to rail, or vice-versa, have not been evaluated.

Ports

Evaluation studies relating to Australian ports have also been concerned predominantly with financial or economic factors. In most of these studies social and environmental impacts have again been limited in range and importance.

CHOICE OF TECHNIQUE

The foregoing survey of evaluation practices in individual countries has revealed many points which are useful in developing a social audit methodology.

Despite variations between countries in these practices, there has recently been a common trend to amend traditional social cost-benefit analysis approaches and to incorporate elements of the planning balance-sheet and multi-criteria approaches into the evaluation framework.

This trend has resulted from the need to develop techniques to satisfy public demands for greater consideration of social, environmental and distributional effects, to allow for increased public understanding, awareness and participation, and to ensure a wise use of transport funds in the face of tighter fiscal controls. It also reflects the dissatisfaction among analysts, decision-makers and the public with some traditional transportation study models which have been biased towards quantifiable factors.

What seem to be largely semantic arguments have occurred in the theoretical literature on the relative merits of different evaluation techniques. Such discussions can be counterproductive, especially as in practice techniques are subject to considerable variation and overlap. Cost-benefit analysis, for instance, has been criticised as being an inadequate analytical tool given the changed emphasis in evaluation studies.

This criticism has been effectively answered by Lichfield, Kettle and Whitbread (1975, pp 67-68) who have pointed out that social cost-benefit analysis is not confined to 'economic' applications but is suitable for analysing wide-ranging problems; is not limited to items for which monetary values are readily available; and does not necessarily require aggregation of costs and benefits to produce an overall result. Despite changes in its presentation and form, it in fact remains the fundamental basis for decision-making. An extract on these arguments is provided in Appendix 1.

Similarly, the European Conference of Ministers of Transport concluded that there were arguments in favour of each method, and that in general, no clear preference could be shown. The various methods were in fact seen to be complementary and basically similar, although some techniques could be more appropriate for particular applications. Cost-benefit analysis might be advocated for project comparisons in the same field where the effects are similar and the choice is likely to depend on direct costs and user benefits, while other methods such as cost-effectiveness analysis require clear specification of goals, and are most useful when one objective clearly outweighs all others (ECMT 1977).

The review of overseas experience strongly indicates that accurate and comprehensive information and analysis based on consultation and the best available information are more important than the choice of technique, as are the decisions made on the following issues:

- which impacts to include and how to present these impacts so as to provide the most easily assimilated, informative and manageable basis for decision-making;
- whether monetary measures, where possible, are the most meaningful way of presenting information; and
- whether the analyst should be concerned with the weighting of alternatives.

The system operating in the United States provides useful guidelines especially in regard to social and environmental criteria, but appears to have become bogged down in a mass of regulations involving excessive time, expense and litigation.

The novel approach employed in the Federal Republic of Germany in weighting road project objectives does not at this stage appear to offer a desirable alternative for application in Australia where transport objectives have only been identified in a very general nature. Overall, the United Kingdom procedures for planning balance-sheet analysis would seem to provide the most useful guide in the possible development of social audit procedures in Australia. The procedures are comprehensive, adaptable and flexible, and provide possibly the best format for handling large complex projects with a multitude of effects (Quarmby 1977).

CHAPTER 3—SOCIAL AUDIT METHODOLOGY

The review of evaluation procedures in Chapter 2 suggests that a social audit evaluation procedure would be similar to traditional social cost-benefit analysis, being concerned with net benefits to society as a whole, pricing at resource costs, and inclusion of all benefits and costs, particularly the social and environmental effects which are not priced by the market. In addition, it should provide a clear presentation of and give appropriate emphasis to these social and environmental effects such that they receive equal consideration to those effects included in the monetary analysis, and treat qualitatively those effects for which monetary values cannot be assigned with an acceptable degree of certainty.

Particular attention needs to be devoted to the distributive effects of proposals as well as any influence of the existing distribution of income on project appraisal. The public should be involved to the extent necessary to provide an adequate indication of social and environmental effects; and the audit presented in a way which allows both the public and decision-makers to understand the evaluation process and the results of the evaluation, and to see clearly the effects analysed.

In determining a form for an evaluation procedure which effectively incorporates these characteristics, a number of methodological issues needs to be resolved, and a discussion of these issues is the main subject of this chapter. In brief, the issues are:

- the form of presentation of the social costs and benefits, and the extent to which it should include elements of cost-effectiveness analysis, goals-achievement methods, or social cost-benefit analysis with planning balance-sheet presentation;
- which goals or effects are to be included;
- how the distributional effects are to be represented;
- whether a specific weighting process should be used to aggregate the results; and
- how adequate public participation might be achieved.

PRESENTATION

The choice of methodology, from the alternatives of multi-criteria analysis, cost-effectiveness analysis, goals-achievement methods and social cost-benefit analysis with planning balance-sheet presentation, is considered to be less important than the need to ensure that all important effects or goals receive consideration.

As indicated in the previous chapter, some problems may be best treated by one technique rather than another; however, there do seem to be some reasons for preferring the planning balance-sheet adaptation of social cost-benefit analysis as a general methodological framework for analysing transport policy issues.

- It preserves intact the traditional procedures of cost-benefit analysis and the discipline that this methodology entails.
- It provides scope for exposition of the range of effects it is desired to measure whether social, environmental or distributional.
- It is flexible in that it leaves room for choice on how the various effects are best described. While a preconceived set of objectives will be an essential forerunner

in the determination of relevant effects, and will be necessary before trade-offs can be made, these objectives do not need to be as rigorously defined as in the formulation of a set of goals for cost-effectiveness analysis, where projects receive a point score according to their contribution to the set goals.

- The decision-maker is able to assess alternatives, make trade-offs, and so establish priorities without the need to adhere to a predetermined set of value judgments.
- It allows members of the public or individual groups to identify matters of interest to them.
- The use of the planning balance-sheet framework would constitute a less dramatic departure from current procedures than the adoption of some form of goals-achievement analysis, with or without weights: as such its use may be initially easier to promote.

Obviously the form of any planning balance-sheet will need to be custom-tailored for the particular case. Some projects will have few effects and many alternatives, others few alternatives and many effects, and some will have more groups affected than others. The tables in a planning balance-sheet will have to be ordered so as to present the relevant information in the most readable way.

Some form of summary table will be desirable, with detail being provided in supporting statements. Initially however it would seem useful to present a table which simply lists all effects considered relevant and all groups which are affected by each.

RELEVANT GOALS AND EFFECTS

Prior to determining the range of effects to be included in the analysis and the groups in the population which are of distributional significance, it is necessary to consider the policy objectives involved.

There are ultimately only two goals with which economic and social evaluations are concerned, namely efficiency and equity. The efficiency goal may be defined as producing as much as possible of what society wants with given resources, or alternatively as minimising the use of resources in the production of a given output. This goal is concerned with maximising the value of the complete range of outputs which compete for the nation's scarce resources. Environmental protection and defence production, for example, are outputs which compete with other industries for resources; they therefore need to be considered within the efficiency goal.

The equity goal or goals against which all distributional effects must be assessed, cannot be uniquely specified, and will reflect changing community views. In some cases equity goals involve equal treatment of all individuals, while in others they involve the deliberate redistribution of incomes towards certain disadvantaged or otherwise favoured groups.

Policy-makers typically do not assess proposals directly in terms of their impact on efficiency and equity, but instead consider a number of intermediate objectives, the achievement of which can be more easily identified. Of particular interest in this study are the objectives for transport policy, and how these relate to the efficiency and equity goals.

With respect to Commonwealth transport policy, the Commonwealth Minister for Transport has set down the following transport objectives (ALP 1983).

Economic objective

to provide access to raw materials, goods and services; to provide passenger transport adequate for desirable national development and individual mobility at least cost to the community;

Environmental objective

to minimise environmental and health damage by full inclusion of such costs in evaluation of projects and the introduction of adequate emission control and safety standards for motor vehicles;

Social objective

to provide freight and passenger transport services that are adequate to enhance co-ordinated national development and balanced in terms of industrial diversity, urban, regional and rural development, employment generation, personal mobility and integration of forms of transport;

Resource objective

to encourage the most efficient use of national resources, including energy, time and space;

Defence objective

to provide a co-ordinated transport network capable of servicing current and anticipated strategic and defence needs, particularly in remote areas of the country.

The objectives in the ALP policy statement which are clearly concerned with efficiency include: provision for adequate passenger and goods movement at least cost, safety, reliability, convenience, avenues for choice, mobility, environmental costs, health effects, efficiency in resource use, defence capability, and industrial peace. The equity or distributional objectives include mobility for disabled or under-privileged groups, balanced urban, regional and rural development, and assistance to disadvantaged regions and country services. Industrial diversity, employment generation, balanced development and decentralisation are objectives with both efficiency and equity aspects.

Particular care is needed in evaluating contributions to these intermediate objectives to avoid the double counting of effects which appear to relate to more than one objective. For example, effects such as employment generation or energy usage involve a use of resources, and unless it can be argued that the monetary values assigned to these resources are not representative of their true cost or value, then supplementary treatment is not warranted.

The point may be illustrated by the example of a branch railway line closure, which would result in cost savings, but cause the loss of a number of jobs. If there is no alternative employment for the displaced labour, then there would be no cost to society if the persons concerned continued to be employed by the railway, as they would not be contributing to society's output in any other capacity. In this situation, the labour costs should be entered in the analysis at some value less than full market price, depending on the likely duration of unemployment, and the value the individual worker places on his leisure. This would have the effect of reducing the cost savings from closing the line and rendering the proposal less attractive from an economic efficiency point of view. If cost savings remained, however, the efficient solution would be to close the line; the labour could be compensated from these remaining cost savings and still there would be a net social gain. Where labour is correctly valued in the analysis, it is not then appropriate to include as a cost the unemployment generated, or to refer to this as an undesirable side-effect in assessing the efficiency effects of the proposal. However, there will be a redistribution of income which will be of concern to policy-makers unless full compensation is arranged. Such redistributions may in fact provide reasons for overriding the conclusions which flow from the economic efficiency analysis.

Similarly an output like tourist development would only warrant special attention if there is some reason to believe the benefits assigned to it are not accurately priced, or if there are distributional reasons for supporting this particular industry.

In many instances there will be conflict between the pursuit of efficiency, and the achievement of distributional goals, and trade-offs will be necessary. Where conflict does occur between efficiency and equity goals, an optimum solution may still be possible by choosing the efficient solution and subsequently redistributing income. The reverse sequence is normally not feasible and choices based on distributional grounds will render the achievement of optimum efficiency solutions difficult, if not impossible.

Objectives have also been established for some specific areas of transport policy, for example those contained in Federal legislation relating to roads and airlines. These more specific objectives do not introduce many additional considerations to those outlined in the ALP (1983) policy statement, although some particular emphasis may be indicated. For example, with respect to roads, national roads have recently received a higher priority, and special emphasis has been placed on tourist roads and roads to development areas.

From these stated objectives of Government transport policy, the details of which effects are to be considered and which distributional impacts are to receive attention, can be developed. This is the starting point in the compilation of a check-list of effects and affected parties which could be used as a guide in any social audit applied to Australian transport proposals.

Check-lists of criteria

There are a number of comprehensive surveys of the impacts of transport decisions which can serve as guides in establishing the environmental and social consequences of transport decisions, and in determining how best to convey the detailed information.

These surveys include:

- Environmental Assessment Notebook Series: Notebook 2 Social Impacts, Notebook 3 Economic Impacts, Notebook 4 Physical Impacts (U.S. Department of Transportation 1975);
- The Environmental Evaluation of Transport Plans (Lassierre 1976);
- Social Impact Analysis (MSJ Keys Young Planners 1974); and
- Summary and Evaluation of Economic Consequences of Highway Improvements (Winfrey and Zellner 1971).

In addition to the surveys, check-lists of effects have been compiled in a number of overseas studies.

The compilers of these documents have been at pains to point out that no technical guidance document can adequately anticipate the nearly infinite variety of localised problems which may be encountered. In particular, there may be effects unique to an area, in some circumstances impacts will be cumulative, or they may not be relevant if nobody is concerned with them.

No prior attempt to specify the effects and affected groups to be included in a social audit can therefore be entirely successful, and there can be no unique format or matrix lay-out prescribed for the framework. However, it is considered that the compilation of a check-list of broad effects to be backed by the more comprehensive manuals of effects that are available can be most useful, especially for major projects with far reaching effects; for small projects, the relevant effects are likely to be more local-specific in nature. Any general list of effects can only serve as a check-list, and a mandatory requirement to evaluate each item is generally not appropriate as some effects on the list will be negligible in the particular application and will not justify the cost of evaluation. Equally some other effects, particularly local-specific ones will not be on the list, or if included, will deserve evaluation at a more disaggregated level.

A suggested check-list of effects and of groups affected is presented below for a transport investment proposal, such as a freeway, bypass, or road or rail improvement. While it would be possible to compile a single check-list of effects for all types of transport proposals, the range of effects to be covered and the emphasis required suggest that separate lists for various classifications of transport proposals would be more appropriate.

The check-list first presents categories of groups affected (Table 3.1), followed by a list of initial (or first round) incidence effects (Table 3.2), and a list of transfer payments and shifts of incidence (Table 3.3). The effects in Table 3.2 are efficiency effects which are additive, while those in Table 3.3 are not, representing distributional changes only. The check-list of Table 3.2 indicates the groups on which any particular effect may have an impact (column 2) and provides in columns 3 and 4 a brief indication of possible methods of measuring some of the effects. It is not possible in a table of this size to describe how all effects can be measured, and this matter is discussed in more detail in the following section. Column 3 indicates the possibility of monetary measurement only. In some cases monetary measurement will not be desirable if the effect is not significant enough to warrant the cost involved.

The category of 'other economic effects' in Table 3.2 needs some elaboration. To warrant inclusion in net benefits, these economic effects must be entirely due to the transport investment concerned and must include a net change in social value added. These effects would include, for example:

- Any net change in social value added (defined as the social value of output less the social opportunity cost of resources used in producing that output) that would not have occurred anywhere without the transport investment. (Thus changes due to pure transfers are not relevant, such as development associated with the transport investment which would have otherwise occurred elsewhere). Such change could result from:
 - a use of otherwise unemployable resources along a transport route;
 - cost reductions due to increased efficiency of factors, or more efficient production methods which are exclusively due to the transport investment (for example, economies of scale in the provision of public services); and
 - capital wastage when new facilities replace existing facilities and prices are not set at marginal cost for the existing facility.
- Effects on other transport modes or other industries involving real costs and benefits (for example, when demand is transferred from a congested or increasing cost industry).
- Changes in costs of associated networks, for example, congestion, accidents, pollution and maintenance costs of local streets.

Controversial monetary valuations

Traditional cost-benefit procedures have sought to measure most, if not all, major effects in monetary terms to allow aggregation of costs and benefits, and hence to reach a single solution as to the economic viability of a project. With more sophisticated valuation techniques and the processing capacity of computers, monetary valuations have expanded to new effects and to a level of detail which would not have been considered feasible several decades ago. More recently there has been increased questioning as to whether the pendulum has swung too far to involve too much emphasis on monetary valuations.

In particular, questions have been raised as to whether some detailed monetary analyses (such as the United Kingdom's COBA model for trunk roads) are overly expensive and unnecessarily detailed; and as to whether some effects should be assessed in non-monetary terms where the monetary values assigned are controversial, or alternatively still valued in money terms, but given additional descriptive treatment.

On the first point no answer can be given at this stage, but it is an issue which needs to be continually reassessed in the light of experience with the application of evaluation techniques. The answer must depend on how important the factors included in the monetary evaluation are relative to other considerations, and on

how costly the analysis is compared with potential savings in choosing between alternatives.

The inclusion of effects with controversial monetary values is a major issue. While the assignment of money values to goods and services which are not the subject of market transactions (and hence have no market prices) allows the presentation of a simple and easily interpreted aggregate cost-benefit analysis result, such a singular result can disguise the fact that it may depend on acceptance of a number of doubtful values.

For instance there are methods available for assigning dollar values to time, to accidents, health and safety, to comfort and convenience, and to a range of environmental and social effects. Some discussion of these methods follows.

In general there are three approaches:

- to ask the parties concerned the dollar value of the particular benefit or cost;
- to attempt to measure directly the economic and social costs associated with a particular benefit or cost; and
- to find an implicit value by observing market responses to the benefits or costs imposed.

Often estimations will involve more than one approach.

With the first approach affected parties may be asked what they would be prepared to pay to enjoy a benefit or to avoid a burden, or what compensation they would require for the loss of a benefit or for the imposition of a burden. This method for instance has been used to reflect some of the social costs of community disruption, stemming from attachment to area, historical associations, and love for a family home, which are probably not possible to measure in other ways.

TABLE 3.1—CHECK-LIST OF GROUPS AFFECTED

Group No.	Group
I	Authority initiating or financing the proposal
II	Users of the service Direct (business, recreation, education, public and community service, shopping) classified by type of vehicle/pedestrian Indirect (users of product or service provided by direct user)
III	Users of affected environment Residents of households (classified by socio-economic characteristics) Businesses (classified by type) Institutions (schools, hospitals, churches) Recreational Visitors/tourists
IV	Non-users of the service/environment with an interest in the service or affected environment Environmental/heritage groups Government/political/local authority interests General public Planning authorities, particularly regional
V	Users or providers of other services, or users of other environments which are influenced in some way by developments in the service or affected environment
VI	Factor or resource owners not elsewhere included

TABLE 3.2—CHECK-LIST OF EFFECTS

<i>Initial incidence effects</i>	<i>Groups affected^a</i>	<i>Monetary valuation</i>	<i>Non-monetary evaluation</i>
Associated mainly with construction of facility			
Costs of uncertainty during planning stage			
Deterioration of property	III, IV	Yes	
Vandalism to acquired right of way properties	I	Yes	
Psychological effects on community	III		Nature of effect: number and characteristics of persons experiencing hardship
Capital Cost	I		
Planning and design		Yes	
Labour	VI	Yes	
Materials		Yes	
Other		Yes	
Other construction costs			
Disruption during construction			
To traffic	II	Yes	Or in the case of time costs, amount of time lost per user, numbers affected
Pollution, dust, vibration, visual intrusion, other environmental	II, III, IV	Yes (mitigation costs)	Indication of seriousness supported by quantitative data where possible: decibels, air pollution levels

TABLE 3.2(Cont)—CHECK-LIST OF EFFECTS

<i>Initial incidence effects</i>	<i>Groups affected^a</i>	<i>Monetary valuation</i>	<i>Non-monetary evaluation</i>
Loss of output	III, V	Yes	(Number affected, time
Temporary relocations	III, I	Yes	(period involved
Acquisition of land, property	I	Yes	(
Costs of relocation, severance, community disruption, compensated or uncompensated ^b	I if compensated III if not compensated		
Cost of replacement of physical unit		Yes	
Legal, financial, movement, time, costs		Yes	
Costs or benefits associated with changes in			
Convenience, comfort			
Social & physical also environment for relocatees and established users of new environment	V		(Description of effects (and assessment of (importance, including (comments by users
Production costs		Yes	(
Access to facilities/ activities		Yes	
Church, school, entertainment, friends, relatives, shopping, parks, jobs, community services			

TABLE 3.2(Cont)—CHECK-LIST OF EFFECTS

<i>Initial incidence effects</i>	<i>Groups affected^a</i>	<i>Monetary valuation</i>	<i>Non-monetary evaluation</i>
Effect on householders' surplus ^c		Yes	Or description of household responses
Benefits of improved, or costs of inferior replacements, or benefits to locality such as slum clearance		Yes	Description of changes
Psychological effects of community disruption			
Loss of social interaction, friends, sense of belonging, community pride, historical ties	includes group remaining behind as well as groups relocated		No satisfactory measures available: some indication from public reaction, neighbourhood indices, detail on numbers affected, socio-economic characteristics, length of occupancy, and descriptions of community activities and behaviour
Associated mainly with operation of facility			
Capital equipment (for example, rolling stock)	I	Yes	
Maintenance, operating costs	I	Yes	

TABLE 3.2(Cont)—CHECK-LIST OF EFFECTS

<i>Initial incidence effects</i>	<i>Groups affected^a</i>	<i>Monetary valuation</i>	<i>Non-monetary evaluation</i>
Changes in operating costs of and in benefits generated for users of alternative modes and connecting services	V	Yes	Description of changes in comfort, convenience, arising from changes in patronage, frequency of service, quality of service
Cost savings to users from	II		
Travel time reductions		Yes	
Avoidance of delays		Yes	And/or indication of time savings for classes of users. The difficulty of measuring the amount or value of time saved in the case of defence or national disasters, suggests that such effects should receive separate treatment
Vehicle operating cost reductions		Yes	
Improved safety		Yes	Supplemented by details of numbers of accidents/deaths
Improved comfort/convenience			Description of effects and indication of importance
Benefits to new or generated traffic (measured by willingness to pay for service)	II	Yes (based on estimation of demand for the service)	

TABLE 3.2(Cont)—CHECK-LIST OF EFFECTS

<i>Initial incidence effects</i>	<i>Groups affected^a</i>	<i>Monetary valuation</i>	<i>Non-monetary evaluation</i>
Environmental costs	I, II, III IV	Some estimates of damage costs possible, also mitigation costs and administration costs of pollution control	
Aesthetic		(Contour maps photographs (drawings (((
View from facility			
View of facility/visual intrusion/effect on surrounds/design of facility			
Air quality			
Emissions, dust, effects on health, on balance of nature, material deterioration			Measured pollution levels, description of effects on health, comfort
Noise and vibration			Decibel levels, contour maps

TABLE 3.2(Cont)—CHECK-LIST OF EFFECTS

<i>Initial incidence effects</i>	<i>Groups affected^a</i>	<i>Monetary valuation</i>	<i>Non-monetary evaluation</i>
Water			
Water quality, water levels, erosion, drainage patterns			Water pollution indicators: biological oxygen demand, turbidity, measured contaminants
Eco-system			
Biological, geographical, hydrographical			Description of effects of severance, of increase in traffic, and indication of seriousness
Natural environment			
Land use, natural beauty, parks, recreation areas, wild-life refuges, flood-plains, coastal zones			As above
Cultural environment			
Historic/archaeological/unique/national heritage aspects			As above
Other economic effects involving a net change in social value added and due exclusively to the transport investment ^d	III,IV	Yes	Or description of effect and importance

TABLE 3.2(Cont)—CHECK-LIST OF EFFECTS

<i>Initial incidence effects</i>	<i>Groups affected^a</i>	<i>Monetary valuation</i>	<i>Non-monetary evaluation</i>
Other effects	IV principally general public		
National prestige			(Descriptive comment and (subjective evaluation of (importance.
National identity			(
Decentralisation			(
Equal opportunity			(
Relief for distressed areas			(

a. In an actual study these composite groups would be divided into a number of sub-groups with different characteristics.

b. A detailed discussion of relocations, severance and disruption effects is contained in MSJ Keys Young Planners (1974).

c. Householders' surplus may be defined as the difference between all the identifiable financial costs of relocating and the amount which the householder would require to compensate him for loss of his own home.

d. For detail see earlier discussion.

Source: Prepared by BTE.

TABLE 3.3—CHECK-LIST OF DISTRIBUTIONAL EFFECTS OF TRANSFER PAYMENTS AND SHIFTS IN INITIAL INCIDENCE

<i>Shifted incidence effects</i>	
<i>Initial effect</i>	<i>Shifted effect</i>
Travel cost savings to direct user	Lower prices or higher profits to users of goods and services freighted
	Changes in property values influenced by accessibility: resulting effects on local taxes
Environmental costs (benefits) on users of environment	Lower (higher) rents to property-owners, lower (higher) property-values
Environmental costs on businesses/institutions	Higher prices to final consumers
Changes in social value added	Benefits or costs to consumers or authorities
Transport authority's costs	General taxpayer
<i>Transfer payments</i>	
<i>Source</i>	<i>Transfer</i>
Differences between social costs and actual monetary payments resulting from	
Taxes	From purchaser of good or service taxed to government
Rents	From purchaser of service to factor or resource-owners
Monopolistic pricing	From purchaser of good or service to producer of good or service
Externalities	From users of affected environment to purchaser of good or service producing the externality
Payments for goods and services	From purchaser to provider/operator
Transfers of demand resulting in gains to some firms at the expense of others	From enterprise to enterprise
Transfer of industry and population, or attraction of new development to particular regions as a result of improved accessibility, and consequent effects on regional employment, regional economic growth, local authority outlay and income.	From region to region

Source: Prepared by BTE.

The second approach is used, in part, to estimate the effects of travel time savings. For example, time saved may result in increased output of goods or services with a monetary value. Not all time saved, however, can be measured in this way. The valuation given to time savings can result in very large benefits, and depending on the nature of the time savings, it is possible that the benefits will be overstated. For example large numbers saving nominal amounts of time (two or three minutes per trip) may not be equivalent to larger time savings for smaller numbers. This problem has given rise to a situation where in some recent studies the use of money values for travel time has been avoided.

Accident costs or safety effects may be valued according to the resulting loss of output or income, property damage, associated medical, hospital and insurance costs, and administration costs including police. However allowance for pain and suffering of victims and friends, particularly where death is involved, remains an important element for which no acceptable measure has been found.

Some of the economic and social costs associated with different forms of pollution such as loss of output, higher production costs, and possibly health costs, can also be measured in this way.

The third approach assigns values to various effects according to values implied by market behaviour. An indication of, for example, the costs imposed by noise, some aspects of air pollution, and visual effects, may be gained by observing differences in property values between polluted and unpolluted areas, or from knowledge of insulation or other pollution avoidance costs. In some cases values for comfort and convenience can be found where the price consumers pay for a more comfortable alternative can be observed. This however will not always be possible, and qualitative assessment may be the only option for such effects.

Natural resource areas or recreational facilities can be valued by the use of travel cost models which purport to reveal users' willingness to pay for the use of these areas. Many of these resources however, especially where cultural factors or national heritage issues are involved, can possess a social value in excess of that which would be indicated by the value to users alone, but no satisfactory way of estimating this exists.

Similarly, effects such as national prestige, the value of defence capability, equal opportunity, or decentralised or diversified industry are either impossible or too difficult to measure in economic terms.

It will be clear from examples such as those above that the available methods of measurement are at best approximations, and while they may be reasonably indicative in some instances, in others they will be far from accurate, and in almost all cases will be subject to controversy. Many methods will also be time-consuming and expensive.

As a rule of thumb, where monetary values can be assigned which are within bounds which are not so wide that they render the monetary analysis meaningless, then a sensitivity analysis should be conducted using the relevant range of values. Otherwise the effect should be taken out of the monetary analysis and described in some other way. This may allow a choice to be made without the need for precise valuation. For instance, a decision-maker need only decide whether certain environmental benefits, such as preservation of the Tasmanian wilderness area, are worth more than the costs of achieving them.

Where descriptive material is provided to convey additional information on monetary assessments, as may occur in the case of fatal accidents where information on the number of deaths supplements the estimated money cost of accidents, the question again arises as to the wisdom of including the effect in monetary terms at all. The inclusion of a monetary and a physical measure will lead, in a sense, to double counting, and undue emphasis being assigned to the effect in question. However,

where the decision-maker is seeking a single value result, but requires additional information on a particular effect, the analyst should stress that the results are not additive and present the results in a form which minimises the risk of double counting of effects.

DISTRIBUTIONAL EFFECTS: AFFECTED PARTIES

The efficiency or allocational effects of a transport decision may be measured at different levels of incidence. For example a road improvement which results in time savings for a semi-trailer driver may increase the profits of the freight operator who employs him, or the time savings of many road users may be partly reflected in increased property values of firms which have better access to the improved road. In determining the efficiency effects, it is usual to assess them at the initial incidence level, which in the above examples, would be the road user.

The nature of a social audit, however, requires that the associated distributional effects be shown in full, or at least in so far as they are significant. With any proposal there will be gainers and losers, whether the effects are time savings, relocation, employment shifts or whatever. Under the standard cost-benefit analysis, the sum of these gains and losses to various parties will be equal to the net gain (loss) in efficiency as there is an implicit assumption that a dollar has the same value irrespective of to whom it accrues. However the resulting distribution of income (as determined by the distribution of the costs and benefits) may differ significantly from one option to another, and society may not be indifferent about the distributional impacts involved, and may value them more or less heavily than the dollar values would indicate.

The typical distributional aspects which decision-makers in the transport field appear to consider are whether a project favours high or low income travellers, leisure or commercial traffic, and also whether it improves transport services for those with poor access (through isolation or physical incapacity), or those with a high dependence on public transport (for example, central business district commuters and school children).

Where the decision-maker has made a value judgment that the distributional impact is relevant to a particular evaluation, he must then attempt to add (or trade-off) the efficiency and distributional impacts. Where two alternatives have the same efficiency gain, but one has a more favourable distributional impact, the decision will clearly be to support the latter. Where however, one option involves an efficiency gain of say \$50 million greater than another but a less desirable distributional impact, then the decision-maker must make a judgment as to whether the distributional gain under the first option justifies foregoing \$50 million in efficiency under the latter.

Finally, in some extreme cases the distributional considerations may totally override the efficiency aspect and become the sole criterion for decision-making. These cases fall within the category of 'community service obligations'; they cannot be supported on the basis of providing a net social gain as measured by cost-benefit analysis but are provided to meet distributional objectives. Where such community service obligations are identified, the assessment issue becomes how to satisfy the distributional objective in the most cost-effective manner, bearing in mind the desirability of mitigating the distortion of efficiency conditions, especially competition between different modes.

Turning to the actual recording of distributional effects, it has been noted that the planning balance-sheet, which records flows of costs and benefits between affected parties, is a most useful tool. Particular care is needed however in the recording of these effects to ensure that double counting of benefits or costs does not occur where transfer payments or transmitted benefits are involved.

Transfer payments are those which accrue to one party at the expense of another, for example where a town bypass causes traffic services such as petrol stations

in the town to decline at the expense of new facilities along the bypass. Transmitted benefits or costs are those which are transmitted to a particular group from the initial beneficiary. In the case of roads, they typically include higher land values, lower goods prices or higher profits of transport operators which result from the initial or direct impact of reduced road user costs.

In the case of transmitted effects and transfer payments, there is generally no net incidence effect which needs to be included in assessing the total gain or loss from the proposal¹. For transmitted effects, the net incidence has been included as a primary effect, and for transfer payments the net effect is zero. Hence from the point of view of assessing efficiency gain, these two groups of effects should be ignored. However, the distributional consequences may be of concern to decision-makers, and of course to local interest groups, who are less concerned with changes in welfare outside their own area.

The above considerations emphasise the importance of arranging the planning balance-sheet in such a way as to distinguish the efficiency effects from the distributional effects which are not associated with net changes in output, so that while all distributional effects are illustrated, the risk of double counting is minimised and the net efficiency gain is clearly shown.

USE OF WEIGHTS

A controversial issue in project evaluation relates to how far the analyst should go in establishing the relative importance of different effects and hence the overall ranking of alternatives, and how much of this task should remain with the final decision-maker.

If the analyst is to perform this function he will need a set of weights which can be applied to the various effects to yield an overall ranking. A number of methods of weighting have been suggested, particularly in the literature on multi-attribute utility analysis (for examples see Bee and Sargious 1982, Aboul-Ela, Stevens and Wilson 1982, Keeney 1973).

The main advantage of the use of weights claimed by its advocates is that they assist the decision-maker by clearly indicating the consequences of assigning different weights to different effects. In choosing between alternative results, the decision-maker is forced to make his subjective valuations explicit. Also an interactive process between the decision-maker and the affected parties may be established in which the weights are progressively changed until ultimately some kind of consensus is reached.

In supporting the case for the use of a specific set of weights, Cassidy and Kilminster (1978) have argued also for the incorporation of an explicit set of objectives in policy evaluation:

...we endorse the empirical construction of a social preference function or range of functions, whose arguments reflect the full range of objectives deemed relevant by the participants in the decision-making process. Concurrently, a set of weights reflecting the intensity of preferences of those involved in policy formation would be specified. Through use of an interactive feed back, involving a re-weighting and learning process entered into with the political decision-maker, the consequences of adopting alternative social preference functions and alternative weightings may be evaluated.

However the opposite view has prevailed in a number of major official reviews of evaluation methodologies, including the reports of the Leitch Committee in the United Kingdom (ACTRA 1978), the European Conference of Ministers of Transport (ECMT

1. An exception to this statement would occur where previously unemployed resources were brought into use, resulting in a net effect on output.

1981), and the National Co-operative Highway Research Program in the United States (Winfrey and Zellner 1971).

The Leitch Committee argued that the choice of weights for such areas as environmental worth and regional development would be both difficult to justify and would vary over time. Judgment was seen as being inevitably central to the process of trading off benefits and losses, and would be keenest when applied to specific examples.

This divergence of views on the use of weights appears to relate largely to the practical difficulties in reaching agreement on a set of weights. Such agreement may be possible in certain circumstances but it does not seem likely that general agreement on a set of weights could be achieved over a widely different range of project and transport issues. The circumstances of particular cases will frequently influence the weights, as will different temporal and spatial situations, different economic conditions and variations in public opinion.

Even where agreement on a set of weights might be possible, the selection of these is likely to be a time-consuming process, particularly where interactive processes between the affected parties, the analyst and the politician, are involved. Where, as in the Commonwealth sphere, transport decisions relate to a wide range of issues and circumstances, and often involve joint Commonwealth-State decisions, the problem would be aggravated. Consequently, little scope, if any, is seen for the use of a system of fixed weights in the assessment of the social worth of alternative options in the current Australian transport policy framework.

It is noted that fixed weights are used in formulae for the allocation of Commonwealth expenditure among States and among local governments under various programs, including some road programs. The key concern here however, appears to be with achieving equity and consistency in the allocation of funds between recipients, and not with establishing the social worth of the final expenditure.

PUBLIC PARTICIPATION

The social audit process may involve considerable participation by the public to identify affected groups, to provide information on the consequences of options, and to gauge public reaction to various proposals and effects. The need for public participation will vary greatly from case to case, but normally would be expected to be greatest for urban projects where large numbers of people are affected often in diverse and indirect ways.

An example of a proposal involving extensive economic, environmental, social and distributional effects is provided by the Victorian Transport Study proposal to close certain Melbourne railway lines (Victorian Transport Study, 1980).

It has been argued that full consideration of all relevant effects would have indicated that continued operation of the lines was warranted, and that by failing to allow for adequate public involvement, members of the Study Group remained unaware of the real social implications of the rail cuts on VicRail employees and members of the local communities affected (Andrews, Lacey and Moriarty, 1981, Andrews and Lacey, 1980).

The level of participation may range from a token level of consultation to effective involvement at every stage of the decision-making process. For social audit purposes, the role of public participation probably needs to be a two way process where the transport authority informs the public of the options and their likely implications, and the public indicates the social values it places on different options and effects, so that all parties to the decision-making process are better informed.

Expansion of public participation, along with the proposal for social audits, is a major tenet in the Government's transport policy. It is envisaged that transport users and employees should become more involved in discussion and participation in the

provision, development and improvement of transport services as well as in the formation of the economic, environmental, defence and social criteria for decision-making. Participation is to be brought about by encouraging 'public meetings, surveys of consumers' needs, publicity campaigns, distribution of information and the establishment of appropriate transport users' committees.' (ALP 1983).

Public involvement may occur at many stages of the decision-making process, including the identification of objectives, the establishment of preferred options from a number of alternatives, and the provision of information for the final stage of evaluation.

In generating input for social audits at the project level, it is the final stage which is of most relevance, and this involves seeking detailed information on social impacts and on the various groups affected. It has been argued however, that debate is likely to be more constructive and more realistic if the public is admitted at an earlier stage of the planning process (Alan M. Voorhees & Partners 1980, John Paterson Urban Systems 1975).

There has been a number of resumes of methods of involving the public in transport planning (for example, Alan M. Voorhees & Partners 1980, NAASRA 1976, BTE 1978, John Paterson Urban Systems 1975). These refer to public meetings, public hearings, search conferences, seminars, panel discussions, street meetings, small group meetings, field offices, formal surveys, contact with voluntary organisations, use of liaison committees and citizens' advisory groups, use of the media, letter-boxing, displays, and telephone enquiry services. The actual means selected will vary with the circumstances of the particular case, such as the geographical area affected, community awareness, the number and dispersion of affected parties, public opinion of the bureaucracy, and whether general or special interests are involved. Hence it is not possible to predetermine a preferred system of participation until the features of each case are known.

A survey of participation practices and experience in Australian transport planning conducted by the Bureau of Transport Economics (BTE 1978) reviewed approximately fifty planning exercises involving participation conducted by various institutions in five States. From a more detailed analysis of ten of these studies the survey concluded that planning for effective participation should be based on a review of the needs, aims and expectations of the groups involved. Successful participation must allow these needs to be satisfied, or at least be seen by the divergent groups as providing an opportunity for advancing their interests. The study identified four relevant groups, the community, politicians, institutions and the study group, and advocated preliminary analysis to determine the needs of each. The public participation program could then be designed to include techniques which would best allow the assessed needs to be fulfilled.

The study stated that 'most individuals in the community seek to satisfy some very simple needs to be heard, to have their interests considered, or to find out the implications of any course of action', and that 'often the simplest discussions satisfy these requirements best'. However, painstaking effort was seen as necessary to ensure that a balance was achieved between the various groups involved, and in particular that the needs of the habitual non-participant were satisfied.

Further points which are given prominence in other studies of public participation relate to:

- the importance of establishing the legitimacy of any public participation exercise and the credibility of the authorities;
- the need to ensure that all relevant information and all implications are considered;
- the need to alert the unaware to the extent of their interests;
- the recognition that specially trained personnel rather than staff of government departments or authorities may be required; and

- the need to consider carefully the resources to be devoted to community involvement.

On this latter point, NAASRA (1976) has indicated that failure to establish the time span and cost limits of participation procedures may result in their dragging on indefinitely with consequent cost implications. While it is clearly desirable to pre-empt such cost escalation, it is possible that the cost of taking the wrong decision may outweigh the increase in the costs of participation. There is an obvious need to aim at a balance between the costs of public involvement and any benefits which are likely to accrue from a greater flow of information and communication between the affected parties.

CHAPTER 4—EXAMPLES OF SOCIAL AUDIT METHODOLOGY

To illustrate the application of social audit methodology, broad outlines have been developed of the procedures which might be followed in preparing social audits for two different types of transport proposals. These outlines are in no way meant to comprise complete social audits. The examples chosen are an investment proposal for a new railway line, and a proposal for the unmanning of lighthouses.

The evaluation procedure is a social cost-benefit analysis with a planning balance-sheet presentation. The balance-sheets and distributional tables presented vary as between the proposals, illustrating the point made earlier that they should be custom-tailored to suit the particular case. The two sample outlines may not therefore be appropriate for other applications; transport issues are too heterogeneous to permit a realistic outline suitable for all proposals.

INVESTMENT IN A NEW RAILWAY LINE

For simplicity this investment is compared with a 'do nothing' option. In practice, a 'do nothing' option is frequently not a realistic option, particularly to a public transport authority, and it is necessary to define carefully a realistic 'do minimum' option as the base case.

The proposal, in brief, will involve the use of capital, labour and land resources in the initial construction phase, plus on-going operating and maintenance costs. It will generate benefits primarily in the form of cost savings to users who find the railway satisfies their requirements to a greater extent than the alternatives formerly available (converted travellers), and benefits to users who did not use alternative modes but are in fact new or generated travellers. Because the development of the new line may involve substantial (non-marginal) changes in demand for other modes and for connecting services, the analysis should relate to the whole journey being made as a result of the investment, and not simply to that on the new section of line. In addition, there will be social, environmental, distributional, and other economic consequences.

A summary of the costs and benefits to be assessed in estimating the net social gain (loss) to the country concerned is presented in Table 4.1. It represents the 'efficiency' effects of the project, and indicates the groups initially affected. This is followed by a description of the distributional effects of the proposal which allows the final incidence to be calculated.

Efficiency Effects

Table 4.1 follows the format used for the check-list of effects in Chapter 3.

The costs included in the table should be the costs to society of the resources used, that is, their social or resource cost, rather than their market price. The two may coincide, but for a number of reasons this may not be the case. For instance, a tax can raise the market price of a good above its true cost of production. Two inputs of which the social costs are frequently believed to diverge from market prices, are labour and energy.

The social cost of using labour on a particular project is equal to the contribution that the labour would make in its next most productive employment. Hence if the alternative for some workers directly or indirectly employed on the project would

be unemployed, then the social cost of these workers would be zero¹ for the period of unemployment, and a project which employs such labour would be socially more profitable on this account than one which used labour with alternative employment. What is important, however, is not only the employment-creation effects of a project, but its overall social profitability, and this depends on the social costs of *all* the resources used in the project, as well as on the social value of the project's output as compared with alternative projects.

Where the employment of labour obviates the need for retraining and other re-employment costs, then the social cost of employing this labour could in fact be negative in that a net saving in the use of resources will occur. To the extent that the individual welfare associated with performing a particular type of work is a legitimate effect to include in the analysis, then this would also be relevant to the calculation (Kolsen 1978).

Similarly, with respect to capital inputs, if it is the case that building the railway would employ otherwise idle capital equipment, directly or indirectly, then this equipment should be assigned its scrap value in estimating its social cost, or the social cost of the intermediate product it helps to produce.

Concern over energy usage, as has been explained in the previous chapter, is largely misplaced if reasonable estimates can be made of future energy prices. However, where serious cost penalties may arise due to energy supply restrictions, then this should be noted in the assessment, and if possible, estimates made of the likely occurrence of supply restrictions and their impact on energy costs.

Apart from the costs directly associated with construction and operation of the line, there are costs and benefits associated with the use and provision of connecting services and alternative modes, which may be attributable to the investment in question. For example, the introduction of the new line may result in some cost changes due to the carriage of additional passengers on services connecting with the new line, on any mode, and may also result in cost changes for existing travellers on these services resulting from the increased demand. For instance, there may be an increase in congestion costs, or alternatively, the increased patronage may lead to improved services. Similarly, a benefit may arise where converting users relieve pressure on existing facilities, as in the case of a reduction in road congestion costs resulting from an urban rail investment.

Environmental costs will include effects, if any, on air quality, noise levels and water quality, land severance costs, disturbance to aboriginal relics and sacred sites, and effects on the eco-system and other aspects of the natural environment.

Social costs could include disturbance to local communities, relocation costs for businesses and households, and accident costs.

A difficult part of the evaluation is the estimation of the benefits. These will result from cost savings to users of alternative modes who transfer to the railway (converting users) and from the benefits to new (generated) users.

In calculating these benefits cognisance should be taken of the complete trip being undertaken. In the case of converting users, for example, the complete trip may now be taken by rail as opposed to road, and cost savings may be greater than those for the new section alone. Similarly, the cost reductions which generate the increased demand in the case of generated traffic may not arise from the new section alone; for instance, they may depend on the convenience of being able to use one mode all the way.

The initial incidence effects in Table 4.1 could be summarised to some extent by providing a total of quantified monetary benefits along with the list of non-monetary effects.

1. This assumes there is no private benefit in remaining unemployed.

TABLE 4.1—ILLUSTRATIVE BALANCE-SHEET OF SOCIAL COSTS AND BENEFITS OF PROPOSED NEW RAILWAY

<i>Initial incidence effects</i>	<i>Groups affected</i>	<i>Monetary valuation^a</i>	<i>Non-monetary valuation</i>	<i>Page reference for further comments</i>
Associated mainly with construction of facility				
Costs of uncertainty during planning stage				
Deterioration of property	Users of affected environment, interested non-users	Yes		
Vandalism to acquired right of way properties	Provider/operator	Yes		
Psychological effects on community	Users of affected environment	Yes		Number and characteristics of persons experiencing hardship
Capital cost	Provider/operator	Yes		
Planning and design				
Labour	Employees also			Numbers employed, number previously unemployed. Employment effect however is reflected in monetary valuation
Materials				
Other				
Other construction costs				
Disruption during construction				
To traffic	Users of service	Yes		Or number affected and time lost per user
Pollution, dust, vibration, visual intrusion, other environmental	Users of affected environment			Number affected and indication of seriousness by use of quantitative data
Loss of output	Users of affected environment	Yes		
Temporary relocations (compensated)	Provider/operator	Yes		

TABLE 4.1(Cont)—ILLUSTRATIVE BALANCE-SHEET OF SOCIAL COSTS AND BENEFITS OF PROPOSED NEW RAILWAY

<i>Initial incidence effects</i>	<i>Groups affected</i>	<i>Monetary valuation^a</i>	<i>Non-monetary valuation</i>	<i>Page reference for further comments</i>
Acquisition of land, property	Provider/operator	Yes		
Costs of permanent relocation/severance/community disruption, compensated or uncompensated	(Provider/operator or users of affected environment; households (owners, tenants), business (primary, secondary, tertiary), institutions.	Yes		
Cost of replacement of physical unit		Yes		
Legal, financial, movement, and time costs		Yes		
Costs or benefits associated with changes in:				
Convenience, comfort				(Description of effects and (assessment of importance, (including comments by users.
Social & physical environment				
Production costs		Yes		
Access to facilities/activities		Yes		
Effect on householders' surplus		Yes		Householders' comments
Benefits of improved, or costs of inferior replacements, or benefits to locality such as slum clearance		Yes		Description of changed environment
Psychological effects of community disruption				No satisfactory measures available: some indication from neighbourhood indices, public reactions and descriptions of community behaviour and socio-economic characteristics of community
loss of social interaction, friends, sense of belonging, community pride, historical ties				

TABLE 4.1 (Cont)—ILLUSTRATIVE BALANCE-SHEET OF SOCIAL COSTS AND BENEFITS OF PROPOSED NEW RAILWAY

<i>Initial incidence effects</i>	<i>Groups affected</i>	<i>Monetary valuation^a</i>	<i>Non-monetary valuation</i>	<i>Page reference for further comments</i>
Associated mainly with operation of facility				
Rolling stock costs	Providers/operators	Yes		
Maintenance, operating costs	Providers/operators	Yes		
Changes in operating costs of and in benefits generated for users of alternative modes and connecting services	Providers/operators and users (by type of user) of alternative modes and connecting services	Yes	Changes in comfort, convenience arising from changes in patronage, frequency of service, quality of service	
Cost savings to converting users from	Converting users business, recreation/ tourism, education, shopping, public/ community service			
Travel time reductions	classified by vehicle type/pedestrian	Yes		
Avoidance of delays		Yes		
Vehicle cost reductions		Yes		
Improved safety		Yes	Supplemented by details of numbers of accidents/deaths	
Improved comfort/convenience			Description of effects and indication of importance	
Benefits to new or generated traffic (measured by willingness to pay for the service)	New users, (business, recreation/tourism, education, shopping, public/community service)	Yes		

TABLE 4.1(Cont)—ILLUSTRATIVE BALANCE-SHEET OF SOCIAL COSTS AND BENEFITS OF PROPOSED NEW RAILWAY

<i>Initial incidence effects</i>	<i>Groups affected</i>	<i>Monetary valuation^a</i>	<i>Non-monetary valuation</i>	<i>Page reference for further comments</i>
Environmental costs	Users of service, users of affected environment, non-users with an interest in the affected environment, providers/operators	Some estimates of damage costs possible; also mitigation costs and administration costs of pollution control		
Visual			Contour maps, photographs	
Air			Measured air pollution levels	
Noise/vibration			Decibel levels	
Water			Measured water quality	
Natural environment			Severance effects, effects of increased traffic	
Cultural heritage			Descriptive detail, subjective evaluation of importance	
Other economic effects involving a net change in social value added and due exclusively to the transport investment	Users of affected environment. Users or providers of other services or users of other environments	Yes		
Other effects				
National prestige	General public			
Defence benefits				
Other			Descriptive comment and subjective evaluation of importance	

a. The sum of values in this column represents total net monetary benefits of the project.

Source: Prepared by BTE.

Distributional effects

The benefits and costs described in Table 4.1 are social benefits and costs and do not necessarily indicate the actual impact on the groups shown. The final incidence will be affected by any transfer payments between groups, and by any shifts in the initial incidence of benefits and costs.

Transfer payments include:

- fare payments from rail users to rail authorities;
- transfers of income from industries in other areas to those serving the new line;
- effects on regional employment, population, and local authority finances, of development attracted by the railway; and
- those arising from differences between social (or resource) costs of goods and services and monetary payments for these goods and services.

In the latter case, a transfer occurs between the purchaser of the good or service and its owner. For example, if the social cost of labour employed in rail construction is less than the wage paid (because it was previously unemployed) then Table 4.1, which records social costs, will underestimate the monetary effect on the rail authority, and will not indicate the full benefit to the employed labour. An adjustment is therefore necessary which increases the amount paid for labour by the rail authority; and this increased cost is offset by an equal benefit to employees. Similar transfers occur in the case of land prices inflated from speculation, sales taxes paid to government, or compensation costs for relocated housing which are in excess of the actual replacement cost.

Shifted benefits and costs include:

- cost savings to rail users passed on in the form of lower prices to users of goods and services freighted;
- the gains from lower travel costs resulting from improved accessibility, passed on to property-owners as higher property values, and on to local authorities as higher rates;
- environmental costs may be shifted to property-owners in the form of lower rents, or may be passed to final consumers by businesses paying pollution control or other mitigation costs; and
- the benefits or costs of output changes associated with any change in social value added may be passed on to consumers or authorities.

The summation of these transfer payments, transmitted or shifted effects, and the initial incidence effects of Table 4.1 will indicate the final distributional effect on each group. Initially the effects in Table 4.1 will need to be collated for each group involved. This will result in a monetary impact and a number of qualitative comments on other effects for each group. When these are adjusted for transfers and shifts in incidence, a final distributional table can be provided showing the total monetary and non-monetary impact on each of the groups concerned.

The overall worth of the proposal can then be decided on the basis of Table 4.1 which indicates whether the proposal involves an efficient use of resources, along with the information on the incidence of the benefits and costs.

UNMANNING OF LIGHTHOUSES

The current proposal to reduce manning levels in Australian lighthouses, as examined in the Report from the House of Representatives Standing Committee on Expenditure (1983), provides a topical example for illustrating social audit procedures.

Assessment of the efficiency of the proposal involves a comparison between the cost savings which would result from substituting automatic equipment for a manned presence, and the benefits which would be lost in consequence.

These benefits relate to the contribution made by lighthouse keepers to coastal surveillance, weather reporting, search and rescue operations, protection of national estate or national heritage assets, protection of the natural environment, and avoidance of disruption to the way of life of lighthouse keepers and families.

Almost all of the benefits are of a kind for which monetary values cannot be readily assigned, if at all. Consequently, a social audit would need to present the opinion of the affected parties on the importance to them of the functions provided by lighthouse keepers, along with available data on, for example, the number of times a certain service has been performed in the past, and the probability of future performance. In the case of environmental damage for instance, projections of future visitor numbers would be part of the data required to estimate probability of damage.

The cost savings from unmanning lighthouses can be presented as a present value or as a series of equal annual values for each lighthouse. For the calculation of efficiency gains, they should reflect the social cost of maintaining a presence at lighthouses and not actual monetary payments. If for example, lighthouse keepers could not be employed in any other way, then on this count, there would be no costs to society if they were to remain employed as lighthouse keepers.

The cost savings can then be viewed in the light of qualitative statements on the importance of each of the benefits sacrificed at each lighthouse, and a judgment then made as to whether the lost benefits outweigh the cost savings.

The results of the efficiency analysis must then be considered along with an analysis of the distributional effects of the proposal to determine its overall merit.

The groups with an interest in the proposal are listed in the following table.

TABLE 4.2—GROUPS AFFECTED BY PROPOSAL FOR UNMANNING OF LIGHTHOUSES

<i>Group</i>	<i>Sub-group</i>
Providers of Service	Department of Transport
Resource/factor owners	Lighthouse keepers
Users of Services	
Coastal surveillance	Australian Coastal Surveillance (ACSO)
Search and Rescue	Persons in ships and aircraft, volunteer coastal patrols, police
Weather reporting	Bureau of Meteorology, fishing fleets, recreational shipping
Environmental control	
Natural areas	(Department of Home Affairs and (Environment, visitors, (scientists
National Heritage	
Non-users with an interest in the service	Environmental associations, State/local governments

Source: Prepared by BTE.

Table 4.3 summarises the relevant information in balance-sheet form for a hypothetical example with five lighthouse stations, and this is followed by a description of the distributional effects.

TABLE 4.3—ILLUSTRATIVE BALANCE-SHEET FOR PROPOSAL FOR UNMANNING OF LIGHTHOUSES

Effects	Lighthouse stations					Group affected	Comments: Page reference for further detail
	1	2	3	4	5		
On provider							
Resource cost savings (\$ per annum)							Annual equivalent values for 30 year period, using 10 per cent discount rate
Labour	20 000	10 000	30 000	12 000	40 000	Department of Transport	Numbers displaced. However employment effect is accounted for in cost savings
Other	10 000	5 000	2 000	–	5 000	Department of Transport	
On resource/factor owners							
Disruption to lifestyle	very important	not important	moderately important	very important	very important	Lighthouse keepers and families	Opinions of affected parties, qualifications for alternative life-style
On users							
Coastal surveillance	no importance	minor importance	no importance	no importance	no importance	Australian Coastal Surveillance (ACSO)	
Search and rescue	no importance	moderately important	minor importance	very important	no importance	Persons from ships/ aircraft directly affected	Number of lives and value of property saved over a given time period
	no importance	very important	no importance	moderately important	no importance	Volunteer coastal patrols	Number of rescues initiated by keepers and number in which they assisted
	minor importance	very important	no importance	minor importance	no importance	Police	

TABLE 4.3(Cont)—ILLUSTRATIVE BALANCE-SHEET FOR PROPOSAL FOR UNMANNING OF LIGHTHOUSES

Effects	Lighthouse stations					Group affected	Comments: Page reference for further detail
	1	2	3	4	5		
On users (cont)							
Weather reporting	not used	vital	moderate importance	minor importance	not used	Bureau of Meteorology; Local use (fishing fleets, recreational shipping)	Estimated saving of property and effect on value of fishing catch
Environmental control							
National Estate/ cultural environment	important	moderately important	moderately important	moderately important	important	Visitors	Keepers provide useful information and personal interest
	not important	moderately important	not important	not important	minor importance	Scientists/ academics	
	important	moderately important	very important	not important	minor importance	Department of Home Affairs and Environment	Estimated effect on vandalism, and hence savings in maintenance expenditure
Natural environment	minor importance	moderately important	minor importance	moderately important	moderately important	Visitors	(
	important	moderately important	moderately important	no importance	minor importance	Scientists	(Prevention/reduction (of damage by vandalism (and bushfires
	moderately important	minor importance	moderately important	very important	moderately important	Departments of Home Affairs and Environment	(

TABLE 4.3(Cont)—ILLUSTRATIVE BALANCE-SHEET FOR PROPOSAL FOR UNMANNING OF LIGHTHOUSES

<i>Effects</i>	<i>Lighthouse stations</i>					<i>Group affected</i>	<i>Comments: Page reference for further detail</i>
	1	2	3	4	5		
On non-users with an interest in manned lighthouse services	minor importance	moderately important	moderately important	minor importance	moderately important	Environmental Associations	
	minor importance	moderately important	minor importance	minor importance	moderately important	State/local governments	
Total monetary benefits	\$m (NPV) or (AEV)	\$m (NPV) or (AEV)	\$m (NPV) or (AEV)	\$m (NPV) or (AEV)	\$m (NPV) or (AEV)		NPV≡net present value at 10 per cent discount rate, 30 year period AEV≡Annual equivalent value, 30 year period, 10 per cent discount rate

Source: Prepared by BTE.

Distributional effects

As in the previous example, the incidence of benefits and costs described in Table 4.3 is based on net social benefits and costs. The adjustments necessary to indicate the actual impact on each group include the following transfer payments and redistributions resulting from shifts in initial incidence.

Transfer payments:

- Payments to factor owners in excess of their social or opportunity cost. For example, if lighthouse keepers were paid more than their opportunity cost, then as a result of demanning, the monetary saving by the Department of Transport would be greater than the social cost of the lighthouse keepers; and this difference would be offset by a loss of income to the keepers.
- Other instances, such as tax payments, where social costs differ from opportunity costs.
- Payments for lighthouse services by the shipping industry to the Department of Transport.

Shifts in initial incidence:

- Benefits to ACSO, police, volunteer patrols, the Bureau of Meteorology and environmental organisations which are passed on to the general public or to specific users such as shipping, aircraft, visitors, and scientists.

The main distributional issues can then be seen to relate to the effects on income or other benefits of lighthouse keepers, and the extent to which the shipping industry may be contributing towards services provided by a manned presence at lighthouses, the benefits of which accrue to other users, such as tourists, or recreational shipping.

CHAPTER 5—SOCIAL AUDITS IN AUSTRALIAN TRANSPORT EVALUATION

This final chapter in the Report examines the potential use of the social audit approach in relation to Australian transport issues. In particular, it covers the development of guidelines and other proposals for promoting the use of the social audit as requested in the terms of reference for the BTE study. The chapter commences with a brief review of the objectives and characteristics of the social audit approach and its potential role with respect to transport issues.

SUMMARY OF SOCIAL AUDIT CHARACTERISTICS

The social audit approach is designed to counter a number of inadequacies associated with traditional social cost-benefit analysis. These include the difficulty experienced by decision-makers and the public in understanding the aggregate results of computerised cost-benefit programs; the lack of emphasis on social and environmental effects; the need for suitable arrangements for public involvement in the decision-making process, in particular to indicate the nature and extent of socio-economic implications of proposals; and the failure to identify distributional effects adequately, particularly those on parties indirectly affected.

A social audit approach to evaluation is appropriate not only to transport, but to many areas where social and environmental effects and distributional aspects are important. However transport is a prime candidate with its wide-spread implications for mobility, accessibility, relocation and land-take, property values, travel time, comfort and safety, pollution and other environmental effects. In many instances these effects are not reflected, or adequately reflected, in market prices and social costs and benefits will vary from private costs and benefits; a social-audit type approach is therefore needed to indicate the full returns to society from a given proposal or action.

Some evaluations with the characteristics of a social audit have been conducted, mainly in relation to investment proposals, and the approach used has been closely akin to traditional social cost-benefit analysis. The social audit approach however has a much wider potential range of applications. With respect to areas of government decision-making, this could include the evaluation of subsidies, funding proposals, regulations and controls, and output and pricing decisions for government undertakings. These evaluations could relate to future planned actions, or to existing policies or undertakings.

A review of a number of representative studies both overseas and in Australia has highlighted the extensive effort which has been directed towards devising appropriate measures of social and environmental impacts. Many transport effects which are not directly priced can nevertheless be assessed in monetary terms. In some cases the direct costs, of for example pollution, can be measured in terms of loss of output, increased production costs, or higher health costs. In other cases proxy measures such as differences in property values between affected and unaffected areas, or estimates of the compensation required to offset the adverse effects of a proposal, have been used. Where no direct measure of the effects can be made, it is often possible to identify who will be affected and to gauge from them what impact they believe the proposal will have.

It would clearly be ideal if all relevant social costs and benefits could be included in an evaluation and subjected to the best available measurement. In practice this is simply not feasible. The measurement of some effects and their impact on a range of affected parties will be costly and time consuming, particularly if extravagant plans for public participation are involved. Those conducting the evaluation will need to weigh carefully the expected benefits in terms of a better and more balanced information base, and possibly a more informed and involved public, against the significant costs of conducting more in-depth studies.

The methodology which best appears to suit the general requirements of a social audit is social cost-benefit analysis with planning-balance sheet presentation. This is a flexible approach with the following desirable features:

- all effects which can be measured in monetary terms can be summed to indicate a net monetary gain or loss from the proposal;
- effects for which a monetary valuation is not possible are listed alongside the monetary effects to help the decision-maker make a subjective judgment as to their significance (for example, if the aggregate monetary effect is a net social loss of \$20 million, and the non-monetary effects are positive, the decision-maker can consider if the latter effects are worth the \$20 million needed to justify the proposal); and
- the balance-sheet presentation enables the main parties affected, and all effects on them to be identified.

Details of this methodology, some of the problems involved in applying it, and check-lists of the main effects and affected parties, are provided in Chapter 3. Two examples of its application to transport issues are provided in Chapter 4. It is noted that while the social audit approach would generally provide a more balanced evaluation by giving more emphasis to social and environmental aspects and distributional issues, it can at the same time add greatly to the evaluation task. Some contributing factors are the need for public participation, the difficulty in measuring indirect effects with controversial values, and the need to avoid double counting some effects and thus distorting the indicated final social impact.

PROMOTING THE SOCIAL AUDIT APPROACH

The wide range of potential areas of application of the social audit methodology, and the considerable costs which may be involved, make it very difficult to generalise about procedures to be followed in any particular case. Social audits of different proposals will require somewhat different approaches. Hence guidelines for the application of the social audit methodology can only be developed at a broad general level, and will need to be adapted to the needs of individual cases. The varying levels of Federal and State control over transport issues also make it difficult to generalise about procedures for promoting its use.

The form of social audit proposed does not constitute a new technique, or a dramatic departure from existing evaluation practices. Rather it represents a development of existing practices and a change of emphasis, aimed at placing social, environmental and distributional consequences on a par with those effects valued in monetary terms, and presenting all information in a form comprehensible to all interested parties. Hence its adoption does not call for revolutionary changes by current practitioners of transport evaluations. The heterogeneity of transport proposals however, suggests that the social audit methodology should be seen as an evolving one, the form of which will become more clearly defined following a range of practical applications.

Promotion of the methodology may involve the extension of current transport evaluation procedures to encompass social audit principles, as well as its use in the analysis of projects and decisions not previously subject to formal evaluation.

The next section considers the avenues open to the Commonwealth Government for promoting the social audit methodology, and this is followed by a discussion of the problems which would be encountered in encouraging or expanding its use. The key issue raised is whether promotion should be limited to persuasive means, or whether some use should be made of mandatory requirements. Such a step would have significant repercussions and would of course need careful consideration.

Commonwealth initiatives

The most obvious task in promoting the use of the social audit methodology is to publicise it, and this report is seen as the first step in this direction. It is hoped that it will generate discussion of evaluation procedures for Australian transport amongst practitioners, decision-makers and other affected parties. The Commonwealth Government could promote this dialogue through its consultative machinery, namely the Australian Transport Advisory Council, the Marine and Ports Council of Australia and the Transport Industries Advisory Council.

In addition to facilitating this dialogue, the Commonwealth could contribute to the development of applications of the social audit approach by encouraging (and possibly requiring) social audits in evaluations undertaken for the Commonwealth, for example, by the Bureau of Transport Economics, the Department of Transport, the Inter-State Commission, consultants and others. In the recent inquiry on the Alice Springs to Darwin railway for instance, the terms of Reference specified the use of social audit procedures.

The Commonwealth has a particular interest in the outcome of evaluations of transport proposals undertaken with respect to Section 96 Grants to the States for transport purposes, and the actions of Commonwealth Statutory Authorities producing transport services, although it is normally not directly involved in the conduct of these evaluations. To the extent that Statutory Authorities (or other Government business undertakings) require subsidisation by the taxpayer, there seems to be a case for undertaking social-audit type evaluations. Social audit evaluations would be desirable also in the case of Section 96 Grants which absorb such a large part of Commonwealth investment in transport; however, it will not be a simple matter to promote their use in this area where the bulk of project evaluation work is done by the States.

Persuasive versus mandatory measures

A considerable amount of social-audit type evaluation work has already been done on Australian transport issues. However, this has generally been in the nature of individual ad hoc studies which have not enabled the development of the breadth of coverage and consistent standards achieved overseas where mandatory requirements and guidelines are operative.

With no change in existing evaluation procedures, it may be possible to encourage a greater emphasis on social, environmental and distributional factors. However, it seems unlikely that the persuasive means open to the Commonwealth, such as publicising potential applications and applying the technique in its own sphere of influence, would lead to dramatic changes.

The alternative would be some kind of mandatory approach, for example making social audit evaluations a necessary condition for Commonwealth specific purpose grants. Such an approach would be a major departure from existing practice in Australia and the following important considerations need to be assessed.

A full social audit could be a costly procedure, and not warranted for minor decisions, where a brief summary of effects and orders of magnitude might be sufficient. To require social audits to be prepared according to detailed and comprehensive guidelines will in some cases result in excessive evaluation costs.

Ideally the scope of the audit should be related to the size of the potential gains from making the best decision in the particular case. However, it would be no easy matter to ascertain what the order of these gains might be. Nor is it necessarily the case that the potential gains from better decision-making are larger the larger the schemes involved. Hence the use of a specified percentage of the project cost as a guide for the level of expenditure on evaluations will not always be appropriate. However, the size of a project and the diversity of alternative solutions in regard to costs and range of effects will be relevant factors in many instances.

This lack of information and absence of any rules of thumb which would enable the appropriate scope of evaluations to be decided, suggest that preliminary studies to determine whether evaluations are justified would be desirable.

A further problem in deciding the appropriate scope for social audits lies in determining the level at which they should be conducted. This issue comes to light in the review of State Road Authority urban road evaluation procedures (Alan M. Voorhees 1980). This paper noted that ideally States should engage in system planning as well as detailed evaluation at the project level for choice among alternatives. The ideal was contrasted to the existing situation where 'projects tend to be undertaken to complete a historically determined network in which evaluation becomes a second-order problem and cost-effectiveness the universal criterion'. The Voorhees review also draws attention to an additional difficulty in setting detailed guidelines for evaluations where States are involved. This arises from the variation in circumstances and regulations that exists from State to State. To set the same requirements for each State might then be unreasonable.

While these problems in identifying the appropriate size, form and level at which social audits might be applied are important, it is clear from overseas experience that they are not insurmountable and that mandatory requirements and guidelines for social audits are operationally feasible. The overriding consideration in assessing a possible mandatory requirement for social audits is the extent to which it will result in more consistent and complete evaluation and the likely benefits from these improved evaluations.

It seems inevitable that the persuasive use of the social audit approach will be hampered by a reluctance on the part of road construction and transport authorities to adopt it. This applies particularly to the evaluation of those social, environmental and distributional effects which do not affect the commercial outcome. The mandatory approach can be used to counter this reluctance, but often at a considerable cost in terms of evaluation expenses.

Currently there are very few mandatory requirements for evaluations in Australia, especially in comparison with those which exist for roads in overseas countries. Because expenditure on roads in Australia absorbs a large proportion of the transport budget, and is high in absolute terms, it is a key area of potential application of social audit procedures. However, the potential benefits from extensive Commonwealth evaluation with respect to road funds allocation may not be realised in practice due to the lack of Commonwealth control over project selection in many areas.

While in the United States mandatory requirements for evaluations of road projects financed from Federal funds have operated for many years, within Australia, the only Commonwealth legislation now requiring evaluations is the *Australian Bicentennial Road Development Trust Fund Act 1982* and here the specified requirements for evaluations are very limited (see Appendix 4).

The Commonwealth Bureau of Roads examined the problem of ensuring adequate treatment of the social and environmental impact of urban and rural roads in 1973, and recommended the following policy initiatives (CBR 1973, p7):

- the introduction of specific requirements attaching to grants of financial assistance;

- co-operative preparation of guidelines for environmental impact statements; and
- direct and active participation and influence by Australian Government representation in a planning process involving all levels of government and affected public.

The Commonwealth Bureau of Roads options were not taken up by the Government. However in 1974 program approval procedures were introduced with the apparent aim of ensuring Commonwealth priorities were followed in the allocation of road funds, and at the same time provision was made for the establishment of consultative planning committees. Due to opposition from the States, the planning committees were not implemented, and the program approval procedures were gradually relaxed and eventually withdrawn. Further attempts to achieve more control over and introduce more rationality into road expenditure programs such as the development of long-term expenditure plans, and the formulation of Commonwealth-State advisory committees have also been thwarted by lack of co-operation from the States.

The question of mandatory requirements for transport evaluations is an issue which extends well beyond the scope of this study. The above comments highlight some of the broad considerations, but it seems impossible to generalise about the likely consequences. These will vary depending on the nature of the issue and the costs and benefits involved, and also the institutional framework and inter-governmental relations involved in the decision-making process.

Mandatory requirements for social audits would be justified where the social benefits of such evaluations are significant in relation to the costs involved, and could not be realised in the absence of the mandatory measures. The careful application of this test on a case by case basis would be desirable before any major decisions are taken to direct, rather than influence, the nature of transport evaluations.

APPENDIX I—SOCIAL COST-BENEFIT ANALYSIS

This appendix contains two sections. The first provides a broad outline of the steps involved in social cost-benefit analysis, and the second section presents an extract from Lichfield et al (1975) on the application of social cost-benefit analysis, and some popular misconceptions about its scope.

OUTLINE OF PROCEDURES INVOLVED IN SOCIAL COST-BENEFIT ANALYSIS

Social cost-benefit analysis is a formal procedure for evaluating projects or proposals to determine whether they are advantageous from the point of view of society as a whole, and to allow alternative projects to be ranked in order of their contribution to social welfare.

This involves assessing the contribution to society of particular proposals, by determining the net value of the output or service produced, having taken into account all benefits and all costs to all members of society affected by the project. It provides a measure of the economic efficiency of proposals, given the distribution of income.

The analysis involves the following steps.

I. Identification of the relevant benefits and costs

Conceptually this step is straightforward but in practice can present problems where transmitted benefits or transfer payments are involved, or where secondary effects on output occur which may or may not be net. The point at which valuation occurs may also be relevant. For example, the benefits from an agricultural improvement depend in part on the increase in value of the produce, which may be priced at the farm or at the market. If the market price includes an element of rent accruing to transport operators, then that rent is properly attributable to the agricultural improvement, though it would not be included in the value as indicated by the farm price.

II. Valuation of the benefits and costs

Problems arise here firstly because market prices may not reflect the true cost to society of using resources, or the true benefit arising from a product or service, and secondly because some outputs do not have market prices, for example, the service provided by roads, police protection, wilderness value or clean air. Social cost-benefit analysis attempts to correct for these deficiencies by 'shadow pricing'. In the case of inputs, this involves estimating the social opportunity cost of the resources used, where social opportunity cost represents the value to society of using a resource in its next most profitable employment. Calculation of social benefits recognises that a good or service may have a value over and above the price which is paid for it. This difference is the 'consumer's surplus', and the total value of the good or service is given by consumer's 'willingness to pay' for it. However there are a number of measures of 'consumer's surplus', and it is obviously desirable to choose the most appropriate for each purpose, or to indicate the effects of choosing one rather than another.

III. Sensitivity testing where values are uncertain

As benefits and costs, particularly those occurring in the future, can rarely if ever be estimated precisely, it is customary to use a range of values and test the outcome of the analysis for variations within this range. In this way, the importance of differences in estimates of future values can be gauged.

IV. Reduction of values to a common denominator where benefits and costs occur at different time periods

A discount factor, usually representing the social opportunity cost of capital, is used to render benefits and costs accruing at different periods in 'present value' and hence comparable terms.

V. Determination of whether explicit weights should be incorporated to resolve equity considerations

In most analyses, dollar values are assumed to carry the same benefits or costs irrespective of to whom they accrue, and the distributional effects of projects receive separate comment.

A possible alternative option is to apply specific weights to the various benefits and costs in the analysis and so influence the results depending on the incidence of these benefits and costs on various groups in society.

VI. Choice of criteria for presenting results

The results of an analysis may be presented in the form of a net benefit or cost (net present value), a ratio of benefits to costs, or a rate of return on the investment (internal rate of return).

The ranking of a number of projects may vary according to the criterion chosen, and there are certain problems associated with each. The usefulness of each criterion also depends on the problem at hand, for example, if capital rationing is necessary, net present values will not be sufficient.

It is often desirable therefore to present results in several ways.

EXTRACT ON THE APPLICATION OF SOCIAL COST-BENEFIT ANALYSIS

The following extract describes the scope of social cost-benefit analysis (SCBA) and discusses some misconceptions about its application (Lichfield et al 1975).

Perhaps we should try first to clear up some popular misconceptions. The most obvious is that SCBA is confined to 'economic' applications. It is therefore not thought to be planning analysis, since planning is reckoned to be a wider-ranging activity than one which is purely economic. This error might be less prevalent if the full title of the analysis were always stated when it is discussed, which is SCBA. The costs and benefits should include all of the social advantages and disadvantages of planning proposals, that is, all which are of interest in society. Any decision which makes individuals feel better or worse off is legitimately the subject-matter of CBA irrespective of the label which may be conveniently attached to it. Kinship ties, aesthetics, and community action are all susceptible to this kind of analysis. They may, of course, be susceptible to other kinds of analysis also. But sociological or aesthetic appraisals are not precluded by or incompatible with the undertaking of CBA.

Another frequent misconception is that CBA is limited to items for which monetary values are readily obtainable. As much as possible measurement in money values is sought, and it is conventional practice to present a summary table of results for those factors for which quantitative estimates of their value in money terms is possible. Yet no respectable CBA will omit discussion of the alternatives in terms of unquantified costs and benefits in the written material accompanying the table of results. In those cases where the analysts do make judgements as to the preferred alternative, the unquantified items ought in general to be carefully considered in relation to those for which a valuation has been made. A recent example is the work of the Roskill Commission on the siting of the Third London Airport.⁵⁰ In presenting the summary analysis the Commission was fully aware that it contained only partial evidence; some of the other relevant evidence related to non-measurable items. In arriving at their recommended choice of site the members were at great pains to take account of all relevant evidence that had been produced, not just the quantified cost-benefit estimates appearing in the table summarising the analysis based upon their Research Team's studies. The assessment of alternative proposed rail links between Heathrow

Airport and Central London is another example of a CBA containing a convenient summary of qualitative factors affecting choice but not capable of quantitative assessment.⁵¹

The principles by which incommensurable and intangible items should be handled are no different from those where items can be quantified in common units. Indeed, it is helpful to see unquantified costs and benefits in perspective by referring to the way they might be assessed were sufficient evidence available. Because in the past some advantages and disadvantages of planning proposals have not been capable of quantification in common units the possibility of obtaining sufficient evidence is not ruled out. "Critics frequently confuse (a) the logical possibility of valuing an intangible outcome, (b) the empirical possibility of evaluation, and (c) the morality of the value if one is derived."⁵² The fact that items exist which cannot be expressed in units common to other items does not invalidate the approach but only limits its usefulness, given the current state of the art.

Another misconception is that all items in a CBA must necessarily be aggregated to give an overall result. Of course, one of the purposes of the exercise is to try to derive evidence of advantages and disadvantages in a rough order of magnitude. But each item needs to be interpreted and the validity of the results appraised. Nor is it correct to assume that a "rate of return" or a figure of "net present value" must be derived from the analysis. It is true that in cases of possible heavy investments, such as in transport planning, it may be practicable and desirable to try to determine whether the investment of a given amount of resources in one sector is justified at the expense of other sectors, such as housing or education. We might also wish to know the rates of return for society that would result from particular plans compared with a decision not to undertake them. Yet without estimating these the analysis may nevertheless indicate which of alternative courses of action will make members of society potentially better off. (Lichfield et al 1975, pp.67-68).

APPENDIX II—UNITED KINGDOM FRAMEWORK FOR TRUNK ROAD APPRAISAL

The following table describes the appraisal framework developed and recommended by the Standing Advisory Committee on Trunk Road Appraisal in the United Kingdom, for the public inquiry stage of the assessment of a trunk road proposal. It relates to a hypothetical scheme involving four options for a by-pass road around Barchester, and shows the effects of each option on the parties involved. The parties are divided into six major groups: travellers, occupiers, users of facilities, authorities concerned with policies for conserving and enhancing the area, authorities concerned with transport, development and economic policies, and the financing authority.

TABLE II.1—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD ASSESSMENT:
CASE OF BARCHESTER BY-PASS

Group 1: Travellers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Car users	Time savings	£m (PVB)	4.21	3.45	3.81	0	<p>Notes A,B and C apply to the first nine lines</p> <p>A. Each column shows the improvements of the particular route over the 'do minimum' option. Hence the 'do minimum' entries are zero.</p> <p>B. Present value of benefits (PVB) for 30 year periods from the expected date of opening and discounted to 1976 prices at 7% p.a.</p> <p>C. It is assumed that national average figures for vehicle occupancy and for accident rates and costs will apply.</p>
	Vehicle operating cost savings	£m (PVB)	-0.12	+0.20	0.00	0	
Users of light goods vehicles	Time savings	£m (PVB)	-0.96	+0.87	0.99	0	
	Vehicle operating cost savings	£m (PVB)	0.04	0.03	0.05	0	
Users of other goods vehicles	Time savings	£m (PVB)	0.87	0.38	0.12	0	
	Vehicle operating cost savings	£m (PVB)	-0.04	+0.02	-0.02	0	
Bus operators and passengers	Time savings	£m (PVB)	0.58	0.51	0.67	0	
	Vehicle operating cost savings	£m (PVB)	-0.01	0	-0.02	0	
All vehicle travellers	Value of accident savings	£m (PVB)	0.19	0.14	0.14	0	

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 1(Cont): Travellers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
All vehicle travellers (cont.)	Reduction in casualties:						The figures indicate the probable reduction in casualties over the 30 years assessment period if the national average rates and distribution between groups applied to each alternative. They take no account of the safety implications of the detailed design of the new routes.
	Fatal	number	4	3	3	0	
	Serious	number	32	24	24	0	
	Slight	number	59	43	43	0	
	Comfort and convenience		Very good	Good	Good	Poor	
	View from road		Attractive, rural	Less attractive	Less attractive	Attractive, urban	
	Traffic delays during construction	£m (PVC)	0.02	0.02	0.25	0	PVC=present value of of costs. Figures are calculated using the same assumption on traffic composition as for travel benefits. No detailed survey has been undertaken.

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 1(Cont): Travellers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Pedestrians (2-3 million pedestrian movements per annum)	Change in amenity		Pedestrian- isation of Town Centre and removal of heavy traffic will improve the quality of the adjacent streets	As modified blue	As modified blue	An increase in traffic will lead to reduced amenity	
	Safety		Segregation of pedestrians and vehicles will improve safety	As modified blue	As modified blue	With the increase of traffic/ pedestrian conflict the danger of accidents will increase	
	Severance (new)		Several foot- paths diverted	Pedestrians will have to use subway to reach hospital	As modified green		

TABLE II.I (Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 2: Occupiers							
Sub-Group	Effect	Units	Modified Blue	Modified Green	District Council Route	Do Minimum	Comments
Residential	Properties demolished	Number	13	3	2	1	Properties demolished on blue route are Circa 1900
	Noise increase	Number of houses experiencing an increase of:					The changes in noise are difference between the forecast for each option for 1998 and the existing levels. The units are dB(A)L ₁₀ 18hr. 6am-midnight
		More than 15dB	0	1	6	1	
		10-15dB	22	27	39	110	
		5-10dB	52	52	40	300	
	Noise decrease	Number of houses experiencing a decrease of:					
		More than 15dB	0	12	11	0	
		10-15dB	138	248	181	0	
		5-10dB	266	142	117	0	
	Visual obstruction	Number of properties within 300m of centre line subject to:					
		Severe	3	4	3	Nil	
		Significant	8	6	10	Nil	
		Slight	15	21	18	Nil	

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 2(Cont): Occupiers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Residential (cont)	Visual intrusion		Least intrusion	River crossing visible from town	As modified green	No changes	Report of Landscape Advisory Committee is relevant
	Severance						
	Relief to existing severance		Most effective	Effective	Effective	No relief	
	Imposition of new severance		Some new severance	Greatest new severance	Some new severance	No new severance	
	Disruption during construction		Slight	Slight	Slight	Nil	
Industrial Premises			3 premises experience an increase in noise of approx 4dB(A) _{L₁₀} 15 years after opening. Since they are engaged in engineering work, this increased noise will not affect their operations.	As modified blue	As modified blue	No change	

TABLE II.1 (Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 2(Cont): Occupiers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Commercial premises Office building	Noise increase	Number subject to increase of more than 15dB(A) _{L₁₀}	1	1	1	3	Average office occupancy on the new routes is 100-200 people. 'Do minimum' route will affect 600- 800 office workers.
	Noise decrease	Number subject to decrease of more than 15dB(A) _{L₁₀}	6	7	4	0	
	Visual obstruction	Number of properties within 300m of centre line subject to:					
		Severe	0	0	0	0	
		Significant	0	0	1	0	
		Slight	1	1	2	0	
	Severance Relief to existing severancement		Greatest improvement	Some improvement	Some improve- ment	No improvement	
	Imposition of new severance		Nil	Nil	Slight to 2 offices	No change	
	Disruption during construction		Nil	Nil	Slight	Moderate	

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 2(Cont): Occupiers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Commercial premises (cont) Shops	Noise increase	Number subject to increase of more than 5dB(A) _{L₁₀}	2	2	3	18	Warren Street Traders Association (representing 30 shops) opposes the modified blue and green routes since Surveys have shown major part of trade comes from through traffic.
	Noise decrease	Number subject to decrease of more than 5dB(A) _{L₁₀}	27	31	29	8	
	Visual obstruction	Number of properties within 300m of centre line subject to:					
		Severe	0	0	0	0	
		Significant	0	1	2	0	
		Slight	2	1	1	0	
	Severance Relief to existing severance		Some improvement	Some improvement	Some improvement	No improvement	
	Imposition of new severance		1 shop severely affected	Slight	Slight	No change	
	Disruption during construction		Slight	Slight	Slight	Moderate	

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 2(Cont): Occupiers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Schools and hospitals							
Barchester Primary (233 pupils in 1978)	Noise effect on 1 classroom and assembly hall and playground	dB(A)L ₁₀	Reduction of 5dB(A)L ₁₀	Reduction of 5dB(A)L ₁₀	Reduction of 2dB(A)L ₁₀	Increase of 3dB(A)L ₁₀	Based on 15 years after opening
	Severance		Existing access is improved	As modified blue	Existing access is improved but only marginally	Increased traffic flow will hinder access to school	
Horton Cottage Hospital (40 beds Accident Unit and Out-patients Dept. open weekdays only)	Noise increase	dB(A)L ₁₀	Increase of 3dB(A)L ₁₀	Increase of 3dB(A)L ₁₀	Increase of 5dB(A)L	No effect	Based on 15 years after opening
	Visual obstruction		Slight to Outpatients Dept.	Slight to Outpatients Dept.	Slight to Outpatients Dept.	No effect	
	Disruption during construction		Nil	Slight	Severe	Nil	

TABLE II.1 (Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 2(Cont): Occupiers

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Farming		Number of farms affected by land take	12	10	11	0	
	Land take	Hectares of land:					
		Grade II	6.8	10.3	12.2	0	Based on MAFF land Classification, compensation included in Group 6
		Grade III	25.0	19.5	20.3	0	
Open space							
Horton Golf course (area 46 hectares)	Land take	Hectares	0	5.7	1.9	0	Effect on Users appears in Group 3
Low Road Methodist Chapel (area 28 hectares)	Land take	Hectares	0.6	0.6	1.0	0	Effect on Users appears in Group 3

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 3: Users of facilities

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Town centre shoppers High St./Market St. (100,000-160,000 shoppers per week)	Reduction of vehicle/pedestrian conflict		Reduces and diverts traffic sufficient to allow pedestrianisation	As modified blue	As modified blue	Existing pedestrian/vehicle conflict will increase with traffic growth	Based on updated County Council 1967 Shopping Study amended in 1975 Structure Plan
Community Centre Civic Theatre (used by average of 300 people each week in 1977)	Change in traffic noise in auditorium		5dB(A)L ₁₀ reduction	3dB(A)L ₁₀ reduction	3dB(A)L ₁₀ reduction	To maintain current noise level will require extensive sound proofing and air conditioning	Reductions are mainly in peak traffic periods and significant mainly at weekends
Public Library (used by average of 1,200 people each week in 1978)	Change in traffic noise in reading room		3dB(A)L ₁₀ reduction	3dB(A)L ₁₀ reduction	3dB(A)L ₁₀ reduction	Existing noise will increase with traffic growth	
Day Care Centre (used by average of 600 old age pensioners and helpers each week in 1978)	Effect on access for the elderly		35-40% reduction in traffic	35-40% reduction in traffic	35-40% reduction in traffic	Increase in traffic	Average age of members 74 years
Warren Street Shops	Convenience to customers		No facilities on new route	As modified blue	As modified blue	No effect	

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 3(Cont): Users of facilities

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Horton Golf Club (382 members in 1977)	Reduction of amenity due to land take		No effect	Reduced to 17 holes. Substantial redesign and construction could restore it to 18 holes but would require closure for 2 growing seasons	Remains at 18 holes but edge of course adjacent to 12th hole is taken	No effect	
Sailing Club (106 members in 1977)	Reduction in amenity (visual intrusion, sailing conditions)		7.6m embankment and river bridge effectively prevents sailing on last 200m of course	8.5m embankment and river bridge effectively prevents sailing on last 100m of course	7m embankment and river bridge cut sailing course approx. in half	No effect	Few sailing clubs in the area. Recently built club house supported by Sports Council
Horton Hunt Club (236 members in 1978)	Severance		2 fox runs north of town severed	As modified blue	As modified blue	No effect	
North Waxton Ornithological Society (57 members in 1977)	Loss of abandoned gravel pits		Gravel pits partly filled. Proximity of new road will disturb birds	As modified blue	Eastern part of gravel pits filled. Proximity of new road will disturb birds	No effect	
Barchester Fishing Club (85 members in 1978)	Loss of fishing rights in gravel pits		Gravel pits partly preventing fishing	As modified blue	East part of gravel pits filled leaving only a quarter of original area for fishing	No effect	

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 3(Cont): Users of facilities

<i>Sub-Group</i>	<i>Effect</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Low Road Methodist Chapel (average congregation 35)	Noise increase		5dB(A)L ₁₀ increase	3dB(A)L ₁₀ increase	9dB(A)L ₁₀ increase	No effect	These increases are less apparent on Sundays
	Visual obstruction		6m embank- ment 30m from church	As modified blue	8m embank- ment 25m from church		
	Severance from main part of town		Slight severance	Slight severance	Moderate severance	No effect	Land take effects appear in Group 2. Compensation in Group 6.

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 4: Policies for conserving and enhancing the area

(Views expressed are those of the relevant Authority unless otherwise stated)

<i>Policy</i>	<i>Authority</i>	<i>Interest</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
To protect the Hill Street Outstanding Conservation Area	Dartshire CC Barchester DC	Improvement of the environmental quality of the conservation area and reduction of pedestrian/vehicle conflict		Reduces and diverts traffic sufficient to allow pedestrianisation	As modified blue	As modified blue	Traffic levels will increase with time to detriment of cobbled square	Department of Environment designated area as Outstanding in 1976. Contains one Grade 1 and three Grade II listed buildings.
To protect other listed buildings outside Conservation Area	DOE Dartshire CC Barchester DC	Effect on Wattle Hall, a Grade II listed building		Road in 1m cutting 500m from house	Road on 1.3m embankment 300m from house	No effect	No effect	Listing is based on interior fittings and ceilings
To preserve Antiquities	DOE Dartshire CC Barchester DC	Effect on tumuli	No. of tumuli destroyed	3	3	2	0	The area has numerous tumuli of the same period. There will be opportunity for the Dartshire Archaeological Society to excavate
To protect Landscape in Avon Valley	Dartshire CC Barchester DC Orford PC National Tourist Board	Effect on view from Orford Church referred to in Wilton's Poem 'Across the Lea'		No effect	Road on 1m embankment 600m from Church (no comment received from County Council)	Road on 2m embankment 500m from Church	No effect	Report of Landscape Advisory Committee is relevant. Orford Church has Saxon Arch, Georgian Choir Stalls and is linked in legend to Hereward the Wake

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 4(Cont): Policies for conserving and enhancing the area

<i>Policy</i>	<i>Authority</i>	<i>Interest</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
To restore derelict land in the Avon Valley	DOE Dartshire CC Barchester DC	Restoration of abandoned gravel pits	Hectares	6 unaffected, 9 can be used for spoil tips and restored	8 unaffected, 7 can be used for spoil tips and restored	10 unaffected, 5 can be used for spoil tips and restored	No effect	See also Dartshire CC Policy on Country Park. See also British Waterways Board Policy on Canal Network
To create a Country Park Leisure Centre adjacent to River Avon West of Barchester	Proposed and supported by: Dartshire CC Barchester PC Countryside Commission Opposed by: Horton PC	To create a Country Park and Leisure Centre along river bank and to incorporate disused gravel pits		Would prevent the creation of Country Park. Water based sports could not be developed	As modified blue	Area of possible Park would be much reduced and overshadowed by road on high embankment	No effect	County Structure Plan approved 1975, local plan approved 1977. Creation of Leisure Centre has potential for grant aid
To maintain and improve National Canal Network	British Water-ways Board	Use of dis-used gravel pits as regulatory reservoirs		Less potential capacity for use as balancing reservoir	As modified blue	Substantially less potential capacity for use as balancing reservoir	No effect	
To protect the habitat of rare plants	Dartshire Botanical Society	Habitat of <i>Cypripedium leitchum</i> (orchid)		Destroys habitat	No effect	No effect	No effect	Only 4 known habitats in England

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 5: Transport, development and economic policies

(Views expressed are those of the relevant authority unless otherwise stated)

<i>Policy</i>	<i>Authority</i>	<i>Interest</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Transport To improve trunk roads to ports	Department of Transport	Ease of access from manufacturing centre to the port		Big improvement	Big improvement	Some improvement	Increasing delays expected	White Paper on Road Policy
To relieve local traffic problems in Barchester	Dartshire CC	Convenience of local traffic		Most effective removal of through traffic will give scope for local traffic management measures	As modified blue	Slightly less effective. Off peak traffic may continue to use existing route	No benefit	Dartshire CC is Highway Authority
To concen- trate heavy goods vehicles on suitable roads	Department of Transport	Transfer of HGV's to new route from existing route	Amount of transfer	40-60 per cent	35-55 per cent	20-30 per cent; junction layout and location discourages transfer	No effect	
To improve safety and to upgrade the London to Camelot line	British Rail	Removal of Heton level crossing		Removes crossing	Crossing remains	As modified green	As modified green	Removal of crossing would obviate the need for local authority small scheme improvement at Heton scheduled for 1985; cost £300,000 at 1976 prices

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 5(Cont): Transport, development and economic policies

<i>Policy</i>	<i>Authority</i>	<i>Interest</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
To maintain river Avon navigation	British Waterways Board	Temporary effect of bridge construction on navigation		1 bridge. Slight reduction of head room for short periods	2 bridges, slight reduction of head room for short periods will occur at both bridge construction sites	As modified blue	None	Licence under Navigation and Waterways Act required
To maintain viable rural bus transport system in South Dartshire	Dartshire CC Bus Operators	Effect on service reliability		Improvement	Improvement	Improvement	Existing traffic delays will increase	
Development and Economic To develop Barchester as Regional Shopping Centre	Dartshire CC Barchester DC	Improve accessibility to, and the amenities of shopping centres		Improves access and provides for pedestrianisation in area, but will dis-benefit shops in Warren Street accelerating the decline of this twilight area	As modified blue	Improves access and provides for pedestrianisation of area, effect on Warren Street shops less severe	Current traffic congestion and delivery difficulties will increase	County Structure Plan approved 1976. Local plan.

TABLE II.1 (Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 5(Cont): Transport, development and economic policies

<i>Policy</i>	<i>Authority</i>	<i>Interest</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
To limit growth in south of County and encourage new employment and housing in villages of Scapton, Haydon and Wettering	Dartshire CC	Effect on rural northern sector of Dartshire		Improves access to Scapton, Haydon and Wettering as well as north of County	No effect	Improves access to Scapton, Haydon and Wettering as well as north of County	No effect	County Structure Plan approved 1976
To safeguard identified commercially workable gravel resources in the River Avon Valley	DOE	Gravel beds underlying river flood plan to west of Barchester		Nil	3.2 hectares affected	2.8 hectares affected	Nil	County Structure Plan approved 1976. Time would permit the extraction of the gravel prior to construction
To encourage all existing non conforming industry to relocate and all new industry to locate on the Barchester Industrial Estate	Proposed by Barchester DC Opposed by Dartshire CC	Effect on access to Industrial Estate		Improves access	Improves access	No effect	No effect	Both the District and County Councils favour concentration of new and non conforming industry on Industrial Estates, but Dartshire would prefer growth at Blaydon City rather than Barchester. Non conforming industry is not compatible with the general land use in the area.

TABLE II.1(Cont)—APPRAISAL FRAMEWORK RECOMMENDED BY THE STANDING COMMITTEE ON TRUNK ROAD
ASSESSMENT: CASE OF BARCHESTER BY-PASS

Group 6: Finance implications

<i>Sub-Group</i>	<i>Interest</i>	<i>Units</i>	<i>Modified Blue</i>	<i>Modified Green</i>	<i>District Council Route</i>	<i>Do Minimum</i>	<i>Comments</i>
Department of Transport	Construction Costs	£m (PVC)	4.7	4.6	5.8	0.7	Costs are discounted from years of expected expenditure to 1976 at 1976 prices (PVC = present value of costs, PVB = present value of benefits, NPV = net present value)
	Land costs	£m (PVC)	1.9	2.1	2.0	0.4	
	Compensation costs	£m (PVC)	0.3	0.3	0.4	0.08	
	Maintenance costs	£m (PVC)	0.03	0.025	0.025	0.01	
	Total cost	£m (PVC)	6.93	7.03	8.23	1.19	
Total quantified monetary benefits		£m (PVC)	6.60	5.60	5.64	0	Includes savings in time, vehicle operat- ing costs and accidents. Taken from Group 1
Net present value compared with 'do minimum'		£m (NPV)	+0.86	-0.24	-1.40	0	

Note: At present it is not possible for the COBA Computer program to produce data on time savings and vehicle operating cost savings in this level of disaggregation. It may, however, become possible to do so in the future.

Source: Standing Advisory Committee on Trunk Road Assessment (SACTRA 1980).

APPENDIX III—LIST OF ENVIRONMENTAL IMPACT STATEMENTS

TABLE III.1—LIST OF TRANSPORT PROPOSALS ON WHICH ENVIRONMENTAL IMPACT STATEMENTS HAVE BEEN PREPARED UNDER THE COMMONWEALTH ENVIRONMENT PROTECTION (IMPACT OF PROPOSALS) ACT 1974-1975

<i>Proposal</i>	<i>Date Directed</i>	<i>Progress</i>
ANL Container Terminal Botany Bay, NSW	30 Sep 75	Final EIS received 6.4.76
South Eastern Freeway Brisbane, Qld	8 Oct 75	Final EIS received 6.6.77
West Cape Light Tower, SA	19 Jan 77	Final EIS received 5.11.79
Construction of Stuart Highway on a new alignment from Port Augusta, SA to NT border	7 Mar 77	Final EIS received 27.4.78
Elements of the Western Parkway and Arterial Road System, ACT (Glenloch Interchange)	26 Jul 77	Final EIS received 14.12.77
Second Hobart Bridge across the Derwent River at Dowsing's Point, Tas	26 Sep 77	Final EIS received 5.10.78
Extension of Arnhem Highway, NT (Pancontinental Mining Ltd)	15 Feb 78	Final EIS received 17.8.78
Redevelopment of Brisbane International Airport, Qld	18 Dec 78	Final EIS received 19.3.79
Perth Airport Master Plan, WA	9 Mar 82	Final EIS received 28.1.83
Adelaide Airport Master Plan, SA	29 Apr 82	Draft EIS Gazetted for 3.5.83
Alice Springs-Darwin Railway, NT	5 Aug 82	Draft EIS Gazetted for public review 8.2.83
Development of Antarctic Transport Sydney, AAT (Dept of Science and Technology)	5 May 83	
Introduction of B737-200 passenger service and B727-100 freight service to Norfolk Island	25 Sep 83	na
Newman-White Springs Section Perth-Darwin National Highway	1 Nov 83	na

na not available

Note: EIS's were also directed on a number of road proposals in 1975 and 1977, but later the directions were revoked.

Source: Department of Home Affairs and Environment, written communication.

APPENDIX IV—MANDATORY REQUIREMENTS FOR PROJECT EVALUATION

The Australian Bicentennial Road Development Trust Fund Act 1982 includes some broad requirements for project evaluations conducted for different classes of roads. These are contained in the Notes on Administration accompanying the Act which specify that in applying for funds under the Act for particular classes of roads or for urban public transport projects, States should provide the following information.

National Highway

Planning reports should be provided for projects which will incur or are likely to incur an expenditure of one million dollars or more in any one year of the project duration, or have a total estimated expenditure in excess of two million dollars; projects which are contentious or potentially so at Commonwealth, State or local government level; and projects having major social, environmental, regional or economic impact.

These planning reports are to cover

objectives of the project and its expected benefits in terms of providing safer, more reliable and efficient carriage of road traffic. These expected benefits are to be quantified where practicable.

Development Roads

an economic evaluation showing the benefits and costs of the proposal and the importance of those benefits from a national viewpoint.

Arterial Roads

objectives of the project and its expected benefits in terms of providing safer, more reliable and efficient carriage of road traffic. These expected benefits should be quantified where practicable.

Urban Public Transport

objectives of the project and its expected benefits, including its effect on reducing traffic and/or wear and tear on urban arterial roads;

an evaluation of the economic and social benefits and costs of the proposed project.

Local roads

objectives of the project and its expected benefits in terms of providing safer, more reliable and efficient carriage of road traffic. These expected benefits should be quantified where practicable.

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